

**IMPACT OF EMIR AND BASEL III ON NON-
FINANCIAL-CORPORATES' HEDGING ACTIVITIES
AND THEIR RESPONSE**

HENOK KIFLE

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Abstract

This dissertation aims to explore and evaluate the impact of regulatory initiatives on corporate hedging activities of the non-financial-corporates (NFCs) and corresponding corporate response for risk and return considerations. Corporate hedging and corporate risk management have been extensively studied in finance literature. However, the previous research and theories focused on the rationale to hedge and the optimal hedging mechanisms and failed to consider regulation as an influencing factor. Subsequently, the existing research and theories do not provide a theoretical framework to analyse the impact of regulation on corporate hedging activities (CHA). This study, as such caters to this lacuna and explores the willingness and ability to conduct corporate hedging, as well as formulating an organisational response to manage the impact of regulation. Despite this gap, the literature review allowed a pre-conceptualisation of a model to analyse the impact of regulation on CHA. Subsequently, the study also yielded an initial conceptual framework based on ideas from literature relevant to corporate hedging and organisational response to regulation. The initial model and conceptual framework brought more focus into the research phase and allowed the usage of deductive qualitative analysis (DQA) procedures (Gilgun, 2010). Based on qualitative data from 12 German NFCs, a model (i.e., the impact-analysis-model, IAM) has been developed to systematically analyse the impact of internal and external actions/actors on CHA. This model addressed the first research question (RQ1), namely how EMIR and Basel III impact CHA of German NFCs. The RQ1 findings show that EMIR impacted NFCs mainly through increased costs, higher requirements for systems and processes, and an increased knowhow requisite. Basel III impacted the NFCs by leading to higher costs and less offers for complex and long-dated derivatives. Overall, the impact is regarded as moderate, which failed to affect any changes in the

CHA. Furthermore, in the current study, the responses of the NFCs have been investigated and conceptualised based on the organisation response set of Cook et al (1983). The findings here show that NFCs mainly referred to managerial level responses with the impact on their activities categorised as moderate. Finally, the study proposes an integrated conceptual framework. This study offers significant relevance towards risk management and treasury practitioners as well as theorists, regulators, and other policy makers.

Keywords: Corporate Hedging, EMIR, Basel III, Derivatives Regulation, Regulatory Impact,

IMPACT OF EMIR AND BASEL 3 ON CHA AND THE RESPONSE

Author's Declaration

I declare that the work in this thesis has been carried out in accordance with the regulations of the University of Gloucestershire and is original except where indicated by specific reference in the text. No part of the thesis has been submitted as part of any other academic award. The thesis has not been presented to any other education institution in the United Kingdom or overseas.

Any views expressed in the thesis are those of the author and in no way represent those of the University.

Signed:

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1. INTRODUCTION

1.1. Chapter introduction

This chapter introduces the research topic, provides the study aim and explains the structure of the thesis. Initiating a brief overview and explanation of the research subject, namely the impact of regulation on corporate hedging of non-financial corporates (NFCs), the chapter explicates on the statement of the research questions and the explanation of the research objectives. Finally, the chapter closes with a brief explanation of the thesis structure.

1.2. Research subject

The regulation of financial derivatives were intensified by the financial market regulators, following the financial crisis of 2007/2008 (Ingves, 2013). The main measures included (i) the implementation of European Markets Infrastructure Regulation (EMIR) to increase transparency of the over-the-counter (OTC) derivatives market; and (ii) Basel III - the reform of the Basel Accord on bank capital adequacy, stress testing, and market liquidity. Given that NFCs are also the significant users of OTC derivatives (Bartram, 2017; Bartram, Brown, & Fehle, 2009a), NFCs cited much concern about the impact of both the (above-mentioned) regulations on their hedging activities, which significantly rely on OTC derivatives. EMIR impacts the cost and effectiveness of hedging activities and requirements on systems given the various reporting and monitoring requirements. Correspondingly, NFCs started seeing trends of higher costs for hedging and a decrease of availability of required derivatives due to Basel III.

For example, in February 2012, the Verband Deutscher Treasurer (i.e., the Association of German Treasurers, VDT) and Deutsches Aktieninstitut (i.e., the German Shares Institute, DAI) surveyed 364 non-financial companies amongst their members with 205 respondents. Amongst the population surveyed, 86.3% stated that banks clearly or at least by trend, attempt to establish higher prices for hedging transactions via derivatives. Also, 44.3% of participants mentioned that banks are urging towards the cash collateralization of OTC derivatives. The NFCs mentioned observing trends in decrease of the availability of financial derivatives products with increased application by banks of a more selective deployment of their scarce equity capital. In addition,

26.9% of respondents mentioned that the number of banks that are willing to provide hedging instruments has declined and 30% stated that it is more difficult to obtain the appropriate hedging instruments for their transactions. The availability of longer-term hedging instruments also showed a significant decline according to 56.3% of respondents.

Furthermore, key findings of an online survey of European corporate treasury professionals conducted in January 2012 by EuroFinance stated that: (i) 57% of corporates in Western Europe expect that the implementation of Basel III regulations will negatively impact their company's performance, and (ii) 61% of European corporate treasurers opined that banking regulators do not understand the impact of their regulations on corporate and trade finance.

Nevertheless, despite the possible repercussions and evident trends, at that time, NFCs failed to devise a full and systematic overview of the impact of the regulatory actions on their corporate hedging activities. Corporate hedging activity (CHA) is defined in this study, as the willingness and ability of NFCs to conduct hedging using financial derivative products. Despite being a widely studied subject, such overview has also not been brought forward by theoretical literature on corporate hedging. This study aims to suggest an analogous overview through an impact-analysis-model that helps to analyse the impact of regulation on corporate hedging activities and a framework that integrates such model and possible corporate responses toward managing the impact of regulation. The research is geographically focussed on non-financial corporates headquartered in Germany, and the European regulatory initiatives; and the subject is of interest for practitioners, theorists, regulators. and other policy makers as well as the general public.

1.3. Research Questions and Objectives

The main aim of this research is to explore and evaluate the impact of regulatory initiatives on corporate hedging activities of the NFCs and their response in the context of risk and return considerations. In terms of regulatory initiatives, the research focusses on EMIR and Basel III, as these two regulations have been identified by NFCs to underpin the main concerns with regards to interest rate and foreign exchange hedging.

In terms of CHA, this study is looking on the willingness and ability of NFCs towards corporate hedging. To achieve the research aim, the study explores two research questions that correspond to four research objectives, as Table 1 shows.

Table 1: Research Questions and Objectives

Research Questions	Research Objectives
1. How do EMIR and Basel III regulations impact CHA of NFCs in Germany in the context of risk and return considerations?	<ul style="list-style-type: none"> a) Create a model to help analyse the impact of regulatory initiatives on CHA. b) Analyse and evaluate the impact of EMIR and Basel III on CHA in context of risk and return considerations.
2. How do NFCs response in terms of alignment of internal processes and strategy to manage the regulatory impact?	<ul style="list-style-type: none"> c) Analyse and evaluate NFCs response in the context of risk and return considerations. d) Conceptualise NFCs' responses to regulation and suggest a conceptual framework that integrates the study findings.

To answer the first research question, this study focuses on creation of an impact-analysis-model to analyse the regulatory initiatives' impact on CHA. The impact-analysis-model consists of the elements that determine NFCs' willingness and ability to conduct corporate hedging. The review of external or internal actions' impact on these determinants can lead to its systematic analysis. Based on that impact-analysis-model, the first research question, namely the impact of EMIR and Basel III, is analysed and evaluated in the context of risk and return considerations. Correspondingly, this study investigates the impact of both the regulatory actions on the key determinants.

The second research question deals with the response of NFCs, in terms of alignment of strategy and processes or any other alignments that the NFCs have incorporated due to the implementation of EMIR and the change due to the transition from Basel II to Basel III. Correspondingly, the third and fourth objectives of this study entail the analysis and evaluation of the response of NFCs and the conceptualisation of that response. In order to conceptualise that response, this study integrates concepts from strategic management research (organisational response to regulation) and aims to suggest a final conceptual framework that integrates the findings of RQ1 and RQ2.

This research is geographically focussed on NFCs headquartered in Germany and the European regulatory initiatives and the subject is of interest for practitioners, theorists, regulators, and other policy makers.

1.4. Structure of the thesis

The thesis is divided into five chapters, as Table 2 shows:

Chapter 1 sets the tone by providing an overview of the research subject, the research questions, and setting the objectives of this research study.

Chapter 2 provides an overview of the relevant literature for this study. The chapter is divided in three sections: It starts with background information on the research topic, i.e., the financial derivatives used by non-financial corporates to hedge interest rate (IR) and foreign exchange (FX) risks, and the newly introduced and reformed regulation of the OTC derivatives market. Subsequently this chapter discusses the literature on corporate hedging, inclusive of the definition of corporate hedging, the explanation of theories of rationales for corporates to hedge, and the optimal hedging strategy within contextual space. The aim of this section is to pre-conceptualise a model that helps to systematically analyse the regulation impact on the willingness and ability to do corporate hedging with derivatives, and thus helps to answer the first research question. In the third section, this chapter conducts a review of literature on organisational response to regulation, with the aim to find suggestions to conceptualise the responses of the NFCs to the regulatory actions, which relates to the second research question. The chapter subsequently closes with presentation of an initial conceptual framework and detailed research questions that guide the empirical phase.

Chapter 3 explains the methodology and the methods applied in the empirical research phase. After explanation of the philosophical stance underpinning this study, the overall methodological approach, including the research approach and the research design is presented. In line with the philosophical stance of a critical realist and the use of DQA, this study uses qualitative data mainly from semi-structured interviews and archival records to answer the research questions. In addition, the aspects of research design ethics and ways to ensure research design quality are described including statements on subjectivity and trustworthiness.

Chapter 4 presents the results of this study, thereby forming the core of this dissertation. The results are presented alongside the research questions and research objectives and include the answers to the detailed research questions resulting from the literature review. Following the introduction to the interviewed NFCs, the detailed descriptions of the interview findings are presented in addition to the results from the participant checks and the search for contradicting findings.

Finally, Chapter 5 reflects on the research findings, results, and theoretical as well as practical implications. Consistent with common standards, the discussion of the results is followed by the presentation of the limitations of the study and recommendations for future research.

Table 2: Structure of the thesis

1. Introduction	<ul style="list-style-type: none"> - Research subject - Research questions and objectives - Structure of the thesis
2. Literature Review	<ul style="list-style-type: none"> - Background knowledge literature - Corporate hedging literature - Literature on organisational response to regulation
3. Methodology	<ul style="list-style-type: none"> - Research philosophy - Approach to research - Research design - Techniques and procedures - Research ethics, subjectivity, and trustworthiness
4. Results	<ul style="list-style-type: none"> - Introduction to the interviewed NFCs - Interview findings - Participant checks - Contradictory findings
5. Discussion / contribution to knowledge	<ul style="list-style-type: none"> - Discussion of findings - Contribution to theory - Contribution to practice - Research limitations - Recommendation for future research

2. LITERATURE REVIEW

The purpose of this chapter is three-fold. The first section provides necessary background knowledge for this study through reviewing the respective literature on background knowledge. It provides an overview of the market for financial derivatives (henceforth derivatives), explains their usage by NFCs to hedge exposure to certain financial risks that arise within their business activities, and gives an overview of the recently implemented and reformed regulation of the OTC derivatives market.

The second section reviews corporate hedging literature with the conclusion that the existing research and theories focus on the rationale for corporates to hedge and the optimal way of hedging and fail to consider regulation as an influencing factor of hedging activities. Given this gap, the main purpose of the second section is to pre-conceptualise a model based on the theories of why corporates hedge and how they hedge. The model framework is designed with the purpose to analyse the impact of regulation on corporate hedging activities. As such, relevant literature on corporate hedging, which is to find in the financial risk management field is reviewed with the aim to identify and define the key concepts for the initial model.

The third section is concerned with concepts of organisational response to regulation. For which, the review is widened into strategic management literature, containing most of the literature on organisational response to regulation. The review yielded into the identification of a concept, namely the organisational response set of Cook, Shortell, Conrad, and Morrissey (1983), which the author deemed instrumental in organizing and categorizing the responses of corporates to regulation. This should help to categorize the reply of the interviewed NFCs. The conclusion section integrates the second and third sections to create an integrated initial conceptual framework. Furthermore, the literature review led to detailed research questions, thereby attributing focus to the empirical phase.

2.1. Derivatives and the regulatory measures

The dissertation focuses on the two most significant financial risks to NFCs, namely FX risk and IR risk (Bodnar, Giambona, Graham, & Harvey, 2014) and the hedging of those risks through OTC derivatives. This section defines derivatives, gives

an overview of the size of the derivatives market; and explains the different types of derivatives used by NFCs. Also, an overview of the newly implemented and reformed regulation of the market for OTC derivatives including practitioner comments on the expected impact of those regulations on their hedging activities is provided.

The section ends with a summary of the main points and highlights the practitioners' need for a framework to analyse and evaluate the impact of actions (such as changes to the regulation of OTC derivatives) on the hedging activities and strategies.

2.1.1. Financial risk management in context with other firm activities

As an ingredient of the risk management systems of corporations, corporate hedging comprises the strategy applied by corporations with the aim to limit or offset certain risks that may challenge the company, primarily attributed to fluctuations of commodities prices, currencies or interest rates (Hillier, Grinblatt, & Titman, 2011). As such, the corporate level view raises to fore the question of the relationship of financial risk management with other firm activities. Review shows that risk management literature differentiates between traditional risk management (TRM) and enterprise risk management (ERM) (Razali & Tahir, 2011). TRM applies a silo approach to risk management, meaning that each risk class is managed in a separate silo, and this approach has been criticized as creating inefficiencies due to the lack of coordination between the various risk management departments (Hoyt & Liebenberg, 2015). ERM in contrast applies a holistic approach through achieving a systematic integration of all types of risks that need to be managed across the entire organization, which, in turn results in a better understanding of the inherent risks in different activities and avoids the duplication of risk management expenditure by exploiting natural hedges (Hoyt & Liebenberg, 2015; Razali & Tahir, 2011). Thus, ERM is part of corporate strategy and the senior management, thus often assumes the responsibility for defining the ERM objectives, entailing the risk appetite, in context of account opportunities, in an integrated corporate strategy formulation (CAS, 2004; COSO, 2009).

Several ERM frameworks provide guidance on identifying, analysing, managing, and monitoring risks and opportunities, under the consideration of the environment. The most often cited are the framework of the Casualty Actuarial Society

(CAS), the framework of the Committee of Sponsoring Organizations of the Treadway Commission (COSO), and the Risk Maturity Model of the Risk and Insurance Management Society (RIMS). For example and as Table 3 shows, the CAS framework conceptualised the ERM along four clusters of operational risk, financial risk, hazard risk, and strategic risk.

Table 3: Overview of Enterprise Risk Management

Operational Risk <ul style="list-style-type: none"> ➤ Business operations (e.g. human resources, product development) ➤ Empowerment (e.g. leadership, change readiness) ➤ Information technology (e.g. relevance, availability) ➤ Information/business reporting (e.g. budgeting, accounting, taxation) 	Financial Risk <ul style="list-style-type: none"> ➤ Price (e.g. asset value, interest rate, foreign exchange, commodity) ➤ Liquidity (e.g. cash flow, call risk, opportunity cost) ➤ Credit (e.g. default, downgrade) ➤ Inflation/purchasing power ➤ Hedging/basis risk
Strategic Risk <ul style="list-style-type: none"> ➤ Competition ➤ Customer needs/Industry changes ➤ Regulatory /political and demographic/social trends ➤ Reputation / Image 	Hazard Risk <ul style="list-style-type: none"> ➤ Natural hazards ➤ Fire and other property damage ➤ Theft and other crime, personal injury ➤ Disease and disability (work related injuries and diseases)

Source: Adapted from (CAS, 2004) Overview of Enterprise Risk Management, Casualty Actuarial Society, p. 10

Financial risk comprises credit risk, market risk, liquidity risk or foreign exchange risk that can negatively impact the corporate value. As these risks are directly connected with the capital structure of the company, financial risk management is closely related to the area of corporate finance as well as with the corporate strategy - considering risk management strategy is part of the overall corporate strategy. With view to the topic of this dissertation, namely impact of regulation on corporate hedging, it is interesting that the corporate hedging part is covered in the above-mentioned framework in the Financial Risk cluster while the regulatory response part is covered in the Strategic Risk cluster.

Overall, the following figure summarizes the authors understanding of the view on financial risk management and corporate hedging in context with other firm activities. Corporate hedging is an ingredient of the risk management systems of corporations and comprises the strategy applied by corporations with the aim to limit or offset certain financial risks challenging the company mainly due to fluctuations of

currencies, interest rates or commodities prices. As such, as depicted in Figure 1, it is closely related to corporate finance and corporate strategy (Ben-Amar, Boujenoui, & Zéghal, 2014; Berk et al., 2013; Hillier et al., 2011).

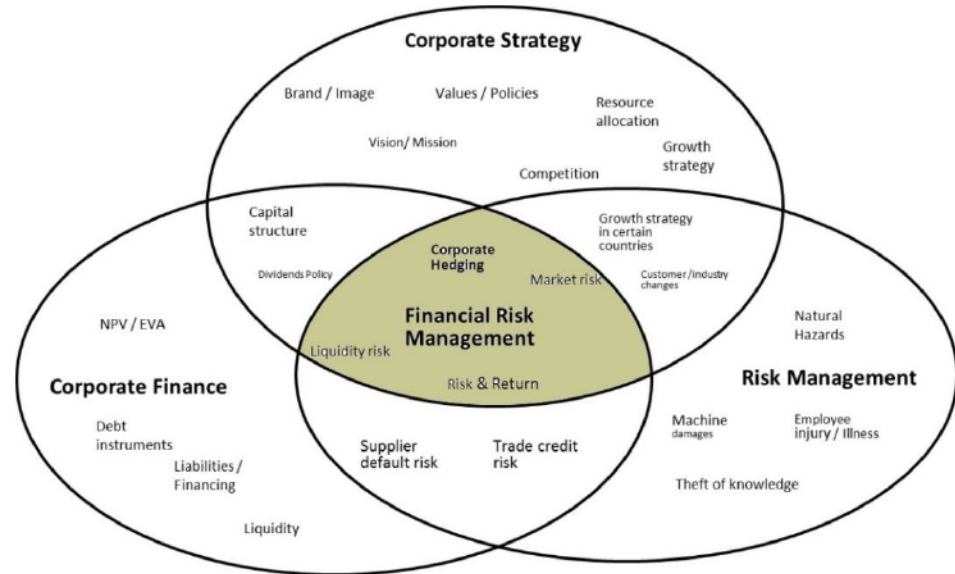


Figure 1: Financial Risk Management in context with other firm activities

A number of empirical studies (Bartram et al., 2009a; Chaudhry, Iqbal, Mehmood, & Mehmood, 2014; Haushalter, 2000; Kim & Chance, 2018; Mian, 1996; Rampini, Sufi, & Viswanathan, 2014) have indicated a positive co-relation between the benefit of a risk management program with the size of the company, thereby leading to a higher likelihood of the larger firms to hedge. One of the major contributing factors to which is the high costs associated with the implementation of a risk management programme. These costs, of which the major part is fixed, for example specialized personnel and information systems' costs, need to be set against the expected benefits of the risk management programme in order to analyse whether corporate risk management will create value on a net basis (Glaum, 2002). Given which, many firms (particularly smaller firms) may not hedge at all or hedge less than they should, despite their exposure to financial risks (Sprčić, Tekavčić, & Šević, 2008).

2.1.2. Risks hedged by Non-Financial Corporates

The literature provides several definitions of risk based on the purpose; some associate it with losses and some differentiate it or set it equal to uncertainty. For the purpose of this study, risk is defined as the actual uncertainty, which impairs the ability to predict and to ensure, under normal business operations, anything that impact the

certainty or stability of the financials, profitability, and financial performance (Rajendra, 2013). The literature abundantly evidences that risks resulting from foreign currency fluctuations, interest rate changes, and commodity price movement are most significant for NFCs. For example, Bartram et al. (2009a) in their study sample of 7319 non-financial firms across 50 countries (which, as per the author's knowledge constitutes the most comprehensive sample) found that in terms of derivatives use, most significant is the use of foreign exchange derivatives (45.2%) to hedge risk stemming from adverse movements of foreign currency, followed by interest rate derivatives (33.1%) to hedge against adverse interest rate changes. A distant third is the usage of commodity price derivatives (10.0%) to hedge against disadvantageous commodity price movements.

Such risks, typically hedged by the NFCs can be differentiated amongst the categories of cash flow risk, fair value risk, and net investment risk. Cash flow risk is the risk that any changes in an underlying variable, such as foreign exchange rate or interest rate, negatively impact the future cash flows paid or received by the company. Cash flow risk arises for example when a company has foreign currency revenues and expenditures. Fair value risk is the risk of changes in an underlying variable affecting the fair value of an asset or liability on the company's balance sheet, such as foreign currency receivables and payables. Net investment risk is the risk of changes in the foreign exchange rate affecting the value of a foreign net investment translated into the company's reporting currency.

2.1.2.1. Foreign Exchange Risk

Economic activity is the source of wealth as well as various types of risks. Correspondingly, the expansion of economic activity leads to a greater source of wealth but also to various types of risks. The main risk that corporations face when expanding economic activities beyond their domestic borders is the FX risk. FX risk is the negative impact of an unanticipated exchange rate change on the value of a firm. Exchange rate fluctuations have an impact on firms' cash flows, accounting profits as well as market and book values (Hillier et al., 2011) and thus, the multinational companies do pay a particular attention to managing their currency risk. For NFCs, there are generally three categories of exposure to FX risk, namely risk stemming from transactions exposure, translation exposure, and economic exposure.

Risk from transaction exposure, also called commitment risk, is associated with the exposure to currency fluctuation when there is a time lag between the commitment and settlement of a transaction denominated in foreign currency, while risk from translation exposure is purely associated with the risk that arises when converting financial statements denominated in foreign currencies into the home currency. The concept of economic exposure is based on the impact of exchange rate changes on a firm's future cash flows (Horchner, 2011). It includes transaction and operating exposure, as future cash flows consist of cash flows from contractual commitment (Fleming, Jackson, Li, Sarkar, & Zobel, 2012) and expected future transactions (operating) (Bodnar et al., 2014). After identifying and measuring the type and the magnitude of currency risk challenging the company, it is time for the company's management to decide, if eliminating or selectively hedging that exposure is in the interest of the firm and how this should be done. When it comes to measuring, notably, only transaction exposure can be precisely measured, while translation and economic exposure rely on estimations and as such are difficult to measure. Table 4 summarizes the three categories of FX risk exposure, that NFCs are exposed to.

Table 4: Categories of Currency Risk

	Transaction risk	Translation risk	Economic risk
Description	Related to individual transactions denominated in foreign currencies, imports, exports, foreign assets, and loans.	Related to the translation of balance sheets and income statements in foreign currencies to the currency of the parent company for financial reporting purposes.	Related to losing competitive advantage due to exchange rate movements.
Examples	A German company imports parts from Japan; the German company is exposed to the risk of the yen appreciating and the Euro price of parts increase.	A German company has a US subsidiary; the German company is exposed to the risk of the euro weakening, and the value of the subsidiary's assets, liabilities and profits decreasing in euro terms in consolidated financial statements.	A German and a Japanese company are competing in the UK; if the yen depreciates against pound sterling and the euro/pound exchange rate remains stable, the Japanese company can lower its prices in the UK, thus obtaining a competitive advantage over the German company.

Source: Hillier et al. (2011), Financial Markets and Corporate Strategy. Berkshire: McGraw-Hill Education.

2.1.2.2. Interest Rate Risk

Non-financial corporates face interest rate risk from two sources: The interest rate sensitivity of their assets and the interest rate sensitivity of their liabilities (Chernenko & Faulkender, 2012). Therefore, matching the interest rate sensitivity of firm's cash flows and the final exposure from the debt instruments is an important goal of risk management departments. In addition, interest rate movement is closely related to business cycle changes and influence – through the cost of capital – the investment behaviour and indirectly the competitive position of firms (Bartram, 2017). As a result, most NFCs are motivated to manage interest rate risk via hedging attributed to their debt choices of capital structure.

When deciding on the company's debt structure, corporate treasurers must for example choose whether to borrow short or long term, at a fixed or floating rate, and because all these decisions affect the firm's liability stream, it emerges as the stream of interest cost that the firm will be paying in the future (Hillier et al., 2011). The company's liability stream can be decomposed into two components: One that reflects default free interest rate (such as a Treasury Bond Rate) and one that reflects the firm's credit rating. Correspondingly, Hillier et al. (2011) showed that a firms' floating rate borrowings and roll over of short-term instruments also present risks. In contrast, when a firm borrows at a fixed rate, both components are fixed, thus the exposure constitutes the risk of being locked in too high interest rate levels when interest rates fall. The changing interest rates will change the market value of outstanding fixed-rate debt. Furthermore, significant risk on the liability side of a firm's balance sheet stems from pension provisions with their value increasing with the fall in interest rates. Those positions on the liability side of corporates' balance sheet have been observed to be traditionally high in some jurisdictions, such as Germany.

Considering the asset side, interest rate changes directly impact a firms' financial assets and change their market value with the specific characteristics of the assets (maturity, tenor, duration, etc.), thereby determining the type and size of the impact (Bartram, 2002). In addition, interest rate movements impact the value of projects and real assets. However, the latter is difficult to identify and quantify, since their market values are not available at

regular intervals and their future cash flows are not contractually fixed (Bartram, 2002). Furthermore, the interest rates also impact the level of assets as the interest rate level is a major determinant of a firm's investment decision (Chernenko & Faulkender, 2012).

2.1.2.3. Commodity Price Risk

Commodities refer to goods such as metals, energy, and agricultural products, whose prices are exposed to volatility due to changes in supply and demand as well as speculation (Peterson, 2018). The changes in commodity prices – which are in general denominated in US Dollars, can have profound impact on the financial performance of corporations (Zsidisin, Hartley, Gaudenzi, & Kaufmann, 2016). Equally, any unfavourable movements from a corporate's perspective can have a detrimental impact on equity value, through increased costs of goods sold and the lower inventory value (Zsidisin et al., 2016). Thus, in ways that are like the management of FX and interest rate risk, corporations aim to reduce commodity price risk exposures maximally possible through natural hedging and through the usage of commodity derivatives.

However, as mentioned above, this study will concentrate on FX-risk and IR-risk given the limitation on scope and time and correspondingly, excludes the hedging of commodity price risk.

2.1.3. Derivatives used by Non-Financial Corporates

The ways in which, non-financial corporates can approach occurring risks through the perspective of foreign currency or interest rate movements, can be summarized under four headings, namely (1) do nothing, (2) eliminate the risk, (3) protect the downside and retain any upside, and (4) contain risk within a range (CIMA, 2008).

When a company decides to reduce or eliminate the risk, the strategy applied is subject to the type of exposure to which the company is subjected; the company's policy; and its ability to implement natural hedging. Natural hedging is a way to reduce financial risk of a financial instrument by investing in a financial instrument whose performance is contrarious to the performance of the initial financial asset (Fauceglier, Shingal, & Wermelinger, 2014). Companies often combine natural hedging and the use of derivatives, such as, forwards, futures, options, or swaps.

2.1.3.1. Derivatives and the Derivatives Market

Derivatives are financial instruments whose value today or at some future date is derived entirely from the value of another asset (or group of assets), known as the underlying asset (Chance & Brooks, 2015). There are four main types of derivative contracts in the financial markets, i.e., forwards, futures, swaps, and options (Hull, 2015). These contracts can be classified as forward commitments and contingent claims, as Figure 2 shows. The former are contracts between two parties to engage in a transaction at a later date at a price established today (e.g. forwards, futures, and swaps), while the latter are derivatives which cause a payoff in case of a specific event (Chance & Brooks, 2015).

Further to the above-mentioned differentiation, derivatives can also be classified, based on the place where they are traded, i.e., in exchange traded derivatives and OTC derivatives. While exchange traded derivatives are traded on official exchanges and are standardised in terms of delivery and settlement, OTC derivatives, such as forwards, swaps and OTC options, are bilateral in nature, i.e. the contract terms are negotiable between the two parties. Thus, they are not standardised, hardly regulated, and tailored to the needs of the counterparties, which in fact emerges as the main advantage of those derivatives.

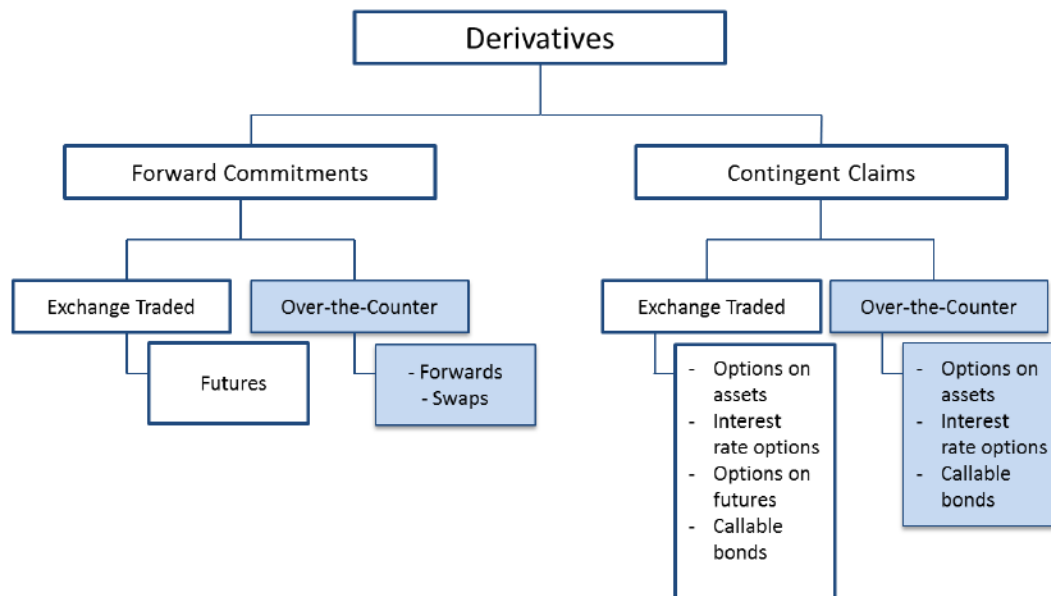


Figure 2: Overview of the Market for Derivatives

Source: Adapted from Financial Services Consulting (2018): *Financial Derivatives Overview*, from [www.finserv.lu/FS Knowledge Center/Derivatives/Derivatives Overview/Type of Derivatives.html](http://www.finserv.lu/FS_Knowledge_Center/Derivatives/Derivatives_Overview/Type_of_Derivatives.html)

The documentation of an OTC agreement is mostly based on standardised model contracts such as the master agreement of the International Swap and Derivative Association (ISDA) and the German master agreement (Deutscher Rahmenvertrag (DRV)) of the German Banking Association (Bundesverband Deutscher Banken), which are subsequently adjusted according to the negotiations of the two contract parties. While the ISDA master agreements are governed by English and New York law, the German master agreement is governed by German law (Hudson, 2017).

In terms of size and structure of the derivatives market, the regular surveys of the Bank for International Settlements (BIS) serve as the primary source, providing internationally consistent information. According to these statistics, the derivatives market, comprising of both the OTC and the exchange traded derivatives, is huge with an estimated notional outstanding amount of USD 690 trillion as per June 2018 (BIS, 2018). The notional amount is the estimated total amount underlying the outstanding transaction, and correspondingly, the contract value under this notional amount might be much lower. Although the statistics collected for the two markets are not completely comparable, the OTC market is much larger than the exchange traded market (Hull, 2015). According to the statistics of the BIS, from the above mentioned USD 690 trillion as of end-June 2018 around USD 595 trillion was attributable to OTC derivatives, while the notional amount of exchange traded derivative amounted to USD 95 trillion (BIS, 2018). Figure 3 presents the market size of OTC derivatives in comparison to exchange traded derivatives.

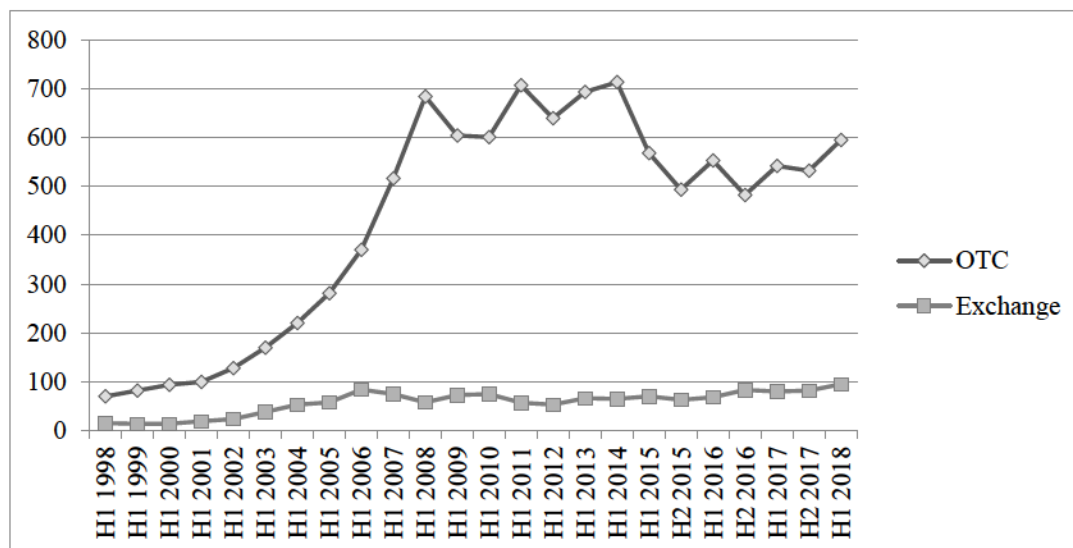


Figure 3: Market size OTC Derivatives vs Exchange Traded Derivatives

Source: BIS (2018) :BIS Statistics Explorer - Derivatives statistics, from <http://stats.bis.org/statx/toc/DER.html>

Within the OTC derivatives market, which constitutes the relevant market for this study, interest rate related contracts and foreign exchange related contracts are the majority of derivatives used, as evident through the below excerpt from the BIS' semi-annual surveys on global OTC derivatives show.¹ For example, of the USD 595 trillion outstanding notional amounts of OTC derivatives at end-June 2018, USD 481.1 trillion were related to interest rate contracts and USD 95.8 trillion were related to foreign exchange contracts (BIS, 2018). Further outstanding derivatives include: equity-linked contracts (USD 7.1 trillion), commodity contracts (USD 2.1 trillion), credit default swaps (USD 8.6 trillion). The gross market value of OTC derivatives, which refers to the cost of replacing all outstanding contracts at current market prices – stood at USD 10.3 trillion at end-June 2018. Table 5 presents a summary of the global IR and FX contracts.

¹ For a complete overview of the outstanding global OTC derivatives (outstanding notional amounts and gross market value) as of end June 2018 refer to appendix 1.

Table 5: Global IR and FX contracts (June- end 2018)

Type of Contract	Notional amounts outstanding in billions of USD	Gross market value in billions of USD
Foreign Exchange Contracts	95,798	2,620
Outright Forwards and FX Swaps	56,416	1,249
Currency Swaps	26,012	1,155
Currency Options	13,307	216
Interest Rate Contracts	481,085	6,644
Forward Rate Agreements	84,131	107
Swaps	349,761	5,914
Options	46,833	623

Source: BIS (2018), OTC derivatives at end-June 2018 Statistical release. Basel: Bank for International Settlements - Monetary and Economic Department.

The major part of the outstanding derivatives is held by financial institutions and reporting dealers. However, the importance and usage of financial derivatives for non-financial corporates has shown a significant increase, following the increase in globalization, interconnectedness, and complexity of markets in conjunction with the development of market for derivative financial products.

Main derivatives used by non-financial corporates are foreign exchange contracts and interest rate contracts. According to BIS (2018), in June-end 2018, the notional value of outstanding IR and FX derivatives held by non-financial firms amounted to USD 14.4 trillion and USD 11.8 trillion in comparison to only USD 6.1 trillion and \$3.3 trillion at the end of year 2000. With regards to German non-financial corporates, derivatives are one of the main tools when it comes to external hedging of risk. For example, a survey of the German Securities Institute DAI and of the Association of German Treasurers VDT shows, 78.6% of 364 corporates with yearly revenues of more than 100M Euros to use derivatives for risk controlling purposes (DAI & VDT, 2012). Findings showed a significant portion of the corporates surveyed to mainly use OTC derivatives (42% very often, 25% often, 8% rather seldom, 25% never) while the exchange traded derivatives are only used by small number of corporates (4.5% very often, 7.5% often, 16.9% rather seldom, 70.8% never).

However, the exponential increase of the OTC derivatives market, especially complex ones, and the fact that its development has decoupled from the real economy due to the increased usage of OTC derivatives for speculation purposes culminated in huge systemic risks emanating from that market. As the Basel Committee on Banking Supervision (henceforth BSCB), which is one of the main regulators of the banking sector, pointed out, new types of risks have been introduced by complex derivatives with high contagion effects and the lack of transparency in the mostly unregulated OTC market; and these, in turn, contributed significantly to the financial crisis that started in summer 2007 (BCBS, 2010b, 2011a). In consequence, G20 countries implemented a comprehensive reform of OTC derivatives markets to reduce systemic contagion risk and spill over risk including the reporting to trade repositories, central clearing of standardized derivatives, as well as higher capital requirements for not cleared OTC derivatives (Ingves, 2013). As derivatives play a pivotal role in corporates risk management strategies of non-financial corporates (Bartram et al., 2009a; DAI & VDT, 2012), any changes in the regulation of such derivatives is expected to impact NFCs' hedging activities and strategies.

2.1.3.2. Foreign Exchange Derivatives

Several strategies are used to hedge FX risk, amongst others, depending on type of exposure identified and measured as well as firm's policy and ability to accommodate natural hedging, which occurs when a company can match its cash inflows from a particular foreign currency to its cash outflows in that foreign currency (Goldberg & Drog, 2008; Kim & Chance, 2018). Companies often combine natural hedging and the use of derivatives.

Natural hedging strategies include among others, the following methods (Goldberg & Drog, 2008; Kelley, 2001):

- Transferring exposure to another company by denominating sales and purchase contracts in domestic currency,
- Minimizing exposure by matching sales and production in same country or by adjusting production level in certain countries, in case of probable unfavourable foreign currency movements,

- Managing exposure by matching cash flows by either borrowing or lending foreign currency,
- Reducing exposure by netting it out within the group as well as adjust timing of payment within group, i.e. accelerate payment or delay payment in response of expected currency movement (leading and lagging technique).

When natural hedging does not suffice to reduce FX risk exposure to an acceptable level, companies often turn to external hedging through the market for derivatives. Hedging through the derivatives market consists of the usage of derivative contracts, such as: Foreign currency forwards, foreign currency futures, foreign currency options or foreign currency swaps. As mentioned above, futures and some standard options are exchange traded, while the OTC market, which is relevant for this study, includes four types of transactions, namely outright forwards, foreign exchange swaps, currency swaps, and currency options.

a) Outright forwards

Outright forwards are transactions involving the exchange of two currencies at a rate agreed on the date of the contract for value or delivery (cash settlement) at some time in the future (BIS, 2019). The effect of using a foreign exchange forward contract is equivalent to the usage of a foreign exchange futures contract, with the only difference that the former is an OTC derivative and the latter exchange traded. The usage of forward contracts, which is usually conducted via a financial intermediary, has the advantage that it can be tailored to the needs of the company, and the disadvantage of limited liquidity as it is not standardised. Furthermore, the profit or loss of a forward contract is realized at maturity, whereas, the profit or loss due to changing futures prices is settled at end of the trading day by the brokerage house, called marking-to-market (Hull, 2015).

However, both methods allow the company to be able to offset the risk by taking the opposite position as it has on the spot rate. While foreign exchange forwards contracts on major currencies are readily available, the trading of less liquid or very volatile currencies is limited.

Forward and future contracts, irrespective of the underlying asset, involve the agreement of certain terms and conditions at one time and the settlement at a future date. Given their forward looking character, forwards and futures, indicate price expectations of market participants and the direction of the economy in the short run (Chow, McAleer, & Sequeira, 2000). Finance literature provides two standard theories of forward and futures pricing, namely, the cost-of-carry hypothesis (also known as the theory of storage), and the risk premium hypothesis (also known as unbiased expectations) (Baldeaux, Grasselli, Platen, & Finance, 2015; Chow et al., 2000; Szymanowska, Roon, Nijman, & Goorbergh, 2014).

The cost-of-carry theory is based on an arbitrage argument that the future prices must be equal to the spot price plus carrying costs, sans which the arbitrage profits become possible. Following that logic, the theory argues that the items leading to the difference between the spot and forward rates are: (1) Foregone interest due to the commodity storage, (2) warehousing costs, and (3) a convenience yield in holding inventory (Baldeaux et al., 2015; Chow et al., 2000; Szymanowska et al., 2014). The risk premium theory in contrast suggest that the principle of risk and return relationship, which is applicable in other financial markets may also apply to forward and future markets and regards a future price as comprising a forecast of a future spot price and an expected risk premium (Chow et al., 2000; Szymanowska et al., 2014).

b) Swaps

Swaps are instruments that allow two counterparties to exchange principal amount and sets of cash flow in one currency for another currency. Swaps involving foreign currencies are more complicated compared to the interest rates swaps as they include the exchange of stream of cash flow in different currencies. With view to the OTC market, two types of swaps can be differentiated, namely Foreign Exchange Swaps (FX swaps) and Currency Swaps.

- (i) FX swaps are transactions involving the actual exchange of two currencies (only the principal amount) on a prior specified date and at an agreed rate (the short leg), and a reverse exchange of the same two currencies at a later date at a rate

(generally different from the rate applied to the short leg) agreed at the time of the contract (the long leg) (BIS, 2019).

- (ii) Currency swaps are contracts that commit two parties to exchange principal and streams of interest payments in different currencies for an pre-agreed period of time and to re-exchange principal amounts in different currencies at a pre-agreed exchange rate at maturity (BIS, 2019).

The main motivation for firms to negotiate a swap transaction is the comparative advantage associated with borrowing in their domestic market and currency. Furthermore, the increased internationalisation of corporates leads to internationalisation of liquidity management, with imports and exports transacted in different currencies. Most large corporates centralise their liquidity management via an international cash pool, thereby, allowing them to shift the cash from one subsidiary to another through intercompany loans. However, this transaction, in some cases presents much difficulty due to regulatory restriction in the emerging markets such as in the BRIC states (Brazil, Russia, India, China).

In case of a foreign currency funding need for a foreign subsidiary, companies can either tap the foreign capital markets through the placement of, for example, a foreign currency bond or alternatively, approach their bank for a foreign currency credit facility. Albeit, both approaches are sometimes difficult. The former, for example, due to regulatory restrictions and underdeveloped capital markets and the latter, for example, due to banks' own limitations as regards the available funding and local presence. Corporates can overcome these problems through the transaction of an FX swap by buying the foreign currency spot and sell it forward or through conducting a currency swap, for example raising money at parent companies home market and converting it into foreign currency liability. With regards to the involved interest rate type on each currency, three different options of currency swaps, are available: namely (1) fix for fix, (2) fix for variable or (3) variable for variable. The most relevant type is the variable for variable swap, called cross-currency basis swap (CCS), as it reflects the interest rate differences between the two currencies and correspondingly, provides a test for the covered interest rate parity theory.

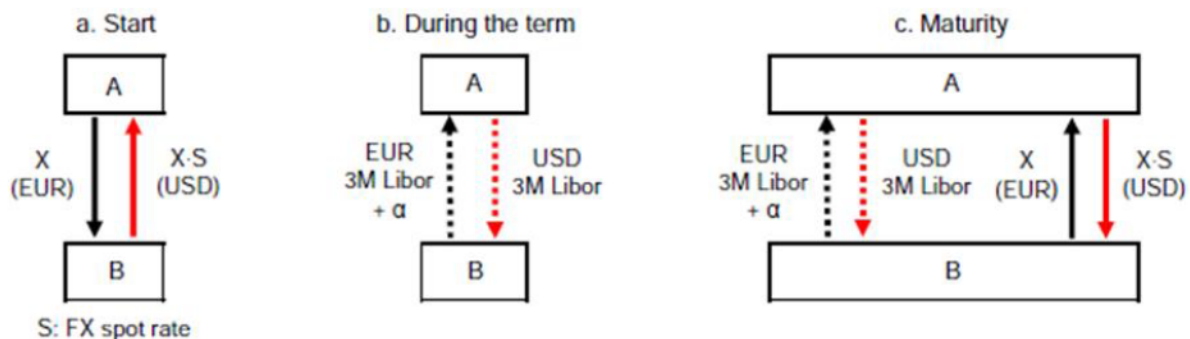


Figure 4: Cross currency basis swap

Source: Baba, Packer, and Nagano (2008), *The spill over of money market turbulence to FX swap and cross-currency swap markets*. BIS Quarterly Review, p. 82.

As mentioned above, currency swaps include the exchange of principal amount and a series of cash flows consisting of the interest rate payments and the re-exchange of the principal amount at the maturity date. Figure 4 shows the basis CCS. From a basic set-up, the currency swap can be viewed as a stream of FX swaps for each period (Amatatsu & Baba, 2007).

c) Currency options

Currency options give the owner or option buyer (in return for a fee often referred to as the option price or option premium) the right, but not the obligation, to buy or sell a currency with another currency at a specified exchange rate (called strike price) during a specified period (BIS, 2019). Using various available options, thus, a firm can mitigate the impact of potential adverse currency movements on their cash flows without forgoing the potential up-side from favourable currency movements (Chance & Brooks, 2012; Hull, 2015).

Options can be based on various assets. In financial options, the underlying asset is a financial asset (for example, stocks or bonds), a currency or an interest rate. Options can be traded on exchanges or on the OTC market, and it has been observed that with options traded on exchanges have a tenor of only up to one year and options traded OTC often go up to five years (Hull, 2015). There are different variations of options, amongst others that depend on the right it constitutes and the exercise time. Prominent examples are call options (constitute the right to buy), put options (constitute the right to sell), European style

options (exercise at maturity date) or American style options (exercise at any time before the maturity date) (Hull, 2015).

With view to the payoff structure, the OTC market offers various kinds of options, such as standard options, average rate options (hedge by averaging the spot rates over the life of the option), basket options (underlying is a basket of currencies) or contingent premium options (premium paid at exercise if contract is in the money). The notion of *moneyness* of an option refers to the relationship between the exercise price and the price of the underlying asset. The terms: in-the money, at-the-money, and out-of-money are used to describe respectively, the situations when the value of the option for the buyer or seller is positive, neutral or negative.

In contrast to forwards and futures showcasing zero value at the beginning, an option has a positive value at the inception, as the buyer must pay the options premium. Thus, at the beginning, the option has a positive value for the buyer and negative value for the seller. At expiration the call option is found to be worth either the positive value of the underlying price minus the exercise price or zero and similarly at expiration the put option is worth either the positive value of the exercise price minus the underlying price or zero (Chance & Brooks, 2012; Hull, 2015).

2.1.3.3. Interest Rate Derivatives

As presented above, interest rate risk management is not purely about managing the interest line in the profit and loss account but also includes the management of several balance sheet positions and the whole debt profile of the business, including the maturity of the debt, the currency of the debt and the fixed-floating mixture of the debt (Bartram, 2002; Dhanani, Fifield, Helliard, & Stevenson, 2008).

Interest rate risk management is more important for firms with high interest rate sensitivity on the asset or liability side, for example due to high leverage. The importance will increase when the company has financial covenants that directly connect interest payments to performance, such as interest cover covenants, setting interest expenses in

relation to operating earnings of the company. Furthermore, empirical evidence indicates that the management of interest risk increases with firm size, which may be since larger firms have more resources to manage these risks on a daily basis (Dhanani et al., 2008). However, in terms of derivative usage, empirical studies such as Faulkender (2005) or Covitz and Sharpe (2005) found no evidence that NFCs hedge the interest rate exposures from their operating assets. The analysis of Covitz and Sharpe (2005) suggested this indicates operating exposures are difficult to measure and firms use derivatives to hedge only those exposures that they can reliably measure.

As often mentioned in annual reports of firms, strategies aiming at the optimal management of interest rate risk are often guided by the interest rate risk policy approved by the Board of Directors and consider internal firm specific preferences and resources as well as external economic considerations, such as direction of interest rates, the magnitude of changes and inflationary tendencies. Within the given ranges, many larger firms manage IR risk actively, based on their operational business model and scenario and sensitivity analysis. Thus, this scenario fails to offer a general preferred concept but indicates rather an individual decision for every firm.

As with foreign exchange risk management, NFCs turn to variety of means to manage interest rate risk, but one of the most common is the use of the derivatives market – especially the use of interest rate swaps (Dhanani et al., 2008). Treasurers, who are the executors in corporations when it comes to the instruments used, prefer to use the OTC market compared to the futures or other exchange traded instruments, as exchange traded instruments are less flexible and onerous with the requirement to settle daily margin payments (Dhanani et al., 2008). The three types of interest rate transactions that are mostly used in the OTC derivatives market are forward rate agreements (FRA), interest rate swaps (IRS), and interest rate options (IRO) (BIS, 2018).

There are many types of interest rates quoted in the financial markets with the most important derivatives trades being the Treasury Rates and Money Market Rates, such as LIBOR, EURIBOR, and EONIA. The Treasury rates represent the interest rates of

government borrowings in own currency, while the LIBOR (London Interbank Offered Rate) is the interest rate charged by banks in the London interbank market for short term borrowings in five different currencies, and the EURIBOR (Euro Interbank Offered Rate) refers to the rate at which the euro interbank term deposits are offered by one prime bank to another in the European monetary Union. Differently than the EURIBOR and LIBOR, which represent the offered rates without any real revenues on these rates, the EONIA (Euro Overnight Index Average) is the euro overnight lending rate for banks in the European Monetary Union and is based on real revenue-weighted trades.

a) Forward rate agreements (FRA)

A FRA is an interest rate forward contract, which at the contract initiation determines the rate to pay or receive on a specific obligation for a set period of time which begins at some time in the future (BIS, 2019). The FRA is an OTC contract that gives the buyer the opportunity to lock in a pre-defined interest rate, namely the forward rate. Forward rates are interest rates for a future period of time based on today's zero rates, which is the rate applicable to an investment lasting for n - years when all the return is realized at the end (n -year zero rate) and calculated based on a method called bootstrapping (Hull, 2015). However, the calculation of forward rates in practice is a very challenging process, as not all necessary maturities are observable in the market and rates are interpolated based on available quotes (Bianchetti, 2009).

From NFCs perspective, regarding the liabilities side of a corporate's balance sheet, FRA protects the corporate when it takes a loan against rising interest rates. As such, it has a similar effect as the FX forward, which offers protection against unfavourable foreign exchange movements. With view to the asset side of the balance sheet, corporations can use FRA to protect interest rate sensitive assets from decreasing interest rates.

Figure 5 explains the methodology of FRAs. The FRA is predefined in T1 and settled at T2 with hedging period until T3. The market standard for FRAs includes cash settlement, thus the present value of the difference between the agreed FRA rate and the market rate for maturity T3, which has been fixed two days before T2, is exchanged at T2.

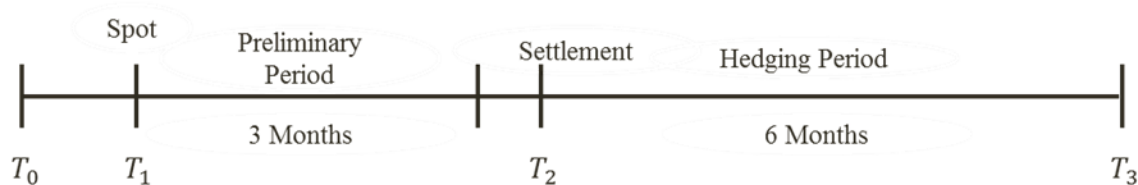


Figure 5: Methodology of FRAs

Source: Adapted from Teasdale (2012): Learning Curve, Forward Rate Agreements, from <http://www.yieldcurve.com/Mktresearch/LearningCurve/FRAs.pdf>

b) Interest rate swaps (IRS)

In an IRS, two parties exchange periodic payments related to interest rates on a principal amount in a single currency (BIS, 2019). This can be fixed for floating based on different indices. Besides securing an asset, an interest rate swap is a way to transform a liability based on the arguments that some counterparties have a comparative advantage when borrowing in a fixed rate or in a floating rate.

The IRS usually accompanies another transaction, such as a loan, however, herein, only the interest is exchanged and not the principal amount (notional amount). The most common type of interest rate swap is the plain vanilla swap, where one party is exchanging a floating rate of interest such the EURIBOR (European Interbank Offered Rate) for a fixed rate of interest, which is normally expressed as a spread over Treasury bonds of similar maturity (Fleming et al., 2012). In the European market, swaps are quoted as a fix annual coupon on the day-count-fraction 30/360 against a floating rate, which in most cases is the 6m EURIBOR, while the markets in the USA most often refer to the 3 months LIBOR and the UK markets to the 6 months LIBOR (Fleming et al., 2012).

In general, a bank or other financial intermediaries act as swap counterparty for the two exchanging parties (see structure below). The role of the bank is in the liaison of the demand and offer side, as usually two non-financial companies willing to arrange a swap do not get in touch directly. For example, a plain vanilla swap is structured in such a way that the bank earns about 3 or 4 basis points (0.03% or 0.04%) on a pair of offsetting transactions (Hull, 2015). This can be attributed to the fact that it is normally very unlikely that two companies with offsetting transactions will contact a bank at the same time, and

correspondingly, the bank acts as a market maker, meaning they enter into a swap agreement without having an offsetting swap with another counterparty (Hull, 2015). As Figure 6 shows, in a standard swap, the fixed paying counterparty is in a position of a payer swap while the floating paying counterparty is in a position of a receiver swap.

From the corporate hedging perspective, a swap can for example reduce interest rate risk, reduce the cost due to comparative advantage, and create a tailored design oriented towards interest rate payments. However, as with the other OTC derivatives, it includes the risk of lost opportunity, in case the interest rate movement would be in the favour of the corporate, as well as counterparty credit risk.

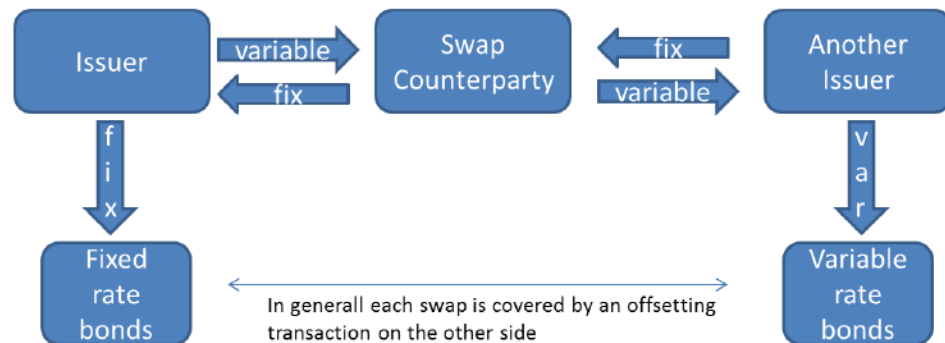


Figure 6: Structure of an Interest Rate Swap

Source: Adapted from Fieldman Rolapp & Associates (2006), An Overview of Interest Rate Swaps (pp 7), Fieldman, Rolapp Associate,s Irvine, California

c) Interest rate options (IROs)

IROs are contracts that give the right to pay or receive a specific interest rate on a predetermined principal for a specified period of time (BIS, 2018). As the underlying is an interest rate, the IRO does not have an exercise price but an exercise rate (or strike rate). IROs are both exchange-traded and OTC and the option is connected to the payment of an upfront fee for granting the owner the right but not the obligation to enforce it. As with currency options, market differentiates options with view to the exercise date (American options and European options) or with view to the right that they constitute (call options and put options). Common variants of options traded in the OTC market are caps, floors, collars, and swaptions with the first three being the most used instruments (BIS, 2019).

When buying a cap, the company can secure an upper interest rate limit for its debt but still benefit from lower rates as they come down, while with a floor the company can enjoy minimum interest rate during the life of the floor but would still benefit from higher rates as they increase (Hull, 2015). The derivatives market also offers a combination of an interest rate cap and interest rate floor, which is called an interest rate collar. It offers the firm, the opportunity to limit its floating interest rate payments over a specific period within a corridor of upper and lower levels (Hull, 2015). Finally, the swaption is the option on a swap. It is an instrument that provides the company (as buyer) with the right to enter an IRS.

2.1.4. Regulation of the market for OTC derivatives

Following the financial crisis, which began in summer 2007 in the US-housing sector and reached its peak with the insolvency of the investment bank Lehmann Brothers (Lehmann), the politicians and financial market regulators concurred that the regulation of the financial sector needs to be improved and it should not be the case again that states are forced to bail-out banks (G20, 2009). As the BCBS, which is one of the main regulators of the banking sector, pointed out, several lessons have been learnt from the financial crisis (BCBS, 2010b). These major lessons are:

- The existence of big banks, which was so far regarded as a necessity for big economies, can be a threat to entire economies when these banks are in difficulties.
- Complex derivatives, which should have stabilized the financial sector through risk allocation brought new types of risks.
- There is a lack of transparency in the mostly unregulated OTC derivatives market, which intensified the crisis.

Regulators proposed several regulatory measures associated with these weaknesses. In context of the largely unregulated market for OTC derivatives, the lack of transparency, and subsequent systemic risk posed by those derivatives transactions posed a huge concern.

The major contagion risk in the OTC derivatives market resulted from asymmetric information - as the prices and notional amounts of outstanding OTC derivatives were not

published or cleared centrally and thus, were only known to the two trade counterparties. This allowed large risk concentrations to build up beyond the purview of regulators and other market participants, thus, resulting in a development, which as the crisis broke out hindered market participants from assessing the financial soundness of their counterparties (Ingves, 2013). Subsequently market participants reduced their exposures to large dealers and a subsequent domino effect of collateral calls triggered asset fire sales, compounding in system-wide liquidity pressures (Ingves, 2013).

Furthermore, counterparty credit risk was not underpinned with adequate capital, in particular against the background of recorded mark-to-market losses, wrong-way risk (exposure to a counterparty increases with decline of credit quality of the counterparty) interconnectedness of large institutions and length of closeout periods (BCBS, 2012; Ingves, 2013).

Considering these shortcomings, G20 leaders agreed on comprehensive reforms of the regulation of the OTC derivatives market. The reforms were aimed to ensure that all standardized OTC derivatives are traded on exchanges or electronic platforms, where appropriate, and cleared through central counterparties by the end of year 2012 (G20, 2009). Through which, the regulators hoped to increase transparency on outstanding volumes, prices and positions, and reduce counterparty credit risk through netting and collateralisation. Furthermore, ruling stipulated that all OTC derivatives are mandated to be reported to trade repositories and non-centrally cleared derivatives are subject to higher capital and margin requirements (BCBS, 2012).

Overall, the current and future regulation of the European OTC derivative market is determined by a combination of several regulatory pillars as Figure 7 presents. In the first instance, the European Markets Infrastructure Directive (EMIR) as well as Basel III, which are implemented through the Capital Requirements Regulation/Directive (CRR/CRD IV) are of particular importance but also the reform of the Market in Financial Instruments Directive (EC, 2014) as well as the Market Abuse Directive (MAD) influence the regulatory environment of the OTC market.

Regulation OTC Derivatives		
Risk Mitigation	Investor Protection	Integrity Transparency
<ul style="list-style-type: none"> • EMIR • Regulation of OTC derivatives • CRR/CRD IV • Capital requirements for financial institutions 	<ul style="list-style-type: none"> • MIFID II / MiFIR • Regulation of financial services providers • Increase competition • Definition of Financial instruments 	<ul style="list-style-type: none"> • MAD II • Expansion of regime to prohibit market abuse • Adjustment of compliance structure of market participants

Figure 7: Regulation of European OTC Derivatives

Source: Adapted from Trepte (2012): Worldwide Regulation, New Regulations (PP3), PricewaterhouseCoopers, Munich

Collectively, the package of regulatory measures influences the existing market structures and value chains. Practitioners think that especially EMIR and Basel III negatively impact their hedging activities. Against the background of time and size limitation, this study focusses on EMIR and Basel III as they are the most significant reforms for the OTC derivatives market from the NFCs' perspective.

2.1.4.1. European Market Infrastructure Regulation (EMIR)

One of the main regulatory reforms that should improve transparency of the OTC market is EMIR. The EMIR was adopted by European Union member countries on 4 July 2012, and entered into force on 16 August 2012 (ESMA, 2013), with much of the necessary details being concretized by the European Banking Authority (EBA) and European Securities and Markets Authority (ESMA), which drafted implementing and regulatory technical standards for the European Commission. An analogue regulation adopted by the USA is the so-called Title VII of the Dodd-Frank Wall Street Reform and Consumer Protection Act of 2010 (Dodd-Frank).

Under Article 2 of EMIR, an OTC derivative contract is defined as a derivative contract, the execution of which does not take place on a regulated market or on a third country market considered as equivalent to a regulated market (ESMA, 2013). EMIR requires standard OTC derivative contracts to be cleared via central clearing counterparties, which act as regulated financial intermediaries (ESMA, 2012). At the time, through which the regulators responded to the problems they experienced during the financial crisis with the bilateral model, namely lack of oversight of the outstanding risk and possible systemic implications that a default of counterparty can have due to the connectedness of the market. Figure 8 shows the two models, the bilateral model and the CCP model.

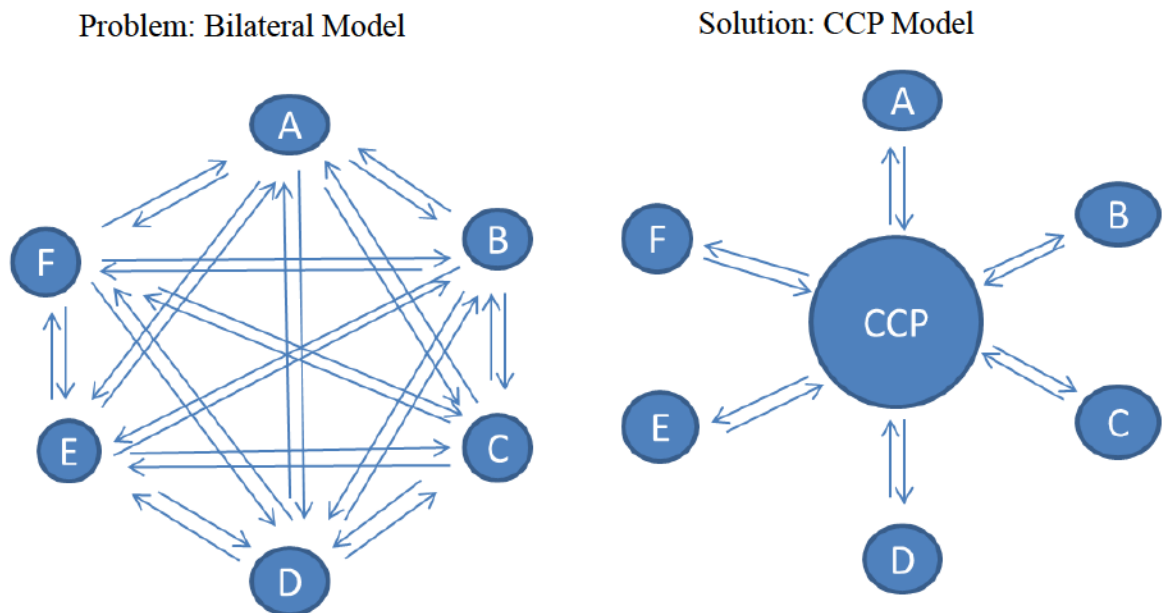


Figure 8: From Bilateral Model to CCP Model

Source: Collet (2013): European Market Infrastructure Regulation (EMIR), How will it impact your business? (PP6) Deloitte Tax & Consulting, Luxembourg

Furthermore, not-standardized derivatives, which do not fall under the clearing obligation should be subject to higher risk management and capital requirements (ESMA, 2013). In addition, EMIR aims at increasing transparency by obligating all derivatives users (i.e., OTC and exchange traded) to report all their derivatives transactions to trade repositories (ESMA, 2013).

The regulation is directly applicable in all European member countries but needs to be adapted to national law of the respective member country. To that end, in Germany, the so called EMIR-Ausführungsgesetz came to effect on 16 February 2013, in order to adapt existing German laws, such as the German Banking Act – *Kreditwesengesetz (KWG)* – and Securities Trading Act – *Wertpapierhandelsgesetz (WpHG)* – to the regulation and allocate the official authority to the German Federal Financial Supervisory Authority – *Bundesanstalt fuer Finanzdienstleistungsaufsicht (BaFin, 2013)*. The ESMA approved six trade repositories, the first in November 2013 and subsequently the reporting obligation in Germany started on 14 February 2014 and includes not only financial counterparties – such as banks, insurance companies, funds, or clearing counterparties - but also all non-financial corporates located in the European Union.

Notably, the group of EMIR regulations are frameworks that are rather general in nature and need to be concretized by level II measures, namely through implementing the regulatory and technical standards (ESMA, 2013). The ESMA, with support of EBA, has accomplished the standards approved by the European Commission on 15.03.2013. Implementation, however, is done on a step-by-step basis and is expected to last until 2017 (ESMA, 2013). The EMIR can be categorised in three pillars according to the obligations they constitute (i) implementation of central clearing via CCPs, (ii) risk mitigation obligations, when derivatives are non-centrally cleared derivatives, (iii) reporting obligations of all derivatives transactions via trade repositories.

a) Clearing Obligations

The most significant reform in EMIR is probably the clearing obligation for certain derivative classes. While until now clearing was rather an option for counterparties to reduce their counterparty credit risk by interposing a CCP between them, though, currently, it is an obligation for certain derivatives. Thus, initially while both counterparties in terms of a derivative contract, were obligated to have just one contract (with each other) they both now need an additional contract with a CCP.

The clearing obligation and the relevant clearing procedures are stated in Articles 4 and 5 of EMIR. Under EMIR, clearing is the process of establishing positions, including the calculation of net obligations, and ensuring that financial instruments, cash, or both, are available to secure the exposures arising from those positions (EU, 2012). As presented in Figure 9, EMIR requires that all OTC derivatives that fall within the scope of the clearing obligations are cleared through a CCP based in the EU and authorized by the ESMA (ESMA, 2013).

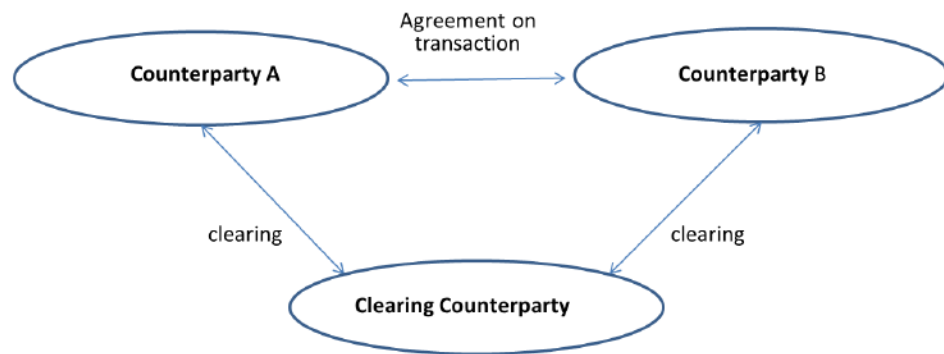


Figure 9: Interposition of CCP Clearing in OTC Agreements

Source: Adapted from Wieland and Weiß (2013), Die Regulierung des europäischen OTC Derivatemarkts (pp 4). Handelsblatt Fachmedien GmbH

EMIR differentiates between direct and indirect clearing, thus allowing the market participants an option to become a clearing member of a CCP, and authorized to clear the contracts or by becoming a client of a clearing member or by establishing an indirect clearing arrangement with a clearing member (EU, 2012). Thus, within the framework of EMIR, clearing has three major aims: (i) Reduction of counterparty credit risk by underlying obligations with collateral, and (ii) Netting of obligations, so that the net positions of counterparties can be reduced, which might lead to lower transaction costs, and (iii) Increase of transparency related to the existence of significant counterparty credit risks in the OTC market. The clearing obligation is determined by the type of counterparty (FC / NFC as described below or intragroup transaction) and the derivative class.

In terms of counterparties that are obliged to clear, EMIR differentiates two main categories (i) Financial counterparties (FCs), and (ii) Non-financial counterparties (NFCs). While financial counterparties (such as, banks and insurance companies) are obliged to clear their derivative transactions, non-financial counterparties in principle are not obliged to clear until they exceed a certain quantitative threshold in terms of gross notional amounts. The thresholds for determining whether an NFC is an NFC+ (above the threshold) or an NFC- (below the threshold) pertain to the gross notional value of EUR 1.0 billion for credit derivatives and equity derivatives; and EUR 3.0 billion for FX derivatives, interest rate derivatives, and commodity derivatives (EU, 2012). The calculation of those transactions is restricted to a rolling 30-business-day basis and does not include OTC transactions entered by NFCs with fully affiliated group companies, which fall under one group wide risk management policy.

In terms of derivatives classes that need to be centrally cleared, EMIR refers to the ESMA to draft technical standards that specify the OTC derivatives' class that should be subject to clearing obligation (EU, 2012). EMIR provides ESMA with two methods in order to identify the relevant class of OTC derivatives, namely a bottom-up approach and a top-down approach (ESMA, 2012). In the bottom-up approach, the initiative is initiated by the CCP or a local competent authority that authorises the CCP to clear a class of OTC derivatives. For the determination of the class of derivatives, ESMA subsequently uses the class of derivatives defined by the CCP and the competent authorities as a basis and adjusts it as deemed necessary (ESMA, 2012). In the top-down approach, ESMA must identify the classes of OTC derivatives, taking into consideration:

- The degree of standardisation of the contractual terms and operational processes
- The volume and liquidity of the relevant contracts
- The availability of fair, reliable, and generally accepted pricing information

In context of the content of the clearing obligation, EMIR envisages various risk management and collateralisation procedures, which are directed to CCPs but are to be included in the contracts with their counterparties. Of particular importance here are the margining and collateralisation requirements that should reduce CCP's risk exposure and

oblige CCPs to calculate the collateralisation requirements as mentioned in Article 39 of EMIR and RTS 2 of the technical standards accomplished as per ESMA during the life time of the trade (ESMA, 2012; EU, 2012).

However, under Article 10 (3), EMIR states that the calculation of the notional amounts refers to computing net of hedging transactions directly related to the operating business activities of non-financial corporations and their asset liability and liquidity management (EU, 2012). ESMA has a relatively wide definition of hedging for that purpose. Hedging is defined to include substantially all trades designed to mitigate risks associated with assets or an investment portfolio (ESMA, 2012). This definition includes hedge accounting transactions that are accepted, based on the definition in IFRS 9 (IFRS Portal, 2018) but also proxy hedging (i.e., OTC derivatives contracts that do not exactly reflect the underlying business but are closely correlated to that) as well as hedging on a macro and portfolio basis.

Furthermore, EMIR excludes intra-group transaction from the clearing obligation, which is also of major interest for non-financial corporations as they also accomplish intra-group hedging transactions (EU, 2012). Thus, as long as the non-financial firms can prove that the derivative transaction is for corporate hedging purposes, they should not be obliged to clear their derivative transactions. Furthermore, with view to the clearing thresholds set by EMIR, this part of the reform can be considered as rather relevant for financial institutions.

b) Risk Mitigation of non-centrally cleared transactions

In order to mitigate counterparty credit risk and operational risk of non-cleared derivatives, EMIR introduced in Article 11, new risk mitigation requirements for all non-cleared OTC derivatives contracts. EMIR aims to ensure that counterparties exercise due diligence, as well as implement appropriate procedures to measure, monitor and mitigate the operational and counterparty credit risk from those derivatives (EU, 2012). The Article 11 issues directives relevant to all OTC derivatives according to the EMIR definition and to FCs and NFCs. To that end, EMIR differentiates between general risk mitigation

requirements, which are to apply to all bilateral derivatives transactions and additional requirements for counterparties that are subject to the clearing obligations (FCs and NFC+) (ESMA, 2012).

General risk mitigation requirements apply to all non-cleared OTC derivatives and include the timely confirmation of terms of the contract (where possible by electronic means), portfolio reconciliation, portfolio compression, and dispute resolution (EU, 2012). With regards to the timely confirmation of trades, ESMA proposed a timeframe ranging from the same business day (FCs), to the next business day (NFCs) with one day leeway for transactions confirmed after 4 p.m. or when counterparties are functioning in different time-zones. The portfolio reconciliation frequency depends on the number of non- centrally cleared OTC contracts outstanding and on the classification of the counterparty as FC or NFC. ESMA initially proposed that portfolio reconciliation should be performed minimally on every business day when the counterparties have 500 or more derivatives contracts with each other, at least once per week for a portfolio between 300 - 499 derivative contracts with each other and once per month for a portfolio of less than 300 derivative contracts.

However, following concerns expressed by several stakeholders, there was a general agreement that when a trade would qualify as hedging, NCFs should not be subject to the same rules with view to the administrative burden as FCs. Correspondingly, ESMA agreed to differentiate the frequency of the reconciliation for NFCs below the clearing threshold. The monthly reconciliation is replaced by a quarterly reconciliation for a portfolio of 50 or less OTC derivative contracts with a counterparty. ESMA proposed in the technical standards, that counterparties may transfer that obligation to a qualified third party duly mandated to this effect (ESMA, 2012).

Another risk-reducing method that EMIR considers appropriate is portfolio compression. Portfolio compression is a risk reduction exercise, wherein, several counterparties terminate some or all their derivatives and replace them with other derivatives whose combined notional value is less than the combined notional value of the

terminated derivatives. In order to perform portfolio compression effectively, the size of the portfolio with a counterparty is a significant criteria while the nature of the counterparty is not accorded the same importance (ESMA, 2012). Thus, the rule concerning portfolio compression requires all counterparties with 500 or more outstanding contracts to implement procedures in order to regularly determine (at least twice a year) whether to conduct portfolio compression to reduce CCR.

The last part of the general risk mitigation requirements is dispute resolution. ESMA (2012) states in its technical standards, that in order to identify and resolve any dispute, FCs and NFCs should have detailed procedures and processes towards dealing with disputes. The aim is to identify, record, and monitor disputes relating to the recognition, valuation of the contract or exchange of collateral. Furthermore, the procedure is to necessarily include timely resolution of identified disputes (i.e., those not resolved within five business days). Also, this obligation can be delegated to an external service provider; however, the counterparty that is outsourcing this task would retain the responsibility to comply with the requirement (ESMA, 2012). Besides the above-mentioned general requirements, additional requirements for FCs and NFC+ entail a daily valuation of outstanding contracts and the implementation of risk management procedures that include the timely, accurate, and appropriate segregated exchange of collateral (EU, 2012). As apparent in the clearing obligation, the intra-group transactions are similarly exempt from this obligation.

c) Reporting Obligations

Article 9 of EMIR states that counterparties and CCPs shall ensure that the details of any derivative contract they have concluded, and any modification or termination of the contract have to be reported to a trade repository no later than the working day after finalisation of the contract (EU, 2012). The aim is to increase transparency and stability in the entire derivatives market and to allow supervisory authorities to recognise risks in the market early-on and make appropriate reactions. To that end, in contrast to the clearing obligation and risk mitigation obligation, the reporting obligations apply to all derivatives,

as well as the exchange traded derivatives. Thus, the reporting obligation is much broader than the reporting obligations under the current markets in financial instruments regime.

With regards to the timeline, the reporting obligation applies to derivative contracts, which were entered before 16 August 2012, and remain outstanding on that date and all derivatives entered on or after 16 August 2012. The minimum set of information reported in the format of codes include the parties to the contract, beneficiary of the rights and obligations arising from it, and the main details of the contract including the type, underlying, maturity, notional value, price and settlement date (ESMA, 2012). As (ESMA, 2012) pointed out, the codes for reporting, (such as the so-called Legal Entity Identifier (LEI) which is used to identify the counterparty and beneficiaries), serve a multitude of purposes, including operational standardisation, cost-effective reporting, easier analysis of the data, and increasing efficiency in the overall reporting chain.

As pointed out in Article 9 of EMIR, addressee of the reports should be trade repository registered in accordance with Article 55 of EMIR or recognised in accordance with Article 77 of EMIR. Thus, the trade repositories play a central role in enhancing the transparency of derivatives markets. Article 77 of EMIR rules the registration of a trade repository established in a third country. Under EMIR, ESMA has direct responsibilities regarding the registration, supervision, and recognition of trade repositories (ESMA, 2012). So far ESMA has registered the following trade repositories: DTCC Derivative Repository Ltd. (DDRL), Krajowy Depozyt Papierow Waosciowych S.A. (KDPW), Regis-TR S.A. and UnaVista Limited, CME Trade Repository Ltd. (CME TR), ICE Trade Vault Europe Ltd. (ICE TVEL). All repositories can report all asset classes, besides ICE TVEL, which is only reporting derivatives related to commodities, credit, equities, and interest rates (ESMA, 2012).

2.1.4.2. Basel III / CRD IV

The BCBS announced in December 2010, the comprehensive reform package on bank regulation, addressing the lessons of the financial crisis and aiming at improvement of banking sectors' ability to absorb shocks arising from financial and economic stress and thus reduce the risk of spill-over to the real economy (BCBS, 2011). The reform included two new frameworks, namely "Basel III: A global regulatory framework for more resilient banks and banking systems" and "Basel III: International framework for liquidity risk measurement, standards and monitoring". The reforms have addressed several specific topics, especially the quality and quantity of capital requirement, liquidity requirements, the requirements on banks' risk management, governance, banks' transparency and disclosures as well as the resolution of systemically significant cross-border banks (BCBS, 2011). The Basel III framework, as represented in Figure 10 below, requires banks to hold capital of up to 15% including two countercyclical buffers and a further buffer for systemically relevant banks. Tier 3 capital which is the lowest form of capital accepted, and included certain subordinated debt with lock-in provision has, in fact, been eliminated (BCBS, 2011). The former Basel II framework required a buffer of 8% including Tier 3 capital.

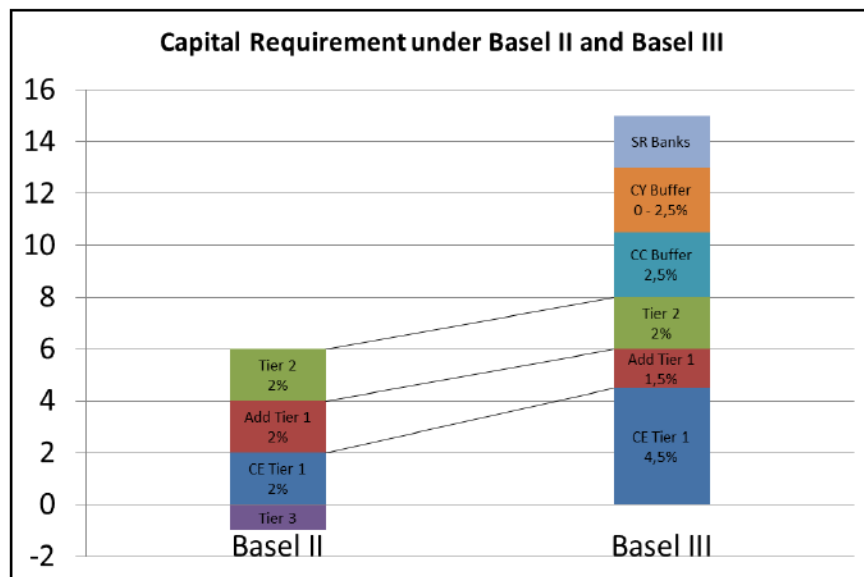


Figure 10: Capital requirement under Basel III

Source: Adapted from Hartmann-Wendels (2011), Reform der Bankenaufsicht und Auswirkungen auf die Kreditvergabe der Banken, Sparkassen und genossenschaftlichen Kreditinstitute (pp. 19). Die Familienunternehmen - ASU e.V.

IMPACT OF EMIR AND BASEL 3 ON CHA AND THE RESPONSE

The reform package entered into force on 1 January 2014, with some of the new provision phasing in until 2019. It specified that transitional arrangements should give banks time to meet the higher standards and continue to support the economy with their lending activities (BCBS, 2012). Similar to Basel II, the reform package has been implemented into EU law through the legislative package called Capital Requirement Directive IV (BaFin, 2013), consisting of the Capital Requirement Regulation (CRR), and a Capital Requirement Directive (BaFin, 2013). While the CRR is directly applicable on the firms across the EU, CRD must be implemented by EU member states through national law. In order to implement CRR, member countries have to accordingly amend existing national law and remove any competing provisions or provisions, which are incompatible with the European regulation (BaFin, 2013).

CRD IV/CRR is supplemented by technical regulatory standards, technical implementation standards, and guidelines which are to be drafted by the European Banking Authority (EBA) (BaFin, 2013). Figure 11 presents the timeline and different stages of the implementation of Basel III.

Phases		2013	2014	2015	2016	2017	2018	2019
Capital	Leverage Ratio		Parallel run 1 Jan 2013 – 1 Jan 2017 Disclosure starts 1 Jan 2015				Migration to Pillar 1	
	Minimum Common Equity Capital Ratio	3.5%	4.0%	4.5%				4.5%
	Capital Conservation Buffer				0.625%	1.25%	1.875%	2.5%
	Minimum common equity plus capital conservation buffer	3.5%	4.0%	4.5%	5.125%	5.75%	6.375%	7.0%
	Phase-in of deductions from CET1*		20%	40%	60%	80%	100%	100%
	Minimum Tier 1 Capital	4.5%	5.5%	6.0%				6.0%
	Minimum Total Capital		8.0%					8.0%
	Minimum Total Capital plus conservation buffer		8.0%		8.625%	9.25%	9.875%	10.5%
	Capital instruments that no longer qualify as non-core Tier 1 capital or Tier 2 capital		Phased out over 10 year horizon beginning 2013					
Liquidity	Liquidity coverage ratio – minimum requirement			60%	70%	80%	90%	100%
	Net stable funding ratio						Introduce minimum standard	

Figure 11: Basel III Phase-In Arrangements

Source: BCBS (2019). *Basel III phase-in arrangements* (pp. 1). Basel: Bank for International Settlement.

The main features of the Basel III reforms impact banks' capital requirements, liquidity requirements, and transparency. With regards to banks' derivatives activities, Basel III introduces higher capital requirements for counterparty credit risk (CCR) (Kind & Tarbert, 2011). CCR covers the risk in case a counterparty defaults before the full settlement of the outstanding derivative transaction. Thus, in contrast to the traditional credit risk, this so-called symmetric risk can shift from one counterparty to the other with the change in the market value of the transactions. The reforms related to CCR should raise the capital buffers backing risk from banks' derivatives, repo, and securities financing exposures and provide additional incentives to move OTC derivative contracts to central counterparties, which, in turn, would increase transparency and reduce systemic risk (BCBS, 2011).

Banks are required to calculate default risk capital charge using a stress calibration and further need to consider capital charge for potential mark-to-market (MtM) losses using a so-called credit valuation adjustment (CVA) associated with deterioration in the credit worthiness of a counterparty (BCBS, 2011; Hartmann-Wendels, 2011; Kind & Tarbert, 2011). In practice, when, a party to a derivative contract defaults, (for example, as did the Bank Lehman Brothers in 2008), the bank must replace the transaction with another counterparty, which should be ready to enter the contract based on the present market conditions, resulting in the loss of the positive market value for the replacing bank. This risk increases with the deterioration in the creditworthiness of the counterparty. CVA risk were not covered by Basel II and had been greater source of losses than actual defaults during the financial crisis (BCBS, 2011). Furthermore, BCBS (2011) proposes raising counterparty credit risk management standards in a number of areas, including the treatment of wrong-way risk, i.e. cases where the exposure to a counterparty increases when the credit quality of the counterparty deteriorates. Below excursus on CVA provides necessary background and further details on the CVA calculation.

- Excursus Credit Value Adjustment Charge

In 1988, the BCBS proposed the first Basel Capital Accord (Basel I) as a response to some perceived failings of the banking and financial deregulation that materialized in

several countries throughout the 1980s and 1990s (Kind & Tarbert, 2011). Basel I introduced the notion of a standardized minimum regulatory capital ratio, defined the items qualifying as regulatory capital (Tier 1 and Tier 2 capital), and the way banks should calculate them (BCBS, 2009; Kind & Tarbert, 2011). Under Basel I, banks had to underlay their Risk Weighted Assets (RWA) with 8% capital, with at least half of it consisting of Tier 1 capital (BCBS, 2009). The RWA are determined by categorizing and weighing assets according to involved counterparty credit risk, whereas the risk weights range from a factor of 0% for OECD governments to 100% for loans to private customers (BCBS, 2009).

Basel II revised Basel I's rudimentary approach to RWA calculation, and provided a more accurate matching of a bank's capital requirement to the riskiness of its assets by providing several alternatives for credit risk measurement, namely the standard approach and two types of internal rating-based approaches (BCBS, 2004; Kind & Tarbert, 2011). The minimum capital requirement under Basel II internal rating-based approach was given by the following formula:

$$\text{Core Capital requirement} \geq [\text{Total RWA} + (\text{adjustments for market and operational risk}) \times 12.5] \times 8\%$$

With regards to derivatives, the changes introduced in Basel III, are oriented to address the credit risk of the counterparty, which is considered in Basel II through the weighting of the assets based on the implied credit risk. The risk consisted mainly of below mentioned three elements (BCBS, 2004):

- The exposure at default (EAD), which is the potential value of the claim at default
- The loss given default (LGD), which is the total loss when the counterparty is in default.
- The probability of default (PD), which considers the probability that the counterparty defaults.

The product of these risk elements yield the so called Expected Loss (EL) which is the credit risk involved in that transaction while unexpected losses (UL) refers to the risk weighing functions in the internal rating based approach (BCBS, 2004).

Thus, the higher the default risk involved in a transaction, the more core capital the bank must underlay for that transaction, which is an expensive source of funding, following its full liability character. However, as mentioned above, Basel II provided cover singularly to the default risk and measures to protect against it but failed to provide measures to cover CVA risk, which was a major source of loss during the financial crisis. Albeit, a specific capital charge for CVA risk has been introduced now by Basel III. Figure 12 shows the components of the credit risk capital (CCR) charge.

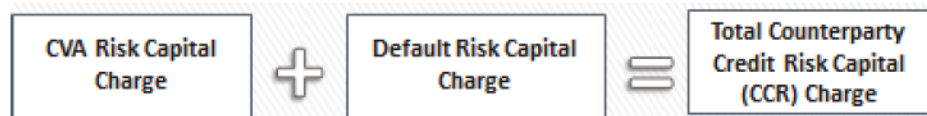


Figure 12: Counterparty Risk Capital Charge

Basel III offers two ways to calculate the CVA risk capital charge: A standard method, which is based on a formula provided by the regulatory authority, and the so-called bond-equivalent-method, which is more advanced and generally expected to be used by most banks. The bond-equivalent-method approximates the value of CVA, and its adjustments based on a synthetic bond with characteristics (i.e., credit spread, notional amount, maturity) same as the underlying derivative transaction or portfolio (BCBS, 2011a). While the notional amount and the maturity are directly extractable from the bond, the credit-risk-spread is determined by using the counterparty's single name credit default swap (CDS) (BCBS, 2011a), which is basically a traded protection (insurance) against the default of a counterparty. In case the CDS cover on the counterparty is not available, (BCBS, 2011a) allows the approximation through an index CDS, which, in fact, is a basket of different exchange traded single name CDSs.

Overall, total capital requirement should increase in line with the CVA risk consideration as one additional risk component will be added to the calculation, which, in turn, should increase the costs of financial institutions. In their paper on the quantitative treatment of counterparty credit risk, (Bahn, Cluse, & Schwake, 2011) presented an

example of the capital requirements for CVA charge for a hypothetical derivative position with an EAD of 100 under the standard method and no hedge of the CVA risk by a CDS.

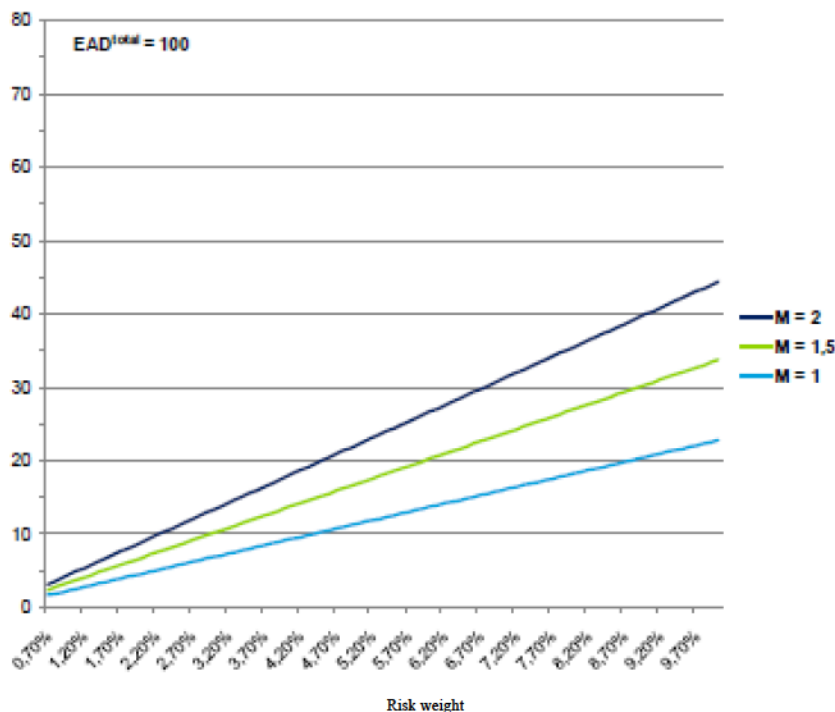


Figure 13: CVA-charge in standard approach

Source: Bahn et al. (2011), *Die quantitative Behandlung von Kontrahentenausfallrisiken unter Basel III* (PP 9), Deloitte-White Paper no. 44., Deloitte Financial Risk Solutions, Munich.

As Figure 13 shows, the capital requirements increase with a decrease in the credit quality (increasing risk weights) and increasing maturity. An OTC derivative exposure to an AAA-rated counterparty with an effective term of two years leads to a capital requirement of 3.10% of that exposure. The same transaction with BBB, BB, and CCC-rated counterparties lead to capital requirements of 4.43%, 8.87%, and 44.35%, respectively.

A major concern for German Industry and Treasury Associations such as the Bundesverband der Deutschen Industrie (BDI), Verband deutscher Treasurer(VDT) or the Deutsches Aktieninstitut was that these additional costs which the financial institutions face will be passed to the banks' clients, i.e. the corporates (BDI, 2011). This, according to their expectation, would reduce the economic value of these derivatives for the end-users and subsequently lead to less usage of these derivatives. As OTC derivatives are primarily used

by NFCs for corporate hedging purposes, companies would be exposed to more business risks – following reduced hedging, that in a worst case would impact an increase in their probability of default, which is contrast to the regulations goal of reducing counterparty risk (BDI, 2011).

To that end, based on an IT-tool developed by the consulting company KPMG, a group of 17 large German companies undertook the complex task to quantify the effect of CVA charge on their frequently used derivatives contracts (namely, contracts on foreign currency, interest rate swaps, and commodity derivatives), resulting in increase of hedging costs for these 17 companies by roughly 200% or ca. 124 million Euros p.a. (BDI, 2011). Furthermore, the additional costs were not uniformly distributed as the different characteristics of the derivative contributed differently to the charge, and here, in particular, the maturity had a significant effect (BDI, 2011).

However, the treatment of capital requirements for CVA is covered under Title VI of the CRR, including the Articles 381-386 (EU, 2013). The European Parliament reviewed the concerns of the industry in all earnestness, and subsequently in Article 382,4(a) ruled an exemption for CVA risk charge for transactions with non-financial counterparties established in the European Union.

2.1.5. Summary and conclusion

This section provided background knowledge on corporate hedging necessary to understand this study. It explicated on the risks that NFCs are exposed to and that they hedge (mainly foreign exchange and interest rate risk) and the way NFCs hedge those risks (mainly via OTC derivatives such as forwards, swaps and options). Furthermore, it provided background knowledge on the market for OTC derivatives and explained the necessity of the implementation of new regulation (EMIR) and the reform of Basel II to Basel III. Considering the importance of the OTC derivatives market for NFCs to hedge interest rate and foreign exchange risk exposure, the main concerns from practitioners' side, were also explained. It has been shown that NFCs demonstrate concerns about the impact

of the regulatory measures on the costs and effectiveness of their hedging activities as well as the behaviour of their banks.

Nevertheless, NFCs do not have a full overview of the impact on their corporate hedging activities – defined here as the willingness and ability to hedge with derivatives – as well as how that impact can be managed. Despite being a widely studied subject, such overview has also not been brought forward by theoretical literature on corporate hedging as the following chapter shows. This study aims to suggest such a systematic overview through the creation of a model that helps to analyse the impact of regulation on corporate hedging activities and a framework that integrates such model and possible corporate responses to manage the impact of regulation. Correspondingly, in the following chapter, the literature on corporate hedging will be reviewed for supporting frameworks.

2.2. Corporate hedging literature

This section aims at the pre-conceptualisation of a model to analyse the impact of the regulatory changes on corporate hedging activities. Correspondingly, the paper reviews the existing literature on corporate hedging critically with regards to relevant ideas and concepts related to corporate hedging activities. The findings have been applied to pre-conceptualise the impact-analysis-model and create associated detailed research questions. In this context, the pre-conceptualisation is understood as a preliminary impact-analysis-model.

First, existing literature will be approached from a historical and theoretical perspective, in order to understand the context and assumptions under which the existing theories have been created and position this study in the right theoretical context. Following that the most relevant theories related to the reasons for corporates to conduct corporate hedging as well as the optimal way of corporate hedging will be critically reviewed.

Corporate hedging and corporate risk management have been extensively studied in finance literature. However, the research and theories provided so far focus on the rationale for corporates to hedge and the optimal way of hedging and fail to consider regulation as an influencing factor of hedging activities (appendix 2). Subsequently, current research and

theories do not provide a theoretical framework in context of the analysis of the impact of regulation on corporate hedging activities – which is defined in this study as the willingness and ability of NFCs to conduct corporate hedging - and organisational response to manage the impact of regulation.

This finding is not completely surprising, against the background that the implementation of the regulations is a rather new phenomenon, which primarily gained ground mainly in the years 2013 and 2014. Given this gap, the author reviewed literature on corporate hedging with the aim to pre-conceptualise a model that helps to analyse the impact of regulation on corporate hedging activities. After that, the author reviewed the literature on regulation and strategy with the aim to create an initial conceptual framework to account for the responses of the corporates on the regulatory actions. The findings of the same are described in the next section, however, the Figure 14 illustrates an overview of the concepts required for the study, found in the financial risk management and strategic management literature. After each section, detailed research questions have been created that can guide the primary research.

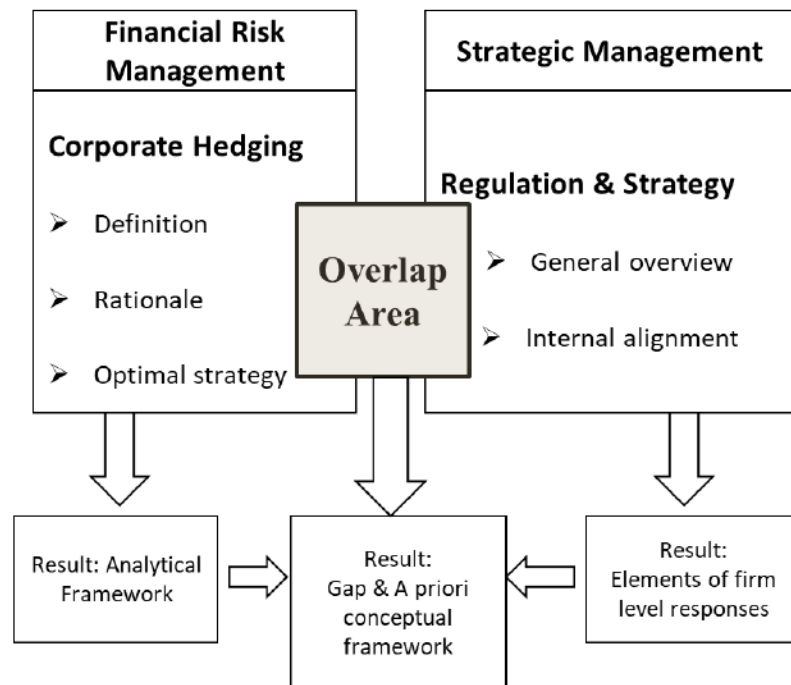


Figure 14: Layout of literature review

2.2.1. Theoretical perspectives on corporate hedging

As an ingredient of the risk management systems of corporations, corporate hedging comprises the actions applied by corporations with the aim to limit or offset certain risks, mainly due to fluctuations of commodities prices, currencies or interest rates (Berk & DeMarzo, 2013; Chance & Brooks, 2015). From a historical perspective, the first elaborations of risk management in literature are found in the context of finance theory. Finance theory pertains to the study of financial assets and financial markets including the valuation and allocation of financial assets under risk and return considerations. French mathematician Louis Bachelier's thesis *Théorie de la Spéculation* published in 1900 is generally associated as one of the starting points of financial theory with view to financial risk management (Dionne, 2013; Gustafson, 2015). He analysed fluctuations of financial assets based on the random movements of particles suspended in fluid, called Brownian motion (Bachelier, 2011). Further historical milestones in the development of financial risk management include the establishment of the American risk and Insurance Association and the American Finance Association (AFA) in 1932 and 1939 as they contributed to research on financial markets, price fluctuations and detection of profitable strategies (Dionne, 2013).

Risk management in general aims at preventing the firm from various kinds of risk, that arise within the operating activities or financing activities (Hopkin, 2017). However, some risks are unavoidable as they result from running the business or are too costly to prevent and subsequently, through its capital structure, the firm shares these risks with the shareholders and debt holders who bear the risk that the firm will default or the risk of volatility of share prices in the case of shareholders (Berk & DeMarzo, 2013; Hopkin, 2017).

Considering the theoretical perspectives, notably organisations, such as businesses and bureaucracies are complex social constructs consisting of formal structures intended to coordinate the pursuit of the common goal and the interrelation with the environment under uncertain conditions (Miebach, 2012). Organizational theory provides insight in order to understand and explain these constructs, but given their complexity, organisations offer a variety of situations for analysis with the usage of different theories that explain the

manifold phenomena of organisations (Frese, 2013). Thus, research studies must ensure that the theoretical perspective for their research matches the requirements, considering the underlying assumptions, empirical evidence, and explanatory power of the existing theories. With regards to corporate risk management, the major theories offered by current literature include finance theory, agency theory, stakeholder theory, and new institutional economics (Klimczak, 2008; Seamer, Choi, & Doowon, 2015).

Finance theory approaches corporate risk management based on the classical Modigliani-Miller paradigm and so far, has been the most productive in terms of both theoretical model extension and empirical research. In the Modigliani and Miller (1958) theorem, risk management is irrelevant, as management cannot increase firm value by engaging into risk management activities. Separating risk in systematic (market risk) and unsystematic (firm-specific) components, the Modigliani-Miller theorem states that the average cost of capital to any firm is independent of its capital structure and thus diversified shareholders are indifferent regarding the firm's financial policy as they can diversify away unsystematic risk. However, the Modigliani-Miller theorem is based on neoclassical assumptions of a perfect world without any information asymmetries, transaction costs or taxes and collide with the real world, where financial manager focuses a great deal on matters of capital structure and are constantly engaged in hedging activities directed at the reduction of unsystematic risk (Arnold, Rathgeber, & Stöckl, 2014; Bodnar, Giambona, Graham, & Harvey, 2016).

As explanation for this clash between theory and practice, the finance theory has identified imperfections in the capital markets, which drive a wedge between the costs of bearing risks inside and outside the firm and as a fallout create comparative advantages for hedging to be undertaken by management instead of investors themselves (Bodnar et al., 2016; Vural-Yavas, 2016). The studies explaining the rationales for corporate hedging within that framework can be differentiated into two groups: The first group connects it to the objective of the firm to maximise shareholder wealth; and the second group focusses on hedging as a mean to maximise managers' private utility, and thus is based on elements of agency theory.

Agency theory prolongs the rationales for firms to hedge by considering the separation of ownership and control as well as managerial motivation. The theory explains a possible conflict of interest between the owners, management, and debt holders due to asymmetries in earning distribution and the influence of agency issues on managerial attitudes (Arnold et al., 2014; Vural-Yavas, 2016). Thus, agency theory sheds light on the incentives of managers toward hedging their own wealth on the expense of shareholders and also on the influence of hedging policies on firm value which is associated with firms' financing structures and give predictions similar to the finance theory (Klimczak, 2008; Seamer et al., 2015). This implies the failure of the Fischer Separation theorem, which allows reduction of the firm to profit maximising operators and entails actions wherein, owners can fully delegate the control of the firm to managers.

Klimczak (2007) suggests additional perspectives that can be derived from stakeholder theory and new institutional economics. The stakeholder theory was originally introduced by Freeman (1983) and is concerned with the balance of the interest of the main stakeholders when generating corporate policy. The theory has gained in importance during the last decade with a growing number of publications in the field of strategic management but is new to the risk management field with few empirical evidence. Described as entities or interests that are involved – voluntarily or involuntarily – in the operation of the business, the main stakeholders of the firm are owners, management, local community, customers, employees, and suppliers (Freeman, 2010; Wicks & Harrison, 2017). With view to corporate risk management an important additional perspective is the extension of implicit contracts from employment to other contracts such as sales contracts and financing contracts, as introduced by Cornell and Shapiro (1987). However, as these implicit contracts are sensitive to financial distress and bankruptcy costs and corporate risk management aims at decreasing those cost, it can lead to firm value increases (Klimczak, 2007; Seamer et al., 2015).

New institutional theory shifts the perspective from management to institutionalized rules that cause organizations to adapt. These institutional rules are formed through interaction of the critical exchange partners, regulatory groups, professional associations

and other relevant actors within the organizational field of the firm (Hoffman, 2001; Wooten & Hoffman, 2016). In his book on institutions and organizations Scott (2013) differentiates between regulative (consisting of rules/laws and the monitoring/sanctioning mechanisms), normative (based on values and norms shared in society) and cultural-cognitive (based on shared understanding of how things are supposed to be done) institutions. In terms of corporate risk management, new institutional theory offers an alternative explanation by predicting that corporate risk management may be determined by institutions or standard practise in the market or industry (Klimczak, 2007; Seamer et al., 2015). However, also this theory is new to the field of corporate risk management and is not substantiated by any significant empirical evidence.

With regards to the aim of this thesis - elaborating on how the regulation of OTC derivatives is impacting corporate hedging activities – all theories provide important perspectives and help the conceptualisation of key elements. While finance, agency and stakeholder theories are important with view to the conceptualisation of the elements that discern the CHAs, new institutional theory is obviously important against the background of the implemented regulation and the consideration of external actors as an influencing factor.

Overall, as key takeaways of this section, it should be noted that:

- Most of the current studies - including those on the definition of corporate hedging, the rationale to hedge and the optimal way of hedging, which are explained in the following sections - have been created under neoclassical perspective of finance and agency theory.
- This study aims to add to the new institutional theory perspective by focussing on external actors' impact on corporate hedging activities.

2.2.2. Definition of corporate hedging and corporate hedging activities

Theoretical literature has provided several different definitions of corporate hedging. Spanò (2013) and Gupta (2017) summarized the three different definitions of corporate hedging that can be derived from theoretical literature as the following: (i) hedging as a generic insurance contract, (ii) hedging as any action reducing covariance

between a firm's value and a state contingent variable or, more specifically, (iii) hedging as the activity of holding derivative financial instruments to reduce the exposure to marketable risks. The latter is the most specific definition and will be of relevance for this study.

2.2.2.1. Hedging as an insurance contract

Mayers and Smith (1982) published the journal article "On the Corporate Demand for Insurance", which is broadly considered as the first study that introduced corporate risk management into the modern theory of corporate finance. The study's view of hedging was as an insurance contract.

Mayers and Smith were primarily concerned with the motivations for corporations to purchase insurance and provided seven possible incentives for firms to hedge. They regarded the corporation as a sort of primary market of explicit and implicit long-term contracts between different claimholders: shareholders, bondholders, employees, customers, and suppliers. Approaching the field from the perspective of a Coase (1960) and Fama and Miller (1972) world, where the value of the firm is unaffected by the assignment of property rights, Mayers and Smith (1982) argued that due to the contracting costs, it is optimal for corporations to allocate risk to those claimholders that have a comparative advantage in risk bearing. In their view, these claimholders were the stockholders and bondholders, as they can diversify their claims through the secondary market.

However, as the amount of risk that can be allocated to stockholders and bondholders is limited by the amount of capital of the firm, Mayers and Smith (1982) suggested that the purchase of insurance (corporate hedging) offers the possibility to reallocate risk from the other claimholders to the insurance company. Thus, purchasing an insurance contract is seen by as a specific method to allocate risk from claimholders that are unable to diversify via secondary markets and consequently the higher the fraction of these claimholders, the higher the probability that the firm will purchase insurance.

The insurance-like definition was the introduction of hedging concerns into the corporate finance theory and some subsequent research, such as Rebello (1995) and

Huberman (1997) still viewed hedging through derivatives based on that perspective. However, some studies pointed out that the insurance-like definition of hedging involves adverse selection and moral hazard problems (Gupta, 2017; Spanò, 2013).

2.2.2.2. Hedging as any action reducing the correlation

Smith and Stulz (1985) published the next path-breaking study that brought the definition of hedging a step further. In their study “The determinants of firms’ hedging policies”, which is broadly considered as the first theoretical model that aimed to explain corporate hedging, they refer to hedging as reducing risk by holding derivative financial instruments but also by other ways, such as a merger or operational and capital structure changes or a change in real operating decisions. Thus, Smith and Stulz consider hedging to be any action that reduces or eliminates the covariance between the firm’s value and the value of a generic state variable and on the opposite, any action that raises the dependence of the firm’s value to a state variable is considered to be reverse hedging (Gupta, 2017).

Smith and Stulz (1985) argue that their approach to hedging is different compared to the insurance-like approach of Mayers and Smith (1982), because - in contrasts to hedging through forwards and futures - for corporations the purchase of insurance provides real services, given the expertise of insurance companies in evaluating risks and administering claims settlement. However, their definition is sufficiently broad to include the insurance-like definition of Mayers and Smith (1982) among the actions defined as hedging, as an insurance contract is a possible means to reduce the covariance between the firm’s value and a state variable. Furthermore, besides the usage of financial risk-reducing methods, such as forwards and futures, the definition also includes real risk-reducing methods, such as the localisation of production in different countries to hedge against currency risk. However, those types of operational hedges relate to higher cost and may be an option in particular for multinational companies and not smaller companies.

2.2.2.3. Hedging as holding derivative financial instruments

The third and most recent definition of corporate hedging that can be derived from the existing literature is attributable to several studies that used a narrower definition of

hedging, explicitly referring to it as the act of holding derivative financial instruments (Gupta, 2017). Authors, such as Froot, Scharfstein, and Stein (1993), DeMarzo and Duffie (1995), Broll and Eckwert (1999) and Battermann, Bräulke, Broll, and Schimmelpfennig (2000) regarded hedging in their studies as the act of holding derivative financial instruments to reduce or eliminate the covariance between the firm's value and the value of an underlying asset subject to market price fluctuations. Their primary interest is often the investigation of the different effects of different derivative financial instruments, for example in order to derive the preferred hedge strategy (Battermann et al., 2000; Froot et al., 1993). As Spanò (2013) and Gupta (2017) pointed out, this type of definition implies the absence of asymmetric information and moral hazard problems, underlining a peculiarity of purchasing derivatives with respect to purchasing insurance contracts, which cannot be captured by the general definition of Smith and Stulz (1985).

With view to the aim of this study, i.e. assessment of the impact of regulation of OTC derivatives on corporate hedging activities, I will revert to the third definition “Hedging as the act of holding derivative financial instrument to reduce or eliminate the covariance between the firm's value and the value of an underlying asset subject to market price fluctuations”. However, with regards to this dissertation, the scope in terms of corporations and risk will be limited to NFCs and to foreign exchange risk and interest rate risk.

Thus, as a key takeaway from this chapter, following definitions for corporate hedging and corporate hedging activities apply in this study:

- Corporate hedging: The Act of holding derivative financial instruments by non-financial corporations to reduce or eliminate the covariance between the firm's value and the value of underlying assets which are subject to foreign exchange risk and interest rate risk fluctuations.
- Corporate Hedging Activity: This study is interested in the impact of regulation on the willingness of NFCs to conduct corporate hedging as well as the influence on the ability of NFCs to conduct corporate hedging. Thus, corporate hedging activities in this study is defined as the willingness and ability of a non-financial corporation to conduct Corporate Hedging.

2.2.3. Rationale for corporate hedging

Studies that can add to the understanding of the elements that make out a NFC's willingness to conduct corporate hedging are studies that explain the reasons for corporations do hedging. Gupta (2017) and Spanò (2013) summarized in their review the existing theories explaining the rationales for corporate hedge and differentiated them into two groups. The first group connects corporate hedging to the objective of the firm to maximise shareholder wealth, and the second focus on hedging as a mean to maximise managers' private utility. While the first group argues that shareholder wealth can be increased by reducing risk at the corporate level, thus imply the failure of the Modigliani-Miller theorem, the second group challenges this view and claims that corporate hedging is a decision made by self-interested managers having more information than shareholders. As Gupta (2017) and Spanò (2013) pointed out, the latter implies the failure of the Fisher Separation theorem which implies that owners can fully delegate the control of the firm to managers.

2.2.3.1. Corporate hedging to maximise shareholder wealth

a) Cost of financial distress

The neoclassical world does not consider costs associated with the financial distress or bankruptcy of a firm. In the real world, however, costs occur when a firm is in financial distress or bankruptcy (Belkhir & Boubaker, 2013). Such costs include the legal and administrative costs of bankruptcy, as well as the agency, moral hazard, monitoring and contracting costs which can reduce firm value even if formal default can be avoided. Financial distress can also lead to the loss of important employees and diverse managements' and employees' attention from their primary work, the creation of value.

Introduced by Smith and Stulz (1985) in their above-mentioned study, this theory suggests that hedging reduces the probability of default and thus the present value of the costs of financial distress. This can be done by reducing the volatility of the firm's cash flows as the present value of the cost of financial distress is a function of the probability of default and the costs given default (Omar, Mohammad, & Ahmad, 2017; Stulz, 2013). Furthermore, Smith and Stulz have argued that, while the reduction of financial distress

cost increases firm value, it augments shareholder value even further by simultaneously raising the firm's potential to carry debt. Hedging lowers the cost of financial distress, which leads to a higher optimal debt ratio and the tax shields of the additional debt further increases the value of the firm. However, they have also mentioned that as shareholders have no possibility to reduce these costs, in the presence of costs of bankruptcy, management has a comparative advantage in managing risk.

More recent models with regards to the cost of financial distress theory have been brought forward by Mello and Parsons (2000), who modelled a firms that hedges to increase the value of its equity by reducing the expected cost of bankruptcy, and by Downie and Nosal (2003), who built a model in which hedging through derivatives prevents the default on a contractual obligation and allows the firm to commit to delivery in all states of the world.

Several studies have investigated empirical evidence for the financial distress argument by analysing the relationship between financial constraints and firms' hedging activities. They looked for evidence that indicates that firms with higher leverage and lower liquidity are more inclined to hedging by using derivatives with ambiguous results. While for example Nance, Smith, and Smithson (1993) and Sprčić (2008a) did not find evidence supporting the financial distress argument, other studies found evidence that firms with lower liquidity and higher leverage are more likely to use derivatives. Among others following studies have found evidence, Dolde (1995), Mian (1996), Fok, Carroll, and Chiou (1997), Goldberg, Godwin Kim Tritschler, and Myung-Sun (1998) and Haushalter (2000), Judge (2002), Fehle and Tsyplakov (2005), Singh and Upneja (2008), Afza and Alam (2011), Adam, Fernando, and Salas (2015) and Judge (2015), who provide strong evidence of relationship between financial distress costs and the foreign currency hedging decision of 366 large non-financial U.K. firms. Ameer (2010) and Chaudhry et al. (2014) on the other hand, looked on determinants of corporate hedging practices of Malaysian and Pakistani firms and found supporting evidence on the liquidity side but not on the leverage side, in terms of higher long term debt.

b) The agency cost of debt

In their study about managerial behaviour, agency costs and ownership structure, Jensen and Meckling (1976) brought forward that firms can decrease agency costs of debt by reducing the volatility of cash flows. Dobson and Soenen (1993) presented three reasons to hedge risk based on agency costs:

- (i) Hedging reduces uncertainty as it smooth future cash flows and by doing this lowers the firm's cost of debt. Hedging will mitigate agency cost which is based on information asymmetry between management and bondholders and by that it increases the value of the firm, the latter being the reason for a rationally acting management to hedge;
- (ii) Within the framework of debt financing, cash flow smoothing by hedging exchange risk will tend to reduce the risk-shifting and underinvestment problems and by that reduce agency cost of debt. The risk shifting problem arises when selecting among mutually exclusive investment projects. Jensen and Smith (1985) pointed out that, once debt financing obtained, management can increase shareholder value at the expense of bondholders by substituting high risk for low-risk projects. The underinvestment problem arises when a firm with outstanding bonds has incentives to reject positive net present value projects if the return from further investment accrues mainly to bondholders (Jensen & Smith, 1985). This is particularly important when a significant portion of firm value consists of future investments opportunities.
- (iii) Hedging extends the length of the contractual relations between shareholders by reducing the probability of financial distress. It mitigates the moral-hazard agency problem by contributing to corporate reputation.

This rationale to hedge is supported by empirical evidence of various studies such as Bessembinder (1991) who has shown that hedging reduces incentives to underinvest, Minton and Schrand (1999) who showed that companies with higher volatility of cash flows have lower levels of investment and higher costs of external capital. Further supporting empirical evidence has been provided by Haushalter, Heron, and Lie (2002),

Judge (2002), Singh and Upneja (2008), Ameer (2010), Afza and Alam (2011), Chaudhry et al. (2014), Deng, Elyasiani, and Mao (2016) and Alexandridis, Chen, and Zeng (2017) while Sprčić (2008a) did not find supporting evidence with regards to Croatian and Slovenian companies.

c) The convexity of the tax function

Smith and Stulz (1985) brought forward the argument that hedging can increase firm value depending on the tax code that the firm faces. While the expected tax liability of a firm, facing a linear tax function (constant effective marginal tax rate), is unaffected by the volatility of taxable income, this changes in the case of a convex tax structure. A tax system can be convex in cases where the marginal tax rate increases progressively with taxable income or due to various tax rules and regulation (Bartram, 2000).

Smith and Stulz (1985) argue that if a firm faces a convex tax function, i.e. the marginal corporate tax rates are an increasing function of the firm's pre-tax value, subsequently, the after-tax value of the firm is a concave function of the pre-tax value. By reducing the variability of pre-tax firm values hedging can reduce the expected tax liability and subsequently increase the expected post-tax value of the firm, as long as hedging costs are not too large. Activities which reduce the volatility in reported earnings will enhance shareholder value by reducing the effective long-run average tax rate and the more convex the effective tax system, the greater the reduction in expected taxes, a rationale supported among others by Froot et al. (1993), Mian (1996), Graham and Smith (1999).

The argument of convexity of tax structure applies also on the shareholder level. If shareholders face a convex tax function a corporate hedging programme that leads to steadier dividend stream would, *ceteris paribus*, increase shareholder value (Glaum, 2002). However, because real world tax systems are complex and because larger firms have thousands or sometimes even millions of domestic and foreign shareholders facing very different tax functions, shareholders personal taxes are usually not taken into account in the discussion on corporate hedging (Glaum, 2002).

The empirical evidence supporting the hypothesis that firms' hedge in order to minimize the net present value of their expected future tax payments is rather weak. While Berkman, Bradbury, and Magan (1997), Judge (2002), Afza and Alam (2011), found some support that theory in their respective samples of New Zealand, UK and Pakistani firms, the results of Nance et al. (1993), Mian (1996) were rather inconclusive and other such as Glaum (2002) and Miloš Sprčić, Tekavčić, and Šević (2008c), Ameer (2010) and Arnold et al. (2014) and Donohoe (2015) and Manconi, Massa, and Zhang (2017) have not found any support for that hypothesis in their respective samples of German, Croatian, Slovenian and Malaysian non-financial firms.

d) Costly external financing

The creation of positive cash flows is essential for a firm to fund its growth aspirations and is a key factor for value creation. Those funds can be generated internally or obtained externally (debt and/or equity) with significant volatility in the value of those funds, for example, due to interest rate and exchange rate fluctuations, being able to disrupt a company's ability to invest. In this theory funds obtained from external sources are assumed more expensive than internal funds because of capital market imperfections (such as transaction costs and agency costs) and stabilizing a firm's cash flows through hedging can be value increasing as it improves the probability of having sufficient internal funds for planned investments and avoiding the need either to cut profitable projects or bear the transaction costs of obtaining external funding (Froot et al., 1993). As explored by numerous scholars, such as Stulz (1990), (Haushalter et al., 2002) and summarized by Glaum (2002), this rationale for hedging is more relevant:

- (i) The larger a firm's growth options.
- (ii) The more pronounced the informational asymmetries between management and investors and between different types of claim holders.
- (iii) The higher the cost of external funding.

Based on that theory and on evidence that internal cash flow is correlated to corporate investment, Froot et al. (1993) produced a model where the costly external

financing can result in underinvestment in some situation, namely when internally generated funds fall short to cover the amount of profitable new investments. Thus, the volatility of profits can lead to a shortage of funds and cause the firm to seek costly external financing for its investments in low-profit times. This, in turn, reduces in Froot et al.'s model the optimal investment in low-profit situations and firms can aim for hedging strategies that reduce the volatility of earnings.

While Berkman et al. (1997) and Jalilvand (1999) did not find confirming evidence, a huge number of studies have presented evidence that provides support for this rationale to hedge, amongst others Fok et al. (1997), Goldberg et al. (1998), Haushalter et al. (2002), Sprčić, Tekavčić, and Šević (2008b), Singh and Upneja (2008), Afza and Alam (2011), Chernenko and Faulkender (2012), Chaudhry et al. (2014), Deng et al. (2016).

2.2.3.2. Corporate hedging as a mean to maximise managers' private utility

This line of reasoning, introduced by Stulz (1984), refers to the incentives of managers to hedge their own wealth on the expense of shareholders. Thus this implies the failure of Fisher Separation theorem, which assumes that shareholders can fully delegate authority to managers whose instruction are to maximise shareholder value Gupta (2017); (Spanò, 2013)

Significant portions of the manager's wealth, in the form of income or share ownership, are linked with the economic situation and financial performance of the firm. Thus, other things being equal, managers prefer stability to volatility in order to improve their own wealth (Jensen & Meckling, 1976). Smith and Stulz (1985) pointed out, that as managers are not fully diversified, they have an incentive to hedge the risks inherent in their own position, and since hedging involves costs, they prefer the firm to hedge them. Against the background that managers might otherwise reject to undertake positive but risky net-present-value projects, the implementation of a risk management programme may also be in the shareholders' interest (Glaum, 2002).

Within the managerial compensation programme, while managerial share ownership provides management with incentives to implement a risk management programme, stock options provides management with an incentives not to hedge, as the value of their options is positively correlated to stock price volatility (Smith & Stulz, 1985).

A further reason, why management may prefer to hedge, focusses on managers' reputation. Managers may prefer to implement a risk management programme in order to communicate their managerial performance to outside observers without income volatility which is not in their control (Bodnar et al., 2016; Breeden & Viswanathan, 1998; DeMarzo & Duffie, 1995). Empirical results for maximising managers' private utility as a rationale to hedge are inconclusive with studies using managerial share ownership and stock option holdings as the variable to proxy managerial interest.

Glaum (2002) suggests that as the predicted relationship between derivatives uses and managerial stock and options holdings are exactly the opposite for hedging and for speculation, the fact that derivatives may be used by firms to hedge or speculate may explain inconclusive empirical results with regards to that theory. For example, some studies such as Berkman et al. (1997), Sprčić (2008a), Huang and Li (2014) did not find supporting evidence for that theory. In contrast in Tufano's (1996) study on North American gold mining firms, the firms' hedging activities were positively related to the value of the shares held by corporate management and negatively related to managers' stock options holdings and Wang and Fan (2011) found similar results for the oil and gas industry. Furthermore others such as Ertugrul, Sezer, and Sirmans (2008), Singh and Upneja (2008), Ameer (2010), Afza and Alam (2011), Sang, Abu, and Osman (2013), Bodnar et al. (2016) and Huang (2016) found similar supporting evidence.

Overall, Table 6 summarizes the key takeaways of this chapter. There are two groups that need to be considered within the hedging decision, namely the shareholders and the management, and both aim to increase profits/wealth by reducing costs associated with volatility. Those rationales and methods are relevant with regards to the extraction of elements that are making out the willingness of NFCs to conduct corporate hedging.

Table 6: Rationales for corporate hedging

Rationales	
Shareholder wealth increase	Reduction of costs of financial distress
	Reduction of agency costs of debt
	Reduction of pre- tax liability
	Reduction of costs of external financing
Managers private utility	Increase own income/wealth by letting firm hedge volatility
	Reputation of managerial performance

2.2.4. Optimal hedging strategy

Further insight into the elements that might influence the willingness and ability of NFCs to conduct hedging can be found in existing theories that deal with the optimal way of conducting hedging from a corporate's perspective. In comparison to the rationales for firms to hedge, which as shown above have been subject of broad investigations, the type of strategy to select, when the decision for corporate hedging is made, is less investigated. Corporate hedging strategy for that purpose is defined as the choice of the hedging instrument, hedge ratio, and tenor (length of time before the derivative expires). There are several studies on corporate risk management and derivative usage, such as Bodnar and Gebhardt (1999), Glaum (2002), Miloš Sprčić et al. (2008c), Kapitsinas (2008), Chaudhry et al. (2014), Bodnar et al. (2016), Huang (2016), Alexandridis et al. (2017) that have shown that firms use very heterogeneous approaches in terms of what kind of risk to hedge, how much of the risk position to hedge, and which instrument or instruments to use.

With regards to the derivatives choice, finance literature generally differentiates between linear and non-linear instruments. Derivatives with linear payoff structure (payoff function has a linear relationship to the price of the underlying asset) such as futures, forwards and swaps are able to inexpensively transfer risk and to reduce the variance of cash flow. Non-linear derivatives, such as options, can reduce downside risk while allowing upside potential and can be used for yield or income enhancement (Hopkin, 2017). At the inception, there are no costs associated when entering into linear derivatives while non-linear instruments are associated with an upfront payment (Hull, 2014).

Furthermore, an important factor, when it comes to the question of how to hedge, is the framework that the operating department is given by the executive board. For most non-financial corporates, it is the executive board that gives guidelines and procedures within which the operating departments can act.

Some seminal contributions have provided theoretical models that explain the optimality of one type of hedging strategy relative to the other including the optimal hedging strategy when linear instruments are chosen or when non-linear instruments are chosen (Bajo, Barbi, & Romagnoli, 2012). However, there is no single uniformly accepted model and most cited theoretical models have been set up within different contexts (Gupta, 2017; Huang, 2003; Mnasri, Dionne, & Gueyie, 2013; Spanò, 2013). Subsequently, empirical evidence and results have been mixed, however, below elaborations dwell on the most cited models, as summarized by Mnasri et al. (2013), and will analyse their possible contribution to the pre-conceptualisation of the impact-analysis-model.

For example, with view to derivative choice (options vs futures) in a portfolio context, Adler and Detemple (1988) argued in their seminal contribution that, in order to achieve optimal hedging, non-diversified managers with no limitation on borrowing and short-selling opportunities will adapt to linear strategies while investors that face borrowing constraints have incentives to use non-linear instruments as financing the margin on futures with short sales of risky securities would generate additional risk.

Froot et al. (1993) looked at corporate risk management in the context of firm-value maximization. They developed a model (FSS Model) that aims to show how a firm's optimal hedging strategy – in terms of both the amount of hedging and the instruments used – depends on the nature of their investment and financing opportunities and is set up in different settings. Within that framework, Froot et al. (1993) show that corporates will find a linear strategy optimal if the sensitivities of investment spending and internally generated cash flows are constant to changes of the underlying risk variable. If this is the case, the firm benefits from natural diversification and a linear strategy suffice to attain the optimal

level of investment. In contrast, a non-linear strategy is required, when future capital spending is a non-linear function of some hedgeable risk.

In the context of firm-value maximization, Mello and Parsons (2000) have developed a model (MP model) for evaluating alternative hedging strategies for financially constrained firms. They focussed on futures contracts and examined how liquidity and cash flow timing problems related to different hedging strategies can affect a firm's value with the optimal hedging strategy being the strategy that minimizes the variability in the marginal value in the firm's cash balances. Thus, the optimal hedging strategy efficiently redistributes cash balances across different states and periods, reallocating cash balances from states for which the marginal cost of the financial constraint is low to those states for which the marginal cost is high (Mello & Parsons, 2000). Furthermore, they highlighted the connectedness of every hedging strategy with a borrowing strategy.

Adam (2002) extended the FSS model and MP model to a multi-period framework. He focused on the reason why firms that face similar risk exposures, such as gold mining corporations, use differential non-linear hedging strategies and argues that this can be explained by differences in firms' credit risk premium, based on the cost differential between internal and external funds. He concluded that a linear approximation of the optimal hedging strategy works best for unlevered firms with only little investment opportunities and low levels of non-hedgable risk (i.e. production uncertainty). Adam (2009) investigated the reason for the usage of options strategies instead of linear strategies and confirmed the findings in Adam (2002). He added that firms with large investment programs which are a non-linear function of some exposure (future oil and gas prices) more likely use insurance rather than linear strategies (put options) and that hedging instrument choices are correlated with current market conditions, thus at least partially influenced by managers' market views.

Other authors assessed the derivative instrument choice with a view to the production characteristics and pricing characteristics of the company's output. For example, Moschini and Lapan (1992) looked on the linear instrument vs. non-linear instrument

choice for a competitive firm with production flexibility. Their model came to the result that a company should use non-linear strategies, namely shorting a put and call option with the same strike price (shorting a straddle position), if it has sufficient production flexibility, i.e. the company is able to change its production parameters after monitoring the future price of the output (Mnasri et al., 2013).

Brown and Toft (2002) modelled a profit-maximizing firm that is confronted with both price and quantity uncertainties and financial distress. Their model concludes that the optimal hedge is critically impacted by the fluctuations of prices and quantities, the correlation between spot prices and quantity produced and the profit margin. They suggest that firms benefit from undertaking a non-linear strategy when levels of quantity risk are nontrivial, or price-quantity correlation is negative. In contrast, they highlighted, firms might use linear strategies, in case of a positive price-quantity correlation which reduced the benefits of using options.

Gay, Nam and Turac (2002, 2003) derived a similar result when they examined how corporations should choose their optimal mix of linear and non-linear derivatives. Their model shows that firms could find linear strategies optimal when facing only price risk. When quantity volatility increases, the use of linear contracts will decline in order to reduce the over-hedging problem and substitution to non-linear strategies occurs. Over-hedging would include selling more quantities under linear derivatives than the already produced output (Mnasri et al., 2013). The level of price-quantity correlation subsequently determines the degree of substitution with a negative correlation exacerbating the over-hedging problem and hence inducing the firm to use non-linear instruments, while a positive correlation incentivises the firm to use linear instruments because quantities and prices are moving in the same direction and over-hedging is less likely (Gay et al., 2003).

Morellec and Smith (2007) analysed the relation between agency conflicts and risk management and showed the importance of underinvestment and overinvestment for a firm's hedging policy which found empirical support in Bartram, Brown, and Fehle (2009b). Their model predicts that more linear instruments stabilize generated cash flows

and reduce managers' affinity to overinvest, the latter being more related to the use of swap contracts only or collars only and negatively to put options only.

Overall, despite the existence of a number of theoretical models, empirical evidence is rather scant and mixed, perhaps due to the lack of a single uniformly accepted model and because models have been set up in different contexts (Mnasri et al., 2013). As a key takeaway of this section, Table 7 summarizes the key determinants of the most cited theoretical models on optimal hedging strategy. Those determinants will subsequently be critically reviewed with regards to their ability to contribute to the impact-analysis-model, i.e. serve as important elements of the willingness or ability of corporates to conduct corporate hedging.

IMPACT OF EMIR AND BASEL 3 ON CHA AND THE RESPONSE

Number	Year	Author	Title	Context	Methodology	Determinants of corporate hedging strategy									
						Typ of risk	Risk aversion	Costs/Prices	Market situation	Liquidity	Investments	Financing opport.	Production flexibility	Availability	Expertise
						10	10	7	6	6	5	6	5	10	10
1	1988	Adler and Detemple	Hedging with futures and option	Portfolio context, options vs futures	Minimum variance hedge model	1	1	1				1		1	1
2	1992	Moschini and Lapan	Hedging price risk with options and futures for the competitive firm with production flexibility	Production risk context	Production flexibility hedge model	1	1		1	1			1	1	1
3	1993	Froot, Scharfstein and Stein	Risk management coordinating corporate investment and financing policies	Firm value maximization	Finance - Investment hedge model	1	1	1			1	1		1	1
4	1995	Moschini and Lapan	The hedging role of options and futures under joint price, basis, and production risk	Production and price risk context	Optimal production and hedging decision model	1	1		1	1			1	1	1
5	2000	Mello and Parsons	Hedging and liquidity	Firm value maximization	Hedging and liquidity model	1	1	1			1	1		1	1
6	2002	Adam, T.R.	Risk management and the credit risk premium	Firm value maximization	Hedge and credit risk premium model	1	1		1	1	1	1		1	1
7	2002	Brown and Toft	How firms should hedge	Firm value maximization/production and price risk context	Quantity price correlation hedge model	1	1	1		1			1	1	1
8	2002/2003	Gay, Nam and Turac	How firms manage risk: the optimal ix of linear and nonlinear derivatives / On the optimal mix of corporate hedging instruments: Linear vs nonlinear derivatives	Firm value maximization/production and price risk context	Quantity price correlation hedge model	1	1	1	1				1	1	1
9	2009	Adam, T.R.	Capital expenditures, financial constraints and the use of options	Firm value maximization	Hedge and market condition model	1	1	1	1	1	1	1		1	1
10	2013	Mnasri, Dionne and Gueyie	How do firms hedge? Empirical evidence from U.S. oil and gas producers	Firm value maximization	Hedge and stock return and volatility sensitivity	1	1	1	1	1	1	1	1	1	1

Following factors have been extracted from the above-mentioned theoretical models as key factors in the context of the optimal hedging strategy:

1. **Risk exposure:** The type of risk that the company is exposed to (i.e., fluctuations in interest rates, foreign exchange rate or commodity prices) is the starting point for each hedging decision and as such either specifically mentioned or implicit in all models. This also includes the pay-off structure. The pay-off structure of the underlying risky asset is a fundamental element of the choice of a hedge strategy, as corporates aim to hedge the risk with a derivative with the same or similar pay-off structure. All studies differentiate explicitly or implicitly between linear and non-linear exposure. The type of risk exposure is particularly important when one is deciding on the optimal hedging strategy.
2. **Risk aversion:** A risk-averse attitude of corporates to financial risk is assumed by all models. It bases the rationale to hedge at all and intersects with the market/industry conditions and expectations, the correlation of the expectations to the risk that the company is exposed to, managements' (specifically the decision makers') guiding policy et cetera. The risk aversion of management and shareholders is of relevance in the initial hedging decision as well as when deciding on the optimal hedging strategy.
3. **Costs/prices:** While neglected by some models due to simplicity reasons, a major part of the studies consider costs as a key factor. This point includes all the costs that are associated with entering the hedging transactions. Like in the theories on rationale to hedge cost reduction and control is a key element when deciding to hedge and when deciding on the optimal hedging strategy.
4. **Market situation/expectation:** This factor has been mentioned by six studies and includes the level of uncertainty associated with the hedging decision. It includes the decision maker's expectations and opinions with regards to the development of the market and the risky asset or cash flows. Thus, also the correlation between the development of the market and the risky asset or cash flows is considered.
5. **Liquidity:** More than half of the studies regard the available liquidity as an important variable of the model or as one of the main aims of the model, namely, to ensure the company's ability to meet its cash flow commitments. To that end, it is

closely related to the financing and investing constraints as well as opportunities of the firm. The available liquidity is not mentioned by the theories on rationales for corporates to hedge as a key factor. The reason for that is that it is mainly relevant when one is deciding on the hedging strategy when the hedging decision has already been made. Thus, with regards to its contribution to the impact analysis model, it is less relevant for the decision to hedge at all but rather for how to hedge for the optimal outcome.

6. **Investments:** Half of the studies mentioned the investments and financings as key factors with regards to the optimal hedging strategy. Especially, studies reviewing the firm-value maximisation regard investment spending and fluctuations of the resulting cash flows as well as investment opportunities as an important element of the corporate hedging strategy. Like the key factor liquidity, investment and financing of investments are key factors when it comes to the optimal hedging strategy and less in the initiation of the hedging decision. Due to that they are not mentioned by the theories on rationales to hedge.
7. **Financing opportunities and costs:** In the same context as the investments, the supply of external finance at beneficial prices is regarded as an important element of the theories on optimal corporate hedging strategy as it can offset shortfalls of internal cash flows or allow pursuing further investment opportunities. In that manner, unnecessary fluctuations are also regarded as not beneficial for the corporates. Following the same logic as the key factors liquidity and investment, also this key factor is primarily relevant when deciding on the optimal hedging strategy.
8. **Production flexibility:** The studies that approached the field in the context of production risk brought forward the available flexibility on the production side as a factor. They argue that available flexibility on the production side can (partly) offset the spot price risk of the output of corporates. Production flexibility also is more of importance when the corporates are deciding how to hedge. This can particularly be

important as a natural hedge element, i.e. reducing the requirement to hedge with derivatives at all, or as an element of the optimal hedging strategy.

9. **Availability:** While the above-mentioned factors are specifically mentioned in the above theoretical models, there are further important factors that the theoretical models assume as given. An element which is not specifically mentioned in most of the studies but is implicitly a significant element in all models is the availability of the derivatives instruments that should be used to hedge the risk exposure and the availability of the required tenor. Most of the models are based on one or two period models. However, as the risk that corporates face is often more than one or two years, the availability of the hedging instruments is of relevance for the optimal hedging strategy but also for the ability to hedge at all.
10. **Expertise/systems:** These elements go in the same direction as availability. All theories and theoretical models assume that the corporates do possess the necessary expertise and systems to develop and secure the right strategy with derivatives. Thus, having the right systems in place and the knowhow of employees is of relevance for the optimal hedging strategy but also for the ability to hedge at all.

2.2.5. Preliminary impact-analysis-model

The above-mentioned theoretical models on the reasons for corporates to hedge and the optimal hedging strategy provide some ideas of the key factors with regards to a firm's hedging decision. In this section, those key factors will be reviewed with regards to their possible contribution to the preliminary Impact-analysis-model related to the impact of regulation on corporate hedging activities (i.e. willingness and ability to hedge).

From a change management perspective, Arnold and Bohner (1993) defined impact analysis as the activity of identifying what to modify to accomplish a change, or of identifying the potential consequences of a change while Pfleeger and Atlee (2006) see it as the evaluation of the many risks associated with the change, including the estimation with regards to the required effort, schedule and effects on resources. For the purpose of this study, impact analysis is defined in line with the second definition of Arnold and Bohner (1993) while the first definition is a rather active approach to change and Pfleeger

and Atlee (2006) limit it on risks connected with change while also chances can play a role for this study. Thus, impact analysis is defined as the activity of identifying the potential consequences of a change.

Given that we are not only interested in the question if there is an impact of regulation on corporate hedging activities but much more in how exactly the impact is happening, the model will have a micro approach, meaning that the key concept of the model (Corporate Hedging Activity) will be disaggregated in its constituent elements and the impact of the regulation on each of the elements will be analysed. Thus, the model will constitute of the factors determining the willingness and the ability of NFCs to conduct corporate hedging.

Regarding the factors determining the willingness of NFCs to hedge, the theories on rationales for corporates to hedge, irrespective of pertaining to the shareholder or managers' context, suggest that the reason for hedging is the maximisation of profits and subsequently firm value. This is done through the elimination of volatility of cash flows and reduction of financial and tax costs. This suggests that shareholders' and managers' risk aversion (i.e., elimination of volatility) is the starting point of any hedging decision. Shareholders and managers are assumed to be risk averse and based on this they decide to hedge risk exposure partly or fully. Thus, depending on the ownership structure and managements' incentives there might be differences between companies with regards to the degree of risk aversion which subsequently would be reflected in the company's hedging policy.

Also, the theories on the optimal hedging strategy support the notion of a company's stance towards risk being an important point. The key factors risk exposure and risk aversion of the theoretical models on optimal hedging strategy suggest that the type of risk exposure is the starting point for each hedging decision and that all corporates that use derivatives have a risk averse attitude. However, other key factors extracted from the theoretical models on optimal hedging strategy, namely liquidity, investments and financing opportunities/costs also support that argument of risk aversion of decision makers being a key determinant. While the liquidity situation as well as the investment and financing

opportunities and costs are particularly important when one is considering how to hedge, they also hint to the notion that management is hedging to avoid the risk of less liquidity, investment opportunities and financing opportunities as well as to avoid an increase of financing costs.

Overall, the following detailed research question will be investigated, which should investigate if risk aversion of managers and shareholders is a key determinant for the decision to do hedging, why this is or is not the case:

D1: Is the risk aversion of shareholders' and managers' a key determinant of the willingness of NFCs to do corporate hedging and subsequently of the impact-analysis-model?

The existing theories on the rationale for corporates to conduct corporate hedging, irrespective of relating it to the shareholders' wealth maximisation or managers' private utility, hint to another element that can be of relevance for the willingness of corporates to hedge. The theories state that shareholders and managers aim to reduce the risk in the market for interest rates and foreign exchange through hedging which essentially is the transfer of the risk towards the derivatives market. This suggests that there is trust in the derivatives market which could be relevant for the willingness to hedge. The theories on optimal hedging strategy do not specifically mention trust of the counterparties to each other as a determinant of the optimal hedging strategy. The reason for that might be that trust is relevant at the beginning of the hedging decision and already given when deciding on the optimal hedging strategy. Thus, it can be assumed that trust is an underlying factor in the theories of the optimal hedging strategy as well.

Overall, as NFCs are replying to the volatility of cash flows by hedging through derivatives, there must be a certain level of trust, in terms of security, from the NFCs into the derivatives market and the counterparty that is trading with them. Otherwise, NFCs would not feel more secure after the hedging with derivatives. Thus, it can be assumed that the degree of trust that NFCs have in the derivatives market and the counterparty that is trading with them also influences their willingness to hedge. Therefore, the following

detailed research question is investigated, which should investigate if the trust is a key determinant when NFCs decide to engage in corporate hedging, why this is or is not the case:

D2: Is the degree of trust into the counterparties and the derivatives market a key determinant of the willingness of NFCs to do corporate hedging and subsequently of the impact-analysis-model?

The theories on the rationale for corporates to hedge show that firms aim to reduce or control costs that are associated with volatility, such as costs of external financing, financial distress, and tax costs. Thereby, they aim to increase firm value. This notion is also supported by the theories on optimal hedging strategy, as a major part of the theoretical models consider costs as a key factor. Subsequently, when the reduction in financial costs through hedging does not lead to an increase in profits, for example, due to higher transaction costs, this rationale for hedging would be meaningless. Therefore, it can be assumed that costs considerations also impact the willingness of NFCs to hedge through derivatives. As a result, the third detailed research question investigates, if costs consideration belongs to the key determinant when NFCs decide to do corporate hedging and why this is or is not the case.

D3: Is costs consideration a key determinant of the willingness of NFCs to do corporate hedging and subsequently of the impact-analysis-model?

The above three factors are the factors that are assumed to influence the willingness of NFCs to do corporate hedging. Before moving over to the factors that determine the ability of NFCs to hedge, however, the following detailed research question will be asked:

D4: Are there any other factors that are important for the willingness of NFCs to do corporate hedging and can be considered key determinants?

With regards to the factors determining the ability of NFCs to hedge, an important

factor which intuitively comes to mind, and is assumed as given in the above-mentioned theoretical models on optimal hedging strategy is that the NFCs have the appropriate systems and processes to conduct and accommodate the derivatives trades. This includes the technological means to connect with the trade counterparties and accomplish the trade as well as to depict the trades in their accounting and booking systems. Also, appropriate processes, including guidelines or policies, are required to handle the trade, the booking, and monitoring properly. This includes the separation of front-office and back-office within the risk management department, with the first doing the trade and the latter booking and monitoring it. Thus, the fifth detailed research question is asked to investigate if the systems and processes are a key determinant that influences the ability of NFCs to do corporate hedging and why this is or is not the case.

D5: Are the systems and processes in relation to corporate hedging a key determinant of the ability of NFCs to conduct corporate hedging and subsequently of the impact-analysis-model?

Furthermore, the theories of the optimal hedging strategy suggest that the expertise of the employees, that do the hedging, and hedging policy deciders are of importance. At all stages of the corporate hedging transaction, that is from calculating the risk exposure to determining the appropriate hedge ratio and choosing the right instrument, the know-how of the employees and management play a major role. The theories on rationale for corporates to hedge do not mention this suggestion but it appears to be the basis for the hedging decision, as one would only hedge with derivatives when one also has the expertise to handle the trade and monitor the trade subsequently. Therefore, it can be assumed that the knowhow of the employees and management with regards to corporate hedging is influencing their ability to do corporate hedging. Consequently, the following detailed research question is suggested to investigate if knowhow is a key determinant of the ability to do corporate hedging and why this is the case or not the case:

D6: Is the knowhow on corporate hedging a key determinant of the ability of NFCs to conduct corporate hedging and subsequently of the impact-analysis-model?

Another determinant that is a key factor in the above-mentioned theoretical models on optimal hedging strategy is the availability of the required instruments and the required tenors. This is, of course, dependent on the derivatives markets' situation, i.e. when the lack of availability of the required derivatives instruments can negatively influence the ability to hedge in an optimal way. The same holds for the required tenors, i.e. when the required tenors are not available, then the NFCs' ability to hedge might be negatively influenced. For most NFCs their core banks make out the market who then, in turn, close the transaction with another counterparty with the opposite demand. Thus, also the situation on the derivatives market, be it directly with another counterparty or via the banks, can influence the ability of NFCs to conduct corporate hedging. Therefore, the following is asked to investigate in how far the situation on the market can influence the ability of NFCs to do corporate hedging:

D7: Is the situation on the derivatives market a key determinant of the ability of NFCs to conduct corporate hedging and subsequently of the impact-analysis-model?

Finally, also here further investigation is also required to see if there are other factors that are key determinants for the ability of NFCs when doing corporate hedging. Thus, the following detailed research question is asked:

D8: Are there other factors that are important for the ability of NFCs to hedge and can be considered key determinants?

A look into the general workflow of a hedging transaction from a NFC's perspective, as Figure 15 shows, appears to confirm the above-mentioned factors. Below figure show general 6 steps of the corporate hedging workflow and the key determinants of each step.

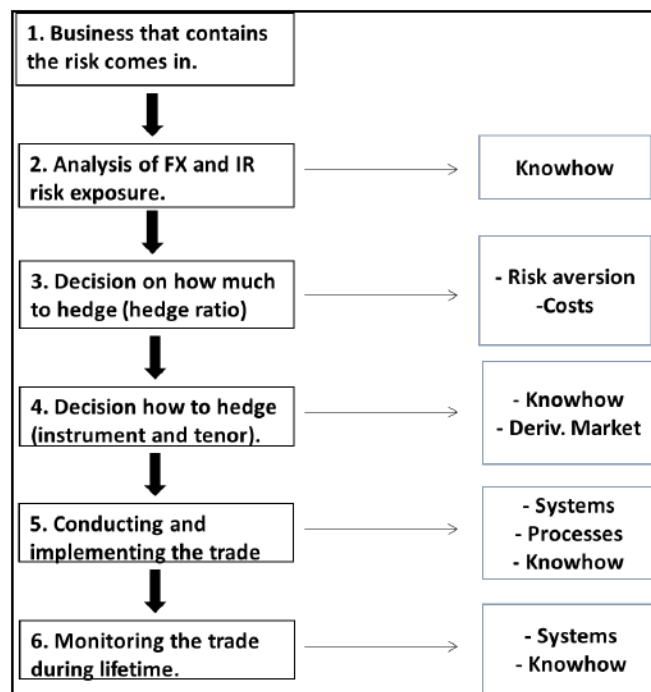


Figure 15: Corporate hedging workflow and key determinant

With regards to the relationship of the corporate hedging activities and the risk/return consideration, the theories on rationales to hedge have shown that firms hedge in order to increase firm value. Therefore, hedging has a positive impact on risk reduction and in subsequently securing certain level of profits. Following this, less hedging might have a negative impact on risk and subsequently lead to more volatility of profits. Thus, if the impact of the regulatory changes is leading to a reduction of the hedging activity, this will increase the firm's risk position and might have negative consequences on profits and firm value as well.

Based on the deep dive into the existing corporate hedging literature, especially the literature on the rationale for corporates to hedge and the theoretical models on optimal hedging strategy, the above mentioned potential key elements of the willingness and the ability of NFCs to conduct corporate hedging are used to create a preliminary impact analysis model. As figure 16 below shows, the theories on rationale for corporates to hedge mainly contributed to the three key determinants that are linked to the willingness of NFCs to hedge. The theoretical models on optimal hedging strategy mainly contributed to the key

determinants that explain the ability of NFCs to hedge. The preliminary impact analysis (Figure 16) should be refined in the empirical phase of the study. The finally created model should subsequently help analysing the impact of the regulatory changes on NFCs corporate hedging activities, i.e. answering of the first research question.

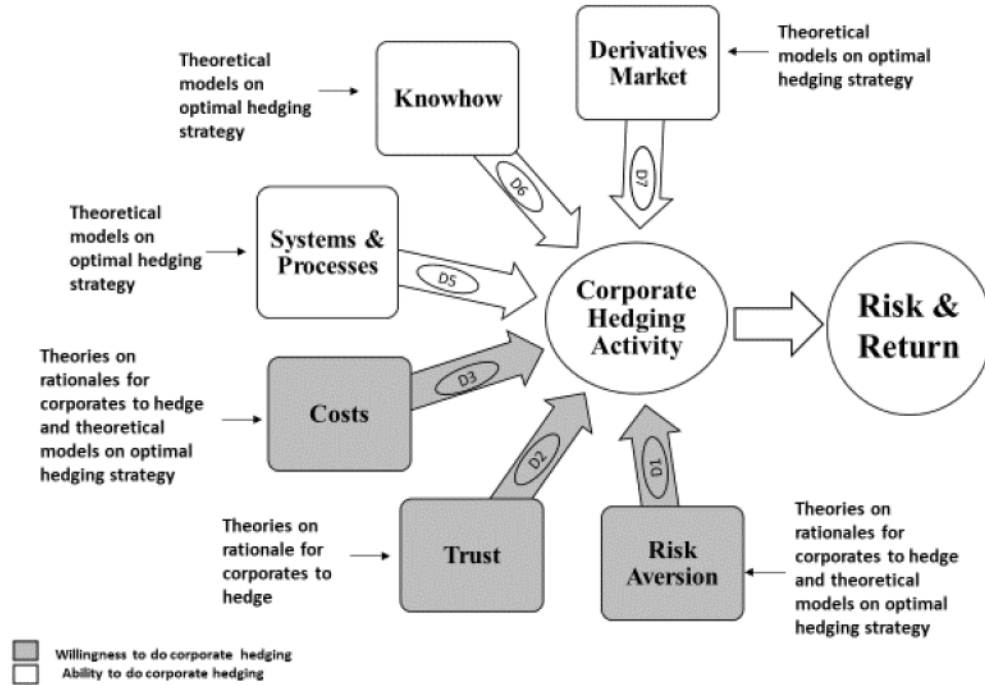


Figure 16: Preliminary impact-analysis-model

In view of the first research question and using the impact-analysis-model, following detailed research questions are asked that should investigate how EMIR and Basel III regulation have impacted the corporate hedging activities of NFCs:

D9: Which of the key determinants of the impact-analysis-model are impacted by EMIR and what is the consequence for risk and returns of NFCs?

D10: Which of the key determinants of the impact-analysis-model are impacted by Basel III and what is the consequence for risk and returns of NFCs?

2.2.6. Summary and conclusion

After identification of the gap in current knowledge with regards to studies analysing the impact of regulation on corporate hedging activities, i.e. existing research studies do not provide a theoretical framework that could lead the empirical research phase, this section has set the basis for understanding the theories around the research subject. This section explained the theoretical perspectives with regards to corporate risk management and presented the definition of corporate hedging. Theories to find within finance theory, namely the rationales for corporates to hedge and the theoretical models on optimal hedging strategy have been critically reviewed with regards to their ability to contribute to the creation of an initial impact-analysis-model and detailed research questions.

Based on the analysis of the literature on the rationales for corporates to hedge and the theories on the optimal way of hedging, I have suggested a pre-conceptualisation of an impact-analysis-model that should guide the analysis of the impact of the regulatory changes on corporate hedging activities. The findings have been applied to formulate detailed research questions that should guide the empirical research phase.

2.3. Literature on organisational response to regulation

The following section reviews studies that can provide a framework on how NFCs will respond to regulatory impact on their hedging activities. Given the lack of a theoretical framework in the financial risk management field, the search is expanded to the strategic management field. It starts by outlining the general importance of regulation when it comes to the strategic options of firms and goes subsequently over to the concept of organisational response to regulations.

2.3.1. Strategy and regulation

The significance of the general environment (which includes regulation) when it comes to a firm's strategic options was always of significant interest for strategy scholars and has been researched from different perspectives. Over the last sixty years, the literature and research on strategic management spread out leaving a diversity of partly competitive

and partly complementary paradigms (Özleblebici & Çetin, 2015; Tansey, Spillane, & Meng, 2014; Volberda & Elfring, 2001). Influential studies can be differentiated in those that focussed their studies on the importance of the environment for opportunities and threats and for positioning the firm with regards to competition such as Ansoff (1965), Andrews (1971), Porter (1979), and those that emphasized the different roles of organizational members when generating strategies such as Mintzberg (1987), Burgelman (1983a) and Hart and Banbury (1994).

With regards to governmental and regulatory involvement, studies show that it is together with ownership structures the major considered external actor when generating the corporate strategy, structure and processes (Frankenberger, 2006). In his study on the influences of external, regulatory actors on corporate strategy and structure, Frankenberger (2006) categorized the literature regarding the impact of governmental/regulatory involvement in five clusters, namely: (1) internal effects, in the form of adjustments of corporate strategy and structure; (2) external effects in the form of externally directed strategic responses of corporations; (3) proactive political strategies to influence the legislation and regulation process; (4) interactive strategies involving multiple actors; (5) macro level studies. He found, and this review of current literature confirmed that most of the studies fall into the first cluster and are concerned with environmental regulations. The first cluster, namely internal effects on the corporate strategy and structure, is also of interest with regards to the third aim of this dissertation, namely, to explore the response of NFCs to the regulation in terms of adjustments of strategy and structure.

2.3.2. Concepts of organisational responses

Regarding the organisational responses to regulation, a milestone study which is cited by several studies (e.g. Chattopadhyay, Glick, and Huber (2001); Frankenberger (2006); Saebi, Lien, and Foss (2016); Vest and Kash (2016)) is the study of Cook et al. (1983). They discussed the type and timing of internal adjustments made by hospitals and patterns of inter-organizational activity within the framework of regulatory constraints. Cook et al. (1983) provide a general theory of organizational response to regulation, which is illustrated using the hospital industry. The theory consists of two major components, (i)

the conceptualisation of the nature of regulatory process into four dimensions (scope, restrictiveness, degree of uncertainty and duration) which reflects the intensity of the regulation and (ii) the organisational response, in the form of an adaption and mutual selection perspective. The adaptation perspective deals with the efforts made by organisations to adapt to changing environmental circumstances and the selection perspective deals with the constraints set by the environment, limiting the adaption process (Cook et al., 1983). Furthermore, Cook et al. (1983) differentiated three levels of organizational level responses to regulation, namely institutional, managerial and technical (see Table 8) and suggest that there is a hierarchical ordering of responses to regulation that constrains financial resources, in view of the relative costliness of making the organizational changes. The theory predicts that organisations will first make internal adjustments at institutional level, followed by managerial level changes, and only as regulation, which is also influenced by other exogenous factors such as political climate, increases in intensity will changes be made at the technical level (Cook et al., 1983).

Table 8: Examples of organisational responses to regulation

	Intra-hospital Regulatory Response	Inter-hospital Regulatory Response
Institutional Level Response	Lawsuits Hospital involvement with regulatory agencies Trustee education program	Multiunit hospital system involvement Merger, Consolidation, alliances Hospital association activity
Managerial Level Response	Boundary spanning activities Consultants, legal, financial marketing Planning department, changes in centralisation and participation in management decision making More budgetary and accounting activities for middle managers Development and expansion of public relation and community affairs Changes in medical staff	Shared nonclinical services Involvement in management contracts and consortia Joint planning with other hospitals Joint review with other hospitals of rates before rate review bodies
Technical Level Response	Development of new services and programs Changes in scheduling, pricing, staffing, practices, concentration of output etc.	Shared clinical services Shared medical staff arrangement

According to that theory, in the earlier and milder form of the regulation, organisations will try to mitigate the uncertainty created by regulatory changes through mechanisms such as educating trustees, attempting to become involved in the process and testing the legality of the imposed regulation through lawsuits. As the regulation persists, organisational response will go over to acquiring additional expertise and input and thereby developing greater boundary spanning capability for dealing with the regulatory environment (Cook et al., 1983).

The theory continues that organisations will try to avoid technical level responses and make them only as regulation increases in intensity. Rationale for that is that those changes go into the core of the products and services provided by the organisation and include an adjustment in the actual services and products provided, in staffing, scheduling

and so on and organisations will try to protect their technical core, given that any modifications in that are costlier and they are the type of changes that the professionals in the organisation care the most about (Cook et al., 1983). The theory notes that contextual variables such as ownership structure might influence the response and further predicts, that only after exploring all the intra-organisational responses, organisations will consider making inter-organisational response. Figure 17 presents the theory of organizational response to regulation according to Cook et al. (1983).

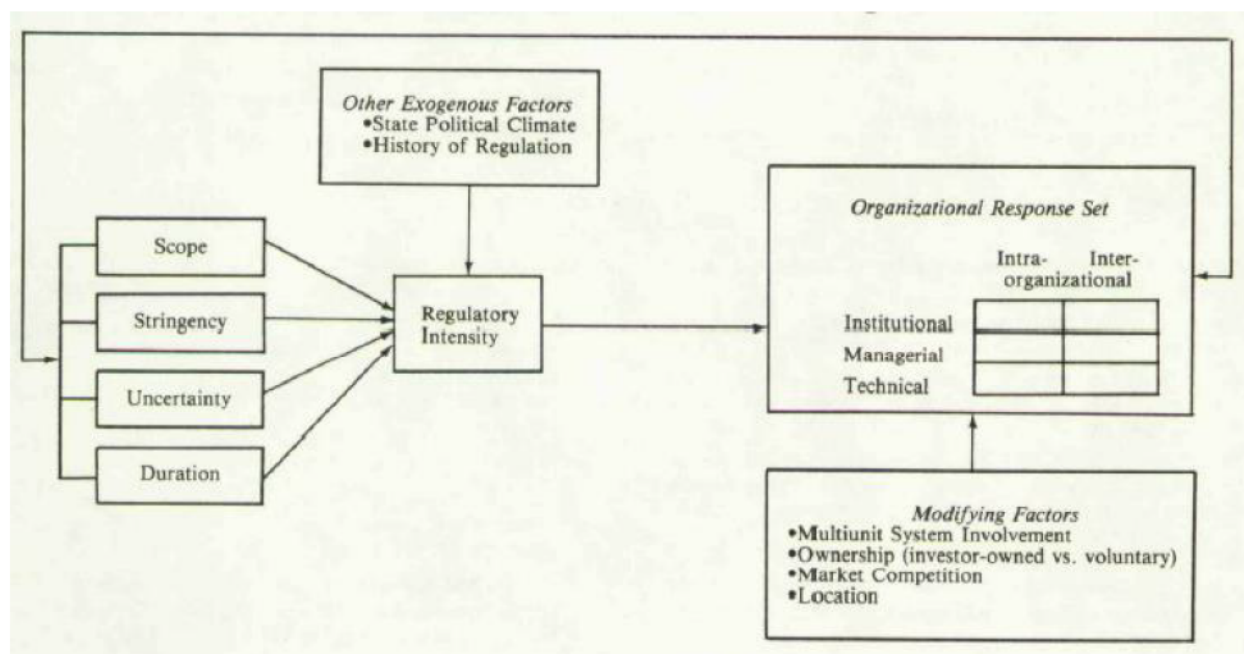


Figure 17: Theory of Organisational Responses to Regulation

Source: Cook et al. (1983), *A theory of organizational response to regulation: the case of hospitals. Academy of Management Review*, 8(2), (pp 203).

While the concept of the regulation, in the form of a tax on services and products as considered by Cook et al. (1983), is not fully applicable to the regulation at hand, given that the EMIR and Basel III regulations are not directly impacting the products and services of the company, the concept of organizational response is helpful to categorize the response forms. Applying that on NFCs and the regulation of the OTC derivatives market suggests that the phase of intra-organisational level response has already been passed, given that EMIR and Basel III regulations have already been implemented. Responses that could be categorized in that phase are the lobbying of NFCs to be exempt from EMIR's clearing

obligations when the derivative transaction is for hedging purposes as well as the CVA addition exemptions for transactions with NFCs for hedging purposes.

Thus, as the regulation already overcame institutional level responses, organisations would now turn to managerial level responses, including the use of consultants, the change in degree of centralization, the upgrade of booking and trading systems etc. Given that the regulations are not directly impacting the products and services of the NFCs, the intensity of the regulation is rather mild, so that it is assumed not to lead to the necessity of technical level responses.

Therefore, it could be assumed that organisations will mainly rely on managerial level changes as response to the regulatory changes. Managerial level responses are connected to costs and additional investments in systems with no additional revenues coming from that investment. This, in general, would have negative consequences for the returns of the NFCs as they would decline. Consequently, the following four detailed research questions are asked to investigate what measures NFCs have been taken as a response to the regulatory changes and what that response means for the risk position and the return of the NFCs:

D11: What measures do NFCs take in terms of alignment of internal processes and strategy as a response to EMIR and Basel III regulations?

D12: What is the consequence of the above-mentioned responses for risk and returns of NFCs?

D13: Can the response of NFCs be conceptualised based on the organisational response set of Cook et al. and can the theory on the level of organizational response to regulation be applied?

2.3.3. Summary and conclusion

This section has expanded the literature review on regulation and strategy with the aim to conceptualise the responses of the NFCs to the regulatory actions. First, the author has explained the general importance of regulation regarding the strategic options of firms. Subsequently, the study discussed the concept of organisational response to regulations that categorizes the response of organisations to regulation into institutional level responses, managerial level responses, and technical level responses. The main purpose to provide the organisational response set is, to check if the results of the interviews related to the response of NFCs to the regulatory actions can be categorized based on this concept.

2.4. Chapter conclusion and a priori conceptual framework

Overall, this chapter has set the basis for the understanding of the subject by explaining the theoretical perspectives with regards to corporate risk management and presenting the definition of corporate hedging. Theories to find within finance theory, namely the rationales for corporates to hedge and the theoretical models on optimal hedging strategy have been critically reviewed with regards to their ability to provide a theoretical or conceptual framework.

The search of relevant literature revealed a gap in current knowledge with regards to studies analysing the impact of regulation on corporate hedging activities as well as NFCs' management of the impact in terms of internal alignment. Given the gap, a priori conceptual framework (Figure 18) has been created and detailed research questions have been formulated.

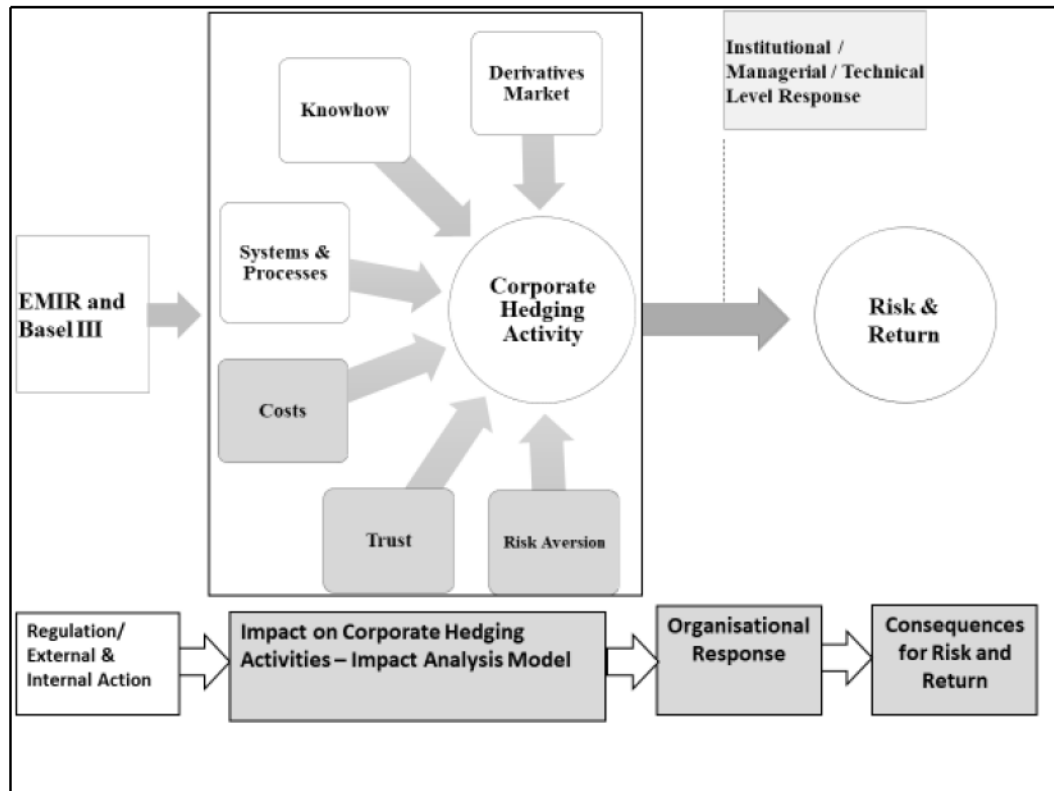


Figure 18: A priori conceptual framework

The below depicted research study progression matrix (Table 9) shows the development of the study and the application of scientific methodology at each point. It shows the connection of the research questions to the research aim and objectives.

Table 9: Research study progression matrix (1)

Research aim	Research Questions	Research objectives	Detailed Research Questions
To explore and evaluate the impact of regulatory initiatives on corporate hedging activities of NFCs and corporate response in the context of risk and return considerations	1. How do EMIR and Basel III regulations impact corporate hedging activities of NFCs in Germany in the context of risk and return considerations?	1. To create a model that helps analysing the impact of regulatory initiatives on corporate hedging activities	<p>D1: Is the risk aversion of shareholders' and managers' a key determinant of the willingness of NFCs to do corporate hedging and subsequently of the impact-analysis-model?</p> <p>D2: Is the trust in the counterparties and the derivatives market a key determinant of the willingness of NFCs to do corporate hedging and subsequently of the impact-analysis-model?</p> <p>D3: Are cost considerations a key determinant of the willingness of NFCs to do corporate hedging and subsequently of the impact-analysis-model?</p> <p>D4: Are there any other factors that are important for the willingness of NFCs to do corporate hedging and can be considered key determinants?</p> <p>D5: Are the systems and processes in relation to corporate hedging a key determinant of the ability of NFCs to conduct corporate hedging and subsequently of the impact-analysis-model?</p> <p>D6: Is the knowhow about corporate hedging a key determinant of the ability of NFCs to conduct corporate hedging and subsequently of the impact-analysis-model?</p> <p>D7: Is the situation on the derivatives market a key determinant of the ability of NFCs to conduct corporate hedging and subsequently of the impact-analysis-model?</p> <p>D8: Are there other factors that are important for the ability of NFCs to hedge and can be considered key determinants?</p>
		2. To analyse and evaluate the impact of EMIR and Basel III in the context of risk and return considerations of NFCs.	<p>D9: Which of the key determinants of the impact-analysis-model are impacted by EMIR and what is the consequence for risk and returns of NFCs?</p> <p>D10: Which of the above-mentioned key determinants are impacted by Basel III and what is the consequence for risk and return considerations?</p>
	2. How do NFCs response to manage the regulatory impact in the context of risk and return considerations?	3. To analyse and evaluate NFC's response in the context of risk and return considerations	<p>D11: What measures do NFCs take to manage the impact of EMIR and Basel III regulations?</p> <p>D12: What is the consequence of the above-mentioned responses for risk and returns of NFCs?</p>
		4. To conceptualise NFCs' response to regulation.	D13: Can the response of NFCs be conceptualised based on the conceptual framework of Cook et al. and can the theory of the level of organisational response to regulation be applied?

3. METHODOLOGY

3.1. Chapter introduction

This study set out to explore, how regulatory actions are impacting corporate hedging activities and how NFCs are responding to that. For that, based on the literature review, an initial impact-analysis-model as well as an initial conceptual framework have been created. The applicability and correctness of both will be explored in the empirical phase of this study.

This chapter explains the methodology applied in the empirical research phase. First the philosophical stance that underpins this study will be presented as well as how the philosophical stance can influence the way the answering of the research questions is undergone. After that the research approach and the research design will be explained, which are based on the type of data required to answer the research questions and the most appropriate procedures of inquiry. Finally, this chapter also will cover ethical construct of the research design and ways to ensure the quality of the research design.

3.2. Research philosophy

The word philosophy describes the critical examination of the grounds for fundamental beliefs and an analysis of the basic concepts employed in the expression of such beliefs (Encyclopaedia Britannica, 2019).

Scientific research aims at contributing to knowledge by creating new knowledge or reforming the existing knowledge about phenomena. At every stage of the research process it is underpinned by the researcher's research philosophy, that is the assumptions about the way in which the researcher views the world (Saunders, Lewis, & Thornhill, 2016; Silverman, 2016; Trochim & Donnelly, 2007). As Kuhn (2012) pointed out, the basis of scientific development is driven in normal periods of science by adherence to a paradigm, which is a set of linked assumptions about the world shared by a community of scientists investigating that world. Thus, being aware of one's philosophical assumption is important for researcher's as this significantly impact one's understanding of the phenomena under investigation as well as on the applied strategy and methods.

Within that framework, Easterby-Smith, Thorpe, and Jackson (2018) identified three minimal reasons explaining the significance of understanding the utility of philosophical issues to researchers:

- Help clarify the required research design, not only in terms of what kind of evidence is required and how it is to be gathered and interpreted, but also how this will contribute to answering the basic questions being investigated.
- Awareness of philosophy can help to recognize which design will work, thus avoiding going up too many blind alleys and indicate the limitations of certain approaches.
- It can support the researcher in identifying, or even creating, designs outside his or her experience and may also suggest ways to adapt these designs.

Research conventionally, differentiates between various types of research philosophies, of which three are considered as the key philosophies: Positivism, realism, and interpretivism. The philosophies are formed from basic ontological and epistemological positions of the researcher, and have developed in both classical (positivism and interpretivism) and contemporary (realism) forms (Silverman, 2016). Ontological assumptions deals with the nature of reality and existence while epistemological assumptions are concerned about the best ways of enquiring into the nature of the world (Easterby-Smith et al., 2018). Furthermore, the axiological assumption, which is the values that the researcher brings to the study, influences the overall research philosophy (Creswell & Poth, 2017).

On the one end of the research philosophies' spectrum are positivists, believing in a social world that exists externally, and that its properties are measurable through objective methods, rather than being inferred subjectively through sensation, reflection or intuition (Easterby-Smith et al., 2018). Positivists mostly employ quantitative methods, trying to produce causal explanations or even scientific laws, and, thus, refer to natural science in their ontology and epistemology (Alvesson & Sköldbberg, 2017; Saunders et al., 2016). This approach offers the advantage that data are usually easy to access and generalise; however,

it also presents possible shortcomings since the generalisation of complex phenomena can lead to false decisions.

Interpretivists in contrast, believe that the real world can only ever be perceived and its working out (social reality) is a human construction. They develop subjective meanings of their experiences, leading them to look for the complexity of things rather than narrow the meanings into a few categories or ideas (Creswell & Poth, 2017). They usually employ qualitative methods, in line with their ontological and epistemological position, in order to gain a deep insight into a field, with a richness of description not obtainable by quantitative methods. However, they have to face the problem that results are difficult to measure in terms of validity, reliability and generalizability (Silverman, 2016).

The criteria for selecting a certain philosophical approach is determined by the personal experience of the researcher (and pertains to worldview, training, experience, psychological attribute), the nature of the research problem, and the audience of the study (Creswell & Poth, 2017). As regards these three points, the philosophical stance that underpins this research study is not confined to either the positivists' end or the interpretivists' end of the spectrum. It is rather a mix of both, bringing the author to the position of the realist. Realists claim that there is a real world out there and it is possible to make causal statements, but, that not all social phenomena and the relationships between them are directly observable (Fletcher, 2017). Bhaskar introduced critical realism in 1975, rejecting the "one size fits all" approach and proposed selecting research methods and techniques according to the nature of the phenomena under investigation (Bhaskar, 2013). Over the past decades subsequently critical realism has gained popularity as a philosophical framework for social scientific research through the work of various researchers such as Ekström (1992), Collier (1994), Danermark, Ekstrom, and Jakobsen (2005), (Cruickshank, 2003), and Archer, Lawson, and Norrie (2013)

Critical realism deviates from positivism and interpretivism in a way that it does not reduce ontology (i.e. what is real, the nature of reality) to epistemology (i.e. our knowledge of reality), but it rather acknowledges that human knowledge captures only a small part of

deeper and vaster reality (Fletcher, 2017). Critical realism does not deny the existence of a real social world that can be attempted to understand through philosophy and social science (Danermark et al., 2005) but points out that some knowledge can be close to reality than other knowledge (Fletcher, 2017).

Syed and Mingers (2018) have accurately summarized, the primary characteristics of critical realism, described below:

- A commitment to realist ontology, that means to the existence of causal mechanisms whose interactions generate the world events and occurrences.
- An epistemology that accepts, with interpretivism, that our knowledge is always socially and historically relative, but maintains a distinction between the transitive, subject-dependent aspects of knowledge, and intransitive domain of the objects of our knowledge.
- A commitment to methodological pluralism based on its pluralist ontology.
- The claim that no social theory can be purely descriptive, it must always be to some extent evaluative, and thus there can be no positivistic split between facts and values.

Critical realists argue that what can be observed is a complex interaction of mechanisms and tendencies of social structures and actions (Pühretmayer, 2014). The structures and the intentions or motivations of actors are usually not directly observable, but their actions are (Pühretmayer, 2014). Thus, in critical realists' ontology, reality is stratified into three levels. The first level (empirical level) deals with events that we experience and can measure empirically while at the second level (actual level) events occur whether or not we experience or interpret them, and the third level (real level) explains causal mechanisms that are inherent properties in an object or structure that act as causal forces to produce the events observed at the empirical level (Fletcher, 2017).

Syed, Mingers, and Murray (2010) also argued, the critical realist's perspective can contribute to an improved understanding of tensions between research and practice and address several research-practice inconsistencies with its simultaneous critical attention to

scholars' and practitioners' preferences and constraints. The research-practice gap is an often-mentioned problem in the field of business and management. Critical realism offers a richer social ontology that also considers the material/objective dimension of social reality and a different epistemology, an alternative perspective on the nature/purpose of social science (Syed & Mingers, 2018).

This research project is approached from the philosophical perspective of a critical realist. As typical for critical realists, like many other researchers, the author commences the research with a particular problem, guided by initial theory (Fletcher, 2017). However, critical realism accepts that the current theory may not reflect reality accurately and some theories may be more correct (Bhaskar, 2013), i.e. it avoids any commitment to the content of specific theories and recognises the conditional nature of results of the theories (Fletcher, 2017) .

3.3. Approach to Research

In terms to the approach to research, this study assesses and evaluated the type of data is required to answer the research questions as thoroughly as possible. Literature differentiates three approaches to research, namely quantitative, qualitative or multiple methods research design (Creswell & Poth, 2017; Easterby-Smith et al., 2018). While the primary researcher abstains from conducting a detailed discussion about the different approaches to research, which can be found in various literatures, the author presents the key aspects and justifying on that basis the overall choice for a qualitative research methodology for this study.

In general, quantitative research is an approach for testing objective theories by examining the relationship among variables, that can be measured by numeric data and analysed using statistical procedures (Creswell & Poth, 2017). This approach to research is generally employed by positivists with a deductive approach to reasoning, usually examining the relationship between variables and attempts to produce causal explanations or even scientific laws and thus refer to natural science in their ontology and epistemology (Maxwell, 2013). The goal of a quantitative research is often the prediction of outcomes

and generalization. Nevertheless, the approach may also fit with the realist and pragmatist philosophies or in some cases such as the collection of qualitative numbers (data based on opinions) it may even partly fit within an interpretivist philosophy (Saunders et al., 2016). However, despite the advantage that data are usually easy to access and generalise; this approach also has shortcomings since the generalisation of complex phenomena can lead to false decisions (Easterby-Smith et al., 2018).

In contrast to that, qualitative research is an approach for exploring and understanding the meaning individuals or groups assign to a social or human problem (Creswell & Poth, 2017). Qualitative research is generally employed by interpretivists, in line with their ontological and epistemological position of a world that is only socially constructed and all knowledge about it is subject to interpretations (Ritchie, Lewis, Nicholls, & Ormston, 2013).

The process of research generally involves emerging questions and procedures with data analysis inductively building from particulars to general themes, and the researcher making interpretations of the meaning of the collected data (Creswell & Poth, 2017). However, as in the case of quantitative research design, this approach may also align with the realist and pragmatist philosophies (Ritchie et al., 2013). An often mentioned critic on qualitative research evidence is that such research and findings are difficult to measure in terms of validity, reliability and generalizability (Creswell & Poth, 2017) and thus hard to access by practitioners. In that context, the generalising of qualitative research evidence has been criticised by several qualitative researchers, as they restrict their findings to a specific context. To some of them, generalisation is neither desirable nor necessary as qualitative studies are not designed to allow systematic generalisations to some wider population (Ritchie et al., 2013). Detaching the qualitative finding from its context can in their view cause a loss of meaning since it is the context that gives the researcher a unique access to understanding the finding (Ritchie et al., 2013; Sandelowski & Barroso, 2006).

Mixed methods research is an approach that includes collecting both quantitative and qualitative data with the core assumption being that the combination of both

approaches provide a more complete understanding of a research problem than either approach alone (Creswell & Poth, 2017). The researcher subsequently has the full repertoire of methodological options, enabling to negate some disadvantages of certain methods and complement the strengths (Saunders et al., 2016). Research literature often distinguishes between mixed model research and mixed methods research (Creswell, 2014). While the mixed-model research involves the mixing of qualitative and quantitative methods in more than one stage of the study, mixed-methods research involves the sequentially or concurrently collection or analysis of quantitative and qualitative data in a single study (Tashakkori & Teddlie, 2010).

As the above explanations indicate, choosing the suitable methodology is critical to produce a coherent and successful research study. Following the still exploratory nature of the research project, where relationships and concepts are still to be developed and the complex nature of the phenomena, which includes business, political and psychological aspects, the author considered a qualitative research approach as the most appropriate choice. The data required to create the impact-analysis-model and develop relationships between concepts mainly consist of the multiple interactions between management, shareholders, employees and external environment, and include soft data that are not measurable in a numeric way.

The primary source of data collection is the interviews conducted with study participants from NFCs, who, in fact, constitute necessary spokes to understand the mechanics of the phenomenon. Those interviews are semi structured interviews with the structure being guided by the research questions and detailed research questions. Furthermore, a profound analysis of secondary data consisting of annual reports and other documents will be used before the interviews to provide the initial background knowledge about the NFCs and after the interviews for consistency checks. This approach to research fits with the critical realist philosophical position and with the exploratory nature of the study. The deductive and inductive elements of the study are considered through the usage of deductive qualitative approach.

3.4. Research design

The research design can be understood as a general plan which will outline the essential mechanism adopted to answer the research questions and to ensure that the evidence obtained enables optimally answering the research questions, and with minimal unambiguity. There are various designs of qualitative research of which the grounded theory design is one of the most common and accepted. It has been introduced by Glaser & Strauss (1967) and is concerned with theory creation without prior frameworks but grounded in the data. In grounded theory the researcher derives a general, abstract theory of a process, action, or interaction grounded in the views of participants as opposed to research that is guided by a theory (Creswell & Poth, 2017). This does not completely fit to this study despite the explorative nature of the research as this study is guided by the pre-conceptualised model and the initial conceptual framework.

The literature review has shown that the phenomena that is researched, namely the impact of regulation on corporate hedging activities and NFCs' management of the impact, is a new territory and has not been subject of investigation before. Nevertheless, the literature review allowed the necessary pre-conceptualisation of the impact-analysis-model and a priori conceptual framework based on synthesis and integration of existing theories that are of interest for the subject under investigation. In line with critical realist philosophical stance, the pre-conceptualised model and initial conceptual framework are initial concepts and will be subject to verification and modification over the course of the research. This approach to the research project has various elements of DQA which is, in fact, deemed most appropriate for this study.

DQA emerged from the research traditions of the Chicago School of Sociology under the name of analytic induction (Gilgun, 2014b). It was used in several studies such as Gilgun (1995), Becker, Geer, Hughes, and Strauss (1961), Cressey (1953), and Lindesmith (1947). DQA makes use of a flexible deductive approach to research and has been introduced by Gilgun (2005) as an update to analytic induction, which was subject of criticism over time related to causation and universality of findings and the reach of the research (Gilgun, 2014a),

but also as an alternative to grounded theory. The term deductive in DQA is based to Dewey's (1910) conceptualization of "complete thinking" which involves both induction and deduction (Gilgun, 2014b).

DQA is a form of qualitative research that begins with a structure or concept that guides the research process, data collection, data analysis and interpretation as well as the writing of the results (Gilgun, 2005, 2010). This clarity of structure and the elimination of the claims on causality and universality of findings (but instead linking it to the idea of tentativeness and social construction of human understandings) differentiates it from analytic induction procedures (Gilgun, 2014b). However, in DQA, similar to the analytic induction, researchers start their research project with a preliminary theory that can be composed of loosely formulated hunches based on personal or professional experience, formal hypotheses, or a set of ideas that form a model of the way things work (Cutlip, 2013; Emery, Sanders, Anderman, & Yu, 2017; Gilgun, 2005, 2010; Hutzler, Barda, Mintz, & Hayosh, 2016).

This is in alignment with critical realist philosophy and fits perfectly with the approach and goal of this study, as the research project starts with the initial conceptual framework that can be verified and adjusted in the empirical phase. DQA aims at the development of theory that fit cases on which it was tested (Gilgun, 2010) and as such, similar to the procedures of grounded theory with regards to sampling, case selection is driven by theory. Like analytic induction, DQA that involves theory testing makes use of negative case analysis, which is the conscious search for evidence that contradicts the findings (Gilgun, 2010). Table 10 below summarizes the key elements and procedures of deductive qualitative analysis. It presents the definition of DQA, the purpose of it, the procedures and the final product.

Table 10: Deductive qualitative analysis

Definition	Qualitative: statements that are made up of words and not numbers Analysis: intensive study of individual units to discover the constituent parts of the units and the relationship between these constituent parts
Purpose	Way to use theory from the start in qualitative research <ul style="list-style-type: none"> - To conduct theory guided research or - To conduct test theory
Procedures	<ol style="list-style-type: none"> 1) Create preliminary theory/concepts 2) Test theory and viability of concepts 3) Revise theory and adjust concepts as required 4) Negative case analysis
Product	<p>A theory that is based solidly on case study material</p> <p>A description of phenomena that are systematically organized by concepts and statement of relationships between concepts</p>

The first step in the theory development process through DQA is the creation of preliminary theory and concepts as preparation for the empirical research. Here, the key concepts are defined and theoretical literature on the subject reviewed to formulate a pre-conceptualisation of a model and a priori conceptual framework that gives guidance and focus to the following stages. Thus, the literature review is part of the process of building theory with the result being the initial model and initial conceptual framework.

Subsequently the initial theory or concepts are tested and revised as necessary till no new findings are added from additional cases. In this stage the researchers seek to add dimensions to sensitizing concepts/conceptual frameworks or, if evidence warrants, discard them in favour of new concepts that fit the emerging analysis (Gilgun, 2010). This leads to purposeful selection of cases, design of the interview instrument, and data collection and analysis (Hutzler et al., 2016). After that follows negative case analysis, the search for evidence that contradicts findings. Gilgun (2010) bases the rationale of negative case analysis on Popper's (1969) definition of how science proceeds: from conjectures, to refutations, reformulations.

Overall, the scope of this study fits very well to the DQA procedures as this research study starts with initial ideas sourced through the literature review. Those ideas have been used to create an initial model and initial conceptual framework which will be analysed,

evaluated and adjusted during the empirical process. Also, the purpose of DQA, which is the production of new more useful model and conceptual framework fits very well with the aim of this study, namely, to start with the initial model and conceptual framework and test and improve this through the empirical research.

3.5. Techniques and Procedures

The techniques and procedures refer to the methods applied for data collection and data analysis. Generally, multiple sources of evidence are of benefit, which ensure the robustness of all type of studies and triangulation and the conversion of different sources of information, is an essential means to that end (Saunders et al., 2016). The first step is the selection of participants.

3.5.1. Participants

The study applies purposive sampling with theoretical considerations in mind and the active search for negative cases as recommended by DQA procedures (Gilgun, 2014b) and applied in other DQA studies (Emery et al., 2017; Hutzler et al., 2016). Purposive sampling makes use of judgement to select cases that will best enable me to answer the research questions with point of saturation in mind. The overall population consists of German NFCs that make use of financial derivatives with focus on multinational corporations (MNCs) who tend to have more derivatives usage given the international operations. The identification of potential case companies is based on the professional acumen and networking of the author, owing to two decades work experience in the German corporate banking sector, as access with interviews and questions on the NFCs strategy is difficult to obtain when one does not know the company. As typical for qualitative studies the sample size is not determine by the number of participants but rather by thematic saturation. This is the point of diminishing return to a sample, when as the study goes on more data does not necessarily lead to more information (Mason, 2010).

Initially, the author approached 40 case companies from his professional network and eight of those companies declared their willingness to participate in the study. In order to get a sample of at least 12 companies (three of each of size category) subsequently

additional six companies were approached of which four declared their willingness to participate in the study. The potential cases were homogeneous with view to the following criteria: (i) They are non-financial corporates, (ii) they use financial derivatives, and (iii) they have corporate hedging activities in Germany. Considering that it is important in DQA to collect data from cases that differ slightly from the cases already collected data from, which contributes to negative case analysis within the data collection phase (Gilgun, 2011), the cases were heterogeneous in terms of their ownership structure, the industries that the case companies operate in, the size of the companies and their hedging strategy. The differences allow further analysis can add to, undermine or refute what an initial analysis of only similar cases suggests (Gilgun, 2011). Thus, overall, 12 companies contributed to the study.

Table 11: Key data of participants

	Ownership	Industry	Revenues p.a. ²	Types of Derivatives	Number of derivatives
NFC1	Family/Foundation	Automotive	Category 2	Forwards/Swaps	Ca.10 000
NFC2	Family/Foundation	Engineering	Category 1	Forwards/Swaps/Options	Ca. 20 000
NFC3	Private / Listed	Manufacturing	Category 3	Forwards/Swaps/Options	Ca. 2 000
NFC4	Private / Not listed	Technology	Category 4	Forwards/Swaps/Options	Ca. 1 000
NFC5	Private/Listed	Chemicals	Category 2	Forwards/Swaps/Options	Ca.15 000
NFC6	Family/Foundation	Healthcare	Category 3	Forwards/Swaps	Ca. 1 800
NFC7	Private / Listed	Construction	Category 2	Forwards/Swaps/Options	Ca. 10 000
NFC8	Private / Not listed	Travel Management	Category 4	Forwards	Ca. 2 000
NFC9	Private / Listed	Utility	Category 1	Forwards/Swaps/Options	Ca.15 000
NFC10	Private / Listed	Industrial supplier	Category 3	Forwards/Swaps	Ca. 10 000
NFC11	Private / Listed	Transport	Category 1	Forwards/Swaps/Options	Ca. 25 000
NFC12	Family owned	Speciality Chemicals	Category 4	Forwards/Swaps	Ca. 1 000

² Three revenue categories are differentiated. Category 1: EUR 50bn – 30bn, Category 2: 30bn - EUR 10bn – EUR, Category 3: EUR 10bn – EUR 5bn, Category 4: EUR 5bn – EUR 500m

3.5.2. Data collection methods

With regards to data collection, this study used different sources with the aim to corroborate the same findings. This also have been established to increases the robustness of findings and is in line with DQA strategy (Cutlip, 2013). For each case, the sources were archival records as well as other documents as provided by the NFCs and the employees of the Corporate Finance and Treasury departments. The data collection methods included the review of archival records, the analysis of additional documentation as provided by the NFCs, semi-structured interviews - either face-to-face or by phone with employees of the Corporate Finance and Treasury departments - and participant checks.

A pilot study has been conducted that gave comfort on, (i) the availability of the required data with NFCs and the ability of NFCs to provide the required data, (ii) the appropriateness of semi-structured interviews and the other data sources to acquire the required data, (iii) the confirmation that both types of interviews, face-to-face or telephone, are suitable to acquire the required data, (iv) the appropriateness of the interview questions to acquire the required data, (v) the confirmation on which person (i.e. from which department) and number of persons to interview and (vi) the estimation of the time required to gather the required information.

After the selected case companies agreed to participate in the study and before the interview questions were sent out to them via email, the annual reports of those companies were reviewed to gather relevant background information on the derivatives usage and the disclosed hedging policy and/or hedging strategy. The main part of data was collected through interviews, which is one of the most insightful data collection methods, as it focusses directly on the topic and provides explanations as well as personal views of the interview participants. Furthermore, they are the recommended data collection method in DQA (Gilgun, 2010).

The interviews conducted in this study are semi-structured, incorporating both open-ended and more theoretically driven questions, extracting data grounded in the experience of the participants, as well as data guided by existing concepts in the research

field (Galletta, 2013) . With view to the still exploratory nature of the study which includes complex and open-ended research questions but also with view to wide range of the topic under investigation, which necessitates some guidance, semi-structured interviews are the most appropriate method. Thus, the interviews include some highly structured sections providing macro-level guidance for the interview, such as the elements of corporate hedging activities, and some unstructured sections, where the corporate informant can freely express her/his thoughts on the subject. The interviews are guided by an interview guide that corresponds with the research questions and detailed research questions (appendix 4).

The interview guide was tested with a pilot NFC and discussed with Bankers from the derivative trading section. The test included the evaluation of the appropriateness of the questions to acquire the required data and estimation of the time and number of persons required to gather the required information. The remarks of the pilot testing were mainly on the length of the background questions and further clearer specification of some questions but with positive feedback on the appropriateness of the questions to receive the required information within the envisaged timeframe.

The interviews have been conducted face-to-face or telephonically and tape-recorded. However, the interview guide has been sent to the participants via email around 3-5 days before the interview date, so that the participants could get the required internal approvals to conduct the interview. This was of importance for the all companies, but especially, for the companies that are listed on stock exchanges.

The aim of the interviews was to explore the key elements of the impact-analysis-model, to investigate the impact of the regulatory changes on those key elements and the response of NFCs. The questions in the interviews were guided by the detailed research questions which were sourced from the review of the literature. The first set of questions asked about the key elements that determine the willingness and ability to do corporate hedging which make out the key elements of the impact-analysis-model. Participants were asked about the importance of each of the key elements and the reasons for the importance

of those elements. The questions were guided by the a priori key elements of the impact-analysis-model but however left room to adjust those elements and add new key elements.

The second set of questions pertained to the impact of the regulatory changes on the NFCs corporate hedging activities and the consequences for risk and return. The case companies were asked about their experience related to the implementation of EMIR and Basel III and how that have impacted their willingness and ability to do corporate hedging. Furthermore, the consequences of the impact in the context of risk and return considerations have been investigated. The impact on each of the a priori key elements of the impact-analysis-model and as a sum to the corporate hedging activities as a whole has been investigated.

The third set of questions subsequently dealt with the response of the NFCs in terms of internal alignments. The questions were guided by the initial conceptual framework derived from the literature review, but however left room to adjust parts of that initial conceptual framework or add new elements to it. Participants were asked what changes they have implemented to processes and strategy, if any, to mitigate any negative impacts to their corporate hedging activities and subsequently on risk and returns.

Other documents (such as extracts from hedging policy that was not publicly disclosed or extracts from the EMIR agreement with Banks) were used as provided by the NFCs. Finally, participant checks (appendix 5) were used to receive feedback regarding the accuracy of the interview interpretations. First participants received a summary of the interview and subsequently checks have been done through follow-up phone calls.

3.5.3. Data analysis methods

Data analysis was conducted in alignment with the DQA procedures and taking into account other researchers experience, such as Cutlip (2013), who examined a theoretical model using DQA procedures. The analysis of the collected data started by first listening to the interview recordings following each interview for multiple times, so that the author could immerse completely in the data and gain an in-depth understanding. Subsequently

data ordering started as each interview was transcribed verbatim and read through several times. This allowed developing a general overview of the data collected and order the data as required in line with the order of the research questions. While reading the transcription, the author made notes in the margin that reflect my understanding of the information and compared this with the information that was gained from the annual reports and other documents as provided by the NFCs.

Coding in DQA can be approached similar to Strauss and Corbin's scheme (including open coding, axial coding, and selective coding), however with the difference that one has a priori codes from prior theories or experience in mind while in grounded theory one start coding from scratch (Gilgun, 2011). Subsequently in DQA, one work on trying to improve the a priori codes and develop new one if what one sees in the data warrants new codes and by using negative case analysis, which helps to look for exceptions to the emerging analysis so that the final result is more inclusive that what one began with (Gilgun, 2011). Consistent with that approach, a priori codes were created that reflected the initial impact-analysis-model and initial conceptual framework.

For the impact-analysis-model, the a priori codes consisted of the key determinants of the initial impact-analysis-model that have been extracted from the literature review. For the response of NFCs, conceptualisation was based on the organisational response set of Cook et al. (1983). Subsequently, the author read each transcription and marked it line by line or paragraph by paragraph with a qualitative data analysis software and made notes in the margin describing the general themes or concepts captured, which matches open coding procedures. The notes made in the margins of the transcription were subsequently used to arrange the interview quotations into the a priori codes. Following a priori codes and categories were deducted from the initial impact-analysis-model and initial conceptual framework.

Table 12: A priori codes for data analysis

Categories	A priori codes	Definition of a priori codes
Willingness to do corporate hedging	Risk aversion	This covers the importance of the shareholders' and managers' risk aversion in general as well as with regards to certain types of risk, payoff structures and tenors. This all influences the willingness to hedge.
	Trust	This indicates the importance of trust from NFCs to the derivatives market and the credit worthiness of their counterparty. This influences the willingness to hedge
	Costs	Firms aim to reduce or control costs and thereby increase firm value This indicates the importance of costs of hedging for the NFC's willingness to hedge. It includes the costs for the transaction, reporting, monitoring etc.
Ability to do corporate hedging	Systems/ Processes	Firms need to have appropriate systems and processes in place to conduct and accommodate the derivatives trades. This includes the technological means to connect with the trade counterparties and accomplish the trade but also appropriate processes.
	Knowhow	At all stages of the corporate hedging transaction, that is from calculating the risk exposure, to determining the appropriate hedge ratio and choosing the right instrument, the know-how of the employees and management play a major role, when firms conduct corporate hedging.
	Derivatives Market	The ability to conduct corporate hedging transactions is of course also dependent on the situation on the derivatives markets and the situation with the banks as they are the main counterparties of the NFCs.
Intra-organizational response to regulation	Institutional level response	Intra-organisational institutional level responses activities that try to mitigate the regulatory impact through mechanisms such as educating trustees, attempting to become involved in the process and testing the legality of the regulation through lawsuits
	Managerial level response	Intra- organisational managerial level responses come into play, as the regulation persists IL level responses and include the acquiring of additional expertise and input and there by developing greater boundary for dealing with the regulation.
	Technical level response	Intra-organisational technical level responses are the least favoured level of response by NFCs, as such changes go into the core of the products and services provided. They include modifications in output, product, staffing, scheduling and so on. Modifications in that area are costlier subsequently the others

The analysis was conducted using qualitative data analysis software and manually using excel for comparison of the marked data. Each case was analysed after the data was collected. The data of each case was entered into two databases consisting of the qualitative data software and the excel spreadsheet per a priori code. The interview quotes from the transcripts were subsequently transferred into the excel sheet of the associated code. The first data base set is relevant for building the impact-analysis-model and analysis of the impact of EMIR and Basel III, thus covering the first two research objectives of this study. It consisted of five columns. The first column includes the definition of the code which at the same time is a determinant of the impact-analysis-model. The second column includes the direct interview quote that is related to that code and the third column includes the comments and the thinking why it was coded in that way and if it needs adjustment. The fourth and fifth column subsequently commented on the impact of EMIR and Basel III by copying in the interview quotes from the transcripts.

The second database was related to the question of NFCs response in terms of alignment of internal processes and strategy to manage the impact. Also, here the qualitative data software and an excel spreadsheet was used for the three above mentioned codes and the spreadsheets consisted of five columns. The first column included the definition of the code and in the second column the direct quote was pasted. The third column included the researcher's thinking to code it in that way and if the initial code requires adjustment. The fourth and fifth columns were subsequently related to the impact of the alignments on risk and return considerations of the NFC. In line with DQA procedures in relation to negative case analysis, during the data analysis process, the author mindfully checked for evidence that contradicted or added to the initial proposed theory and the a priori codes.

The analysis of each interview was completed with a final summary of the interview findings. These findings were subsequently shared with the respective interview participants to allow them checking on the interview findings and interpretations and gave an additional confirmation on the interpretation of findings. The case after case analysis and comparison with the initial theory led to a continual refinement of the initial impact-

analysis-model and initial conceptual framework. Correspondingly, at the end of the paper, the findings are discussed, and the final model and conceptual framework has been presented.

3.6. Research ethics, subjectivity and trustworthiness

3.6.1. Research ethics

Ethics in the context of research is concerned with the rights of the research participants or persons that are affected by the research and refers to the principles and standards that guide the researcher during the research study. At their core, ethical principles in research emphasize the need to be beneficence and non-maleficence (Lund & Lund, 2019). In this dissertation, ethical principles are in line with the University of Gloucestershire's principles and procedures, as presented in the guidelines, Research Ethics: A Handbook of Principles and Procedures.

Ethical principles were considered at each stage of the study. In the participant selection phase and data collection phase, it was ensured that the research does not expose participants to any risk, harm or disadvantage and participants are aware that they are subject of research. Ethical principles are assured by (1) obtaining informed consent from participants; (2) confirming that participation is voluntary with the right to withdraw; (3) confirming that there is no risk of harm to participants; (4) protecting participants and their firms anonymity and confidentiality; (5) not using any deceptive practices (Lund & Lund, 2019; Trochim, 2006). The informed consent form (appendix 3) makes sure that participants understand the aims of the study, the ways the research will be conducted, the duration as well as possible consequences. It ensures that participants are aware of their right to refuse participation at any time and explain anonymity and confidentiality issues as well as the right to reject the use of data-gathering devices.

3.6.2. Subjectivity

Qualitative research is influenced by the preconceptions and values of the research (Hennink, Hutter, & Bailey, 2010; Merriam & Grenier, 2019). Subjectivity is considered by some qualitative researchers as something that they want to maintain at a near zero level.

This can be achieved by strictly adhering to the text which is analysed. While other scholars reflect on the necessity of subjectivity and suggest making use of that by drawing on one's inner experience in order to better understand the subject under study (Drapeau, 2002; Merriam & Grenier, 2019). However, while it is necessary and helpful for this research project, subjectivity includes certain risk, such as that data can be skewed, filtered or even misconstrued and also the impact on subsequent interpretations (Hennink et al., 2010; Peshkin, 1988).

In this research study subjectivity is addressed in the following ways:

- Creation of the initial model and the initial conceptual framework is based on the literature review which decreases subjectivity during that phase.
- Verbatim transcription of interview data decrease subjectivity during data collection phase
- Participant checks decrease subjectivity during analysis and interpretation phase.

3.6.3. Trustworthiness

Each research study aims to produce high quality research results. The instruments used to evaluate the quality of research differ between qualitative and quantitative research approaches and is also influenced by the researcher paradigm (Ghafouri & Ofoghi, 2016). In quantitative research the quality of the research is mainly assessed by its internal and external validity, reliability and objectivity. These criteria are not suitable to evaluate qualitative research as that type of research aims for deep insight and accepts subjective and multiple realities (Connelly, 2016; Ghafouri & Ofoghi, 2016). To address quality issues of qualitative research, Lincoln and Guba (1985) introduced a set of criteria for trustworthiness in qualitative research, namely credibility, transferability, dependability and confirmability.

Credibility deals with the question of how the researcher knows that research findings are true and accurate and corresponds roughly with the concept of internal validity in quantitative research (Noble & Smith, 2015). Thus, credibility in a research project depends of the richness of data and data analysis and can be enhanced using triangulation (Connelly,

2016) instead of relying on sample size like in quantitative research (Noble & Smith, 2015). Credibility in this study is ensured through data triangulation, i.e. by using multiple different data sources and collection methods (literature review, interviews with corporate participants, cross check annual reports and other documents, participant checks).

The second criteria that need to be addressed when conducting qualitative research is the transferability of findings. This corresponds to external validity in the quantitative research area (Noble & Smith, 2015). Transferability deals with the demonstration that the findings are applicable to other context such as similar situations, populations and phenomena. This is difficult to achieve in many qualitative research projects as they are focussed to a specific situation. However, it can be enhanced by providing thick and detailed description of the context and people studied (Ghafouri & Ofoghi, 2016; Lincoln & Guba, 1985). Thick descriptions refer to a method of describing the phenomena studied in sufficient detail for the reader to be able to understand in how far the findings are transferable to other times, settings, situations, and people (Lincoln & Guba, 1985). In order to enhance transferability of the findings, the context of the research has been clearly explained in Chapter 2 (Background) and the NFCs studied, and the individuals interviewed have been introduced in Chapter 5 (Results), so that future researchers are aware of the context of the findings of this research.

The third point that Lincoln and Guba (1985) mentioned to address to enhance trustworthiness of qualitative research is conformability, which refers to the level of neutrality in the research study's findings and corresponds to objectivity in quantitative research (Ghafouri & Ofoghi, 2016). This implies that the results of the research should be based on the responses of the participants and not be influenced by the researcher's bias. As mentioned in the previous section on subjectivity of the research study, verbatim transcription of the interview data and participant checks of the interview findings secure conformability of the findings. Thus, researcher's bias is limited on every step of the creation of the impact-analysis-model and conceptual framework.

The fourth and final point mentioned by Lincoln and Guba (1985) is dependability, which corresponds to reliability in quantitative research (Ghafouri & Ofoghi, 2016). This criterion refers to the extent that the study is replicable by other researchers with consistent findings (Connelly, 2016). Dependability in this research study is addressed by the transparent and systematic process of the study. Starting from the literature review and the creation of detailed research questions to the process of data collections and analysis as well as the interpretations of the data and the participant checks.

Overall, while trustworthiness on the researcher's side is secured through the above mentioned measures, notably, the research study will inevitably be affected by the personal characteristics and professional code of conduct of the participants, which includes their willingness and ability (in terms of the possession and permission) to share the information. Furthermore, it should be noted that the researcher's profession might influence participants. The researcher has been employed in the corporate banking sector, i.e. providing corporate finance products to German NFCs for around two decades. Given that the corporates are clients of the bank that the researcher works for, they might have that in mind when answering the questions. For example, they might want to appear very conservative in their hedging policies in order to give the impression of a no risk policy, which in turn can be beneficial for credit prices. However, being aware of this, the researcher should take that into consideration in the analysis of the data and avoid questions that could be regarded by corporate participants as influencing the relationship with the researcher's bank. In addition, the usage of different data collection sources should help further minimizing that point.

3.7. Chapter conclusion

This chapter has presented the overall methodology and methods applied in this research study. The philosophical assumption that influences this research study is the critical realist's view of a world, which includes a commitment to realist ontology, i.e. the existence of causal mechanisms whose interactions generate the events and occurrences of the world, and an epistemology that accepts, with interpretivism, that our knowledge is

always socially and historically relative, but maintains a distinction between the transitive, subject-dependent aspects of knowledge, and intransitive domain of the objects of our knowledge (Syed et al., 2010).

The literature review revealed that existing theories on corporate hedging and risk management do not consider regulation as an influencing factor. However, those theories were able to support the pre-conceptualisation of an impact-analysis-model. In addition, an excursus into strategic management literature supported in the creation of an initial conceptual framework related to the reply of NFCs to regulatory changes. Subsequently, the gaps revealed in the literature review and the initial concepts derived from existing theoretical literature call for inductive and deductive elements in the methodological approach. This was complied with through the application of deductive qualitative analysis methodology.

The overall research design utilises qualitative data from different sources. Qualitative data is best suited to answer the explorative nature of the research questions (“how” and “why” questions). Based on purposeful sampling with literal and theoretical replication in mind, the study makes use of semi-structured interviews with corporate professional participants flanked by data from documents in combination with the archival records. The collected data is analysed in line with DQA procedures using the initial impact-analysis-model and initial conceptual framework as basis for coding.

The possible limitations of the study are related to the methodology and the nature of the topic. The limitations can be attributed to the limited generalizability of findings and should be overcome or strongly minimized through the usage of analytic generalisation and drawing conclusions on conceptual level. Further potential limitation for this study could be identified in terms of research bias. This will be addressed through the increased awareness in the analysis of findings and the usage of different sources to confirm the same findings.

With view to the progress matrix of the research (Table 12), it can be safely inferred that the paper furnishes a methodological framework which is suitable for the aim and

objectives of this study. The detailed research questions were established as a result of the literature review will serve as guidelines for the empirical research and result in a final impact-analysis-model and conceptual framework which should enable future researchers to analyse impact of external and internal actions on NFCs' corporate hedging activities and NFCs' responses.

Table 13: Research study progression matrix (2)

Research Aim	Research Questions	Research Objectives	Detailed Research Questions	Methodology
To explore and evaluate the impact of regulatory initiatives on corporate hedging activities of NFCs and corporate response in the context of risk and return considerations.	1. How do EMIR and Basel III regulations impact corporate hedging activities of NFCs in Germany in the context of risk and return considerations?	1. To create a model that helps analysing the impact of regulatory initiatives on corporate hedging activities	D1: Is the risk aversion of shareholders' and managers' a key determinant of the willingness of NFCs to do corporate hedging and subsequently of the impact-analysis-model? D2: Is the trust in the counterparties and the derivatives market a key determinant of the willingness of NFCs to do corporate hedging and subsequently of the impact-analysis-model? D3: Are cost considerations a key determinant of the willingness of NFCs to do corporate hedging and subsequently of the impact-analysis-model? D4: Are there any other factors that are important for the willingness of NFCs to do corporate hedging and can be considered key determinants? D5: Are systems and processes in relation to corporate hedging a key determinant of the ability of NFCs to conduct corporate hedging and subsequently of the impact-analysis-model? D6: Is the knowhow about corporate hedging a key determinant of the ability of NFCs to conduct corporate hedging and subsequently of the impact-analysis-model? D7: Is the situation on the derivatives market a key determinant of the ability of NFCs to conduct corporate hedging and subsequently of the impact-analysis-model? D8: Are there other factors that are important for the ability to hedge and are considered key determinants?	Semi structured interviews supported by archival records
		2. To analyse and evaluate the impact of EMIR and Basel III in the context of risk and return considerations.	D9. Which of the key determinants of the impact-analysis-model are impacted by EMIR and what is the consequence for risk and returns of NFCs? D10. Which of the key determinants are impacted by Basel III and what is the consequence for risk and return considerations?	Semi structured interviews / archival records
	2. How do NFCs response to manage the regulatory impact in the context of risk and return considerations?	3. To analyse and evaluate NFC's response in the context of risk and return considerations	D11: What measures do NFCs take to manage the impact of EMIR and Basel III regulations? D12: What is the consequence of the above-mentioned responses for risk and returns of NFCs?	Semi structured interviews
		4. To conceptualise NFCs' response to regulation.	D13: Can the response of NFCs be conceptualised based on the conceptual framework of Cook et al. and can the theory of the level of organisational response to regulation be applied?	

4. RESULTS

4.1. Chapter Introduction

This chapter presents the study results as interpreted by the researcher. Using a deductive qualitative analysis approach, priori codes were created based on the initial impact-analysis-model as derived in the literature review chapter, from existing theoretical models. The data collected were coded into these categories with the continual check for negative cases that contradict the initial impact-analysis-model as well as the initial conceptual framework. This chapter is divided into four sections, namely, the introduction to the interviewed NFCs, the detailed descriptions of the interview findings, the participant checks as well as description of contradicting findings. The results are presented alongside the research questions and research objectives and include the answers to the detailed research questions mentioned as a result of the literature review.

4.2. Introduction to the interviewed NFCs

Fourteen participants from twelve case companies have participated in the semi-structured interviews for this study. The NFCs were interviewed separately, and each interview lasted between sixty to ninety minutes. The participants were asked for a face-to-face interview but were provided with the possibility to opt for a telephone interview provisioning for any disruptive time or other issues. Interviews with six NFCs were conducted face-to-face at the offices of the case companies while six NFCs opted for telephone interviews due to time limitations.

The interviewed companies are homogeneous on several variables, i.e., all NFCs located in Germany and all of them are hedging by using derivative financial instruments in the OTC market. Furthermore, all NFCs have a hedging policy in place and all participants work in the treasury department and corporate finance department of the corporates, and mainly the group head of the treasury department or employees from the treasury department were interviewed. This is because the treasury/corporate finance department is engaged with the hedging activities of the NFCs. However, the interviewed NFCs are heterogeneous in terms of their business activities and industry, their size (revenues

generated per year range between EUR 500m and EUR 50bn), and the type and number of derivatives used by them. Table 14 presents the key heterogeneous variables.

Table 14: Key heterogeneous variables

	Ownership	Industry	Revenues p.a. ³	Types of Derivatives	Number of derivatives
NFC1	Family/ Foundation	Automotive	Category 2	Forwards/Swaps	Ca. 10 000
NFC2	Family/ Foundation	Engineering	Category 1	Forwards/Swaps/ Options	Ca. 20 000
NFC3	Private / Listed	Manufacturing	Category 3	Forwards/Swaps/ Options	Ca. 2 000
NFC4	Private / Not listed	Technology	Category 4	Forwards/Swaps/ Options	Ca. 1 000
NFC5	Private/ Listed	Chemicals	Category 2	Forwards/Swaps/ Options	Ca. 15 000
NFC6	Family/ Foundation	Healthcare	Category 3	Forwards/Swaps	Ca. 1 800
NFC7	Private / Listed	Construction	Category 2	Forwards/Swaps/ Options	Ca. 10 000
NFC8	Private / Not listed	Travel Management	Category 4	Forwards	Ca. 2 000
NFC9	Private / Listed	Utility	Category 1	Forwards/Swaps/ Options	Ca. 20 000
NFC10	Private / Listed	Industrial supplier	Category 3	Forwards/Swaps	Ca. 10 000
NFC11	Private / Listed	Transport	Category 1	Forwards/Swaps/ Options	Ca. 25 000
NFC12	Family owned	Speciality Chemicals	Category 4	Forwards/Swaps	Ca. 1 000

a) NFC1

NFC1 is a family owned company, which is engaged in the manufacturing and supply of products mainly for the automotive industry worldwide. NFC1 operates in Europe, the Americas, Asia-Pacific, and Africa and uses OTC derivatives only for hedging purposes.

³ Three revenue categories are differentiated. Category 1: EUR 50bn – 30bn, Category 2: 30bn - EUR 10bn – EUR, Category 3: EUR 10bn – EUR 5bn, Category 4: EUR 5bn – EUR 500m

Regarding hedging, in connection to FX and interest rate risk, the Head of Group Treasury defined the company policy, stating that:

Core of our policy is as follows: the company does not take actively a risk position but only covers the risk resulting from the operational activities. The hedging is very simple and does not allow the active management of timing and hedging ratios. The company has a strong belief that nobody in our company can foresee market development. Hedging is necessary for risk positions that are above EUR 1m and that are already in the ERP System, that means there is already an invoice. Those positions must be hedged with 100% while planned positions are hedged with a gradually increasing quota, depending on when the risk position will occur.

NFC1 uses more than 10,000 derivatives (forwards and swaps) per year with the usage of derivatives necessarily linked to the existence of an operational underlying transactions or related investments and financings, whereby, expected and not yet invoiced risks are covered with a continuously declining hedging grade. The company covers a hedging horizon of 24 months. The hedging transactions are only concluded with banks with a prime credit rating and they are subject to strict regular controls.

For this study, the Head of Group Treasury and Corporate Financing of NFC1 was interviewed in his office at the premises of NFC1. He is 42 years old and has been with NFC1 for more than 8 years, and thus is experienced the implementation of both EMIR and Basel III with NFC1. As regards pertaining to his responsibilities he said, “as the Head of Group Treasury and Corporate Financing, I am responsible for the adequate financing, liquidity provision and risk management operations of the group.” He cited that to fulfil his responsibilities, he has a team of 12 professionals, of which two are responsible for dealing derivatives financial instruments and four for booking and reporting those and other transactions. Furthermore, he mentioned that those employees have experience in that area of between 5y and 10y.

Regarding the company’s financial health and financial performance as per the last full financial year, as table 15 below shows, NFC1 has a healthy financial structure with a sound equity ratio (shareholders equity/total balance sheet) of 36%, a moderate indebtedness as represented by the net leverage ratio (total debt – cash and cash equivalents / EBITDA) of only 0.2x and good liquidity situation as emphasized by the current ratio of

2.1x and the cash ratio of 0.3x. The current ratio is calculated based on the following formula: inventory + receivables + cash and cash equivalents / accruals + accounts payables + notes payables). The cash ratio is calculated based on the formula: cash and cash equivalents / accruals + accounts payables + notes payables.

Operating profitability (EBIT/revenues) is satisfactory but on the lower end of the industry average as the company has a relatively high fix costs position, but overall the financial performance of the company was positive with a return on equity of nearly 15% and a return on total assets of 7.4%. The return on equity is calculated with the formula: net income / shareholders equity). The return on assets is calculated with the formula: operating income / total assets. As one can see from the table below the financial set up of the company is relatively conservative with a low indebtedness and high liquidity as well as equity position. In line with that also the hedge ratio is set up on a conservative way as NFC1 has a hedge ratio of 100% for both foreign exchange and interest rate risk.

Table 15: Financial and performance indicators NFC 1

Financial, liquidity and performance indicator	Value
Equity ratio	36%
Net leverage ratio	0.2x
Current ratio	2.1x
Cash ratio	0.3x
Operating profit margin	4,9%
RoE (Return on Equity)	14.8%
RoA (Return on Assets)	7.4%

b) NFC2

NFC2 is a leading global engineering and manufacturing company that operates in more than 60 countries and manufactures products for various industries. Correspondingly, their business operations are affected by fluctuations in FX and interest rates. The annual report of NFC 2 mentions their aim, which is to reduce those fluctuations in FX and interest rates through natural hedging maximally possible and use derivatives for hedging of remaining risk. Hedging is centralized and guided by internal regulations and guidelines. The guidelines state the following with regards to the usage of derivatives:

Financial instruments such as forward transactions and interest swaps may only be used in connection with the operating business, financial investments, or financing transactions; speculative transactions are not allowed. Hedging transactions are entered into solely via banks whose creditworthiness is good. Their creditworthiness is constantly monitored, and counterparty credit limits are defined accordingly.

The Head of Treasury and Controlling of NFC2 was interviewed by phone. He opted for a telephone interview due to timing issues and came in early to work to conduct the interview. He is 40 years old and with NFC2 for more 6.5 years, and thus is experienced in the implementation of both EMIR and Basel III with NFC2. As the Head of Group Treasury and Controlling, he oversees the liquidity provision and risk management operations of the group, including the hedging of interest rate and exchange rate risk. The Treasury and Controlling Department consists of 15 people, of which three deal with the FX and interest rate risk, to which the company is exposed. NFC 2 uses more than 20,000 derivatives in form of forwards, options, and swaps used singularly in connection with the operating business and not for speculation. It furthermore states in its policy that transactions are entered solely with banks with very good credit worthiness (A rating).

Like NFC1 also NFC 2 possesses a healthy financial structure and liquidity situation as per the accounting date of the last full financial year, as table 16 shows. Equity ratio stood very high at 47% and the net indebtedness was low with 0.1x. Also, the liquidity situation was sound as emphasized by the current ratio of 2.0x and the cash ratio of 0.3x. Operating profitability was on a good and upper end of the industry average with 7%. However, RoE was lower than the average of the last years (10% vs 15%) due to some exceptional expenses and return on total assets stood at 7.0%. Also, NFC 2 has a conservative way of hedging risk. The company has a hedge ratio of 100% for both foreign exchange and interest rate risk.

Table 16: Financial and performance indicators NFC 2

Financial, liquidity and performance indicator	Value
Equity ratio	47%
Net leverage ratio	0.1x
Current ratio	2.0x
Cash ratio	0.3x
Operating profit margin (EBIT margin)	7,0%
RoE (Return on Equity)	10%
RoA (Return on Assets)	7.0%

c) NFC3

NFC3 is a listed company that is active in the manufacturing industry and services global clientele. Also, NFC3 uses financial derivatives only for hedging purposes and does not allow any speculation to gain profits from derivatives as stated in their hedging policy.

During the interview, the derivatives financial instruments in NFC3 were mainly comprised of currency forwards and interest-rate swaps. The company mentioned that hedging decision is not centralised, i.e. the local entities can hedge themselves out through the head office in Germany, who, in turn hedges the risk out via banks. However, different than most other NFCs the hedging policy is prescribing the group entities to hedge at least 75% of existing exposure and not 100%. With regards to that, the Treasury Manager said the following in the interview:

Hedging policy is saying to all group entities to look on their planning for 15 months and subsequently they have to look on their planning in foreign currency and subsequently they should hedge at least 75%. So, in my former company for example the Policy was different, it was not 75% in general but rather based on the type of exposure. All the exposure is transactional exposure, but for example booked exposure was hedged completely, and contracted 95% and the rest which is only planned and has no binding issues lower, depending on the currency and the environment and the prognosis of the banks and so on. But here we have straightforward 75%.

The treasury department of NFC3 deals with the hedging activities, making use of more than 2000 derivatives per year and dealing only with banks with an investment grade rating. The main hedging instruments used are foreign currency forwards.

IMPACT OF EMIR AND BASEL 3 ON CHA AND THE RESPONSE

The Manager Treasury, the primary resource for addressing EMIR issues at NFC 3, and has been interviewed at the premises of NFC3. The Manager has six years of experience in FX risk and interest rate risk management. In NFC3, he is responsible for all EMIR and other regulatory matters and the system wise implementation of EMIR reporting. He mentioned that, including the head of treasury, seven professionals work in that department of which two are responsible for the front office side of transaction with derivatives financial instruments, while one attends to all regulatory matters and the valuation of transactions and another three for the back-office side of the transactions, i.e. booking and confirmation of trades. Those employees are very experienced in the FX and interest rate risk management with experience of between 5y and 30y, which is essential as regards the hedging strategy formulation, while the daily trading business is mainly done via electronic platform. To that end, the Manager Treasury mentioned that around 95% of their trades are conducted through an electronic trading system connected to their treasury systems.

With view to the company's financial health and financial performance as per the last full financial year, table 17 below shows that NFC3 has a stable financial structure. However, compared to the other two NFCs, the financial structure is less conservative (in terms of less equity and more debt). The equity ratio stood at satisfactory 25% and net indebtedness as represented by the leverage ratio at 2.4x, which is on the higher end of investment grade companies. Liquidity situation as emphasized by the current ratio of 1.4x and the cash ratio of 0.2x was not as comfortable as NFC 1 and NFC 2. Operating profitability is sound with 7% margin and overall returns were satisfactory with a return on equity is 13% and return on total assets of 4.3%. As one can see from Table 17, the financial set up of the company is less conservative compared to the other two NFCs. In line with that also the hedge ratio is at 75% for foreign exchange risk and 100% for interest rate risk.

Table 17: Financial and performance indicators NFC 3

Financial, liquidity and performance indicator	Value
Equity ratio	25%
Net leverage ratio	2.4x
Current ratio	1.4x
Cash ratio	0.2x
Operating profit margin (EBIT margin)	7,0%
RoE (Return on Equity)	13.0%
RoA (Return on Assets)	4.3%

d) NFC4

NFC4 is a US based technology company that provides solutions for its clients worldwide with regards to the management and efficient use of natural resources. Different from most companies, the Treasury Department is not located on the top of the organisation but is just one of the entities in the group. The department comprises of seven employees and the responsibilities are divided region-wise, with three professionals covering the US and four covering Europe and rest of the world. The people working in the department have more than 5 years of domain experience in total and are guided by a hedging policy set up by the parent company in the US. In context of the currency and interest rate risk hedging guidelines, the Group Treasurer of NFC4 said:

Our policy on currency and rate hedging is relatively simple We use different hedging instruments and market outlooks and timing strategies with the aim to achieve the optimal hedge. We as Corporate Treasury analyse and evaluate the risks and market conditions continually to evaluate the optimal exposure to a currency and the best hedging possibility for that risk.

Those hedging strategies are developed by the Global Treasury Department in the US and include also the consideration of market outlook. In their guidelines, NFC 4 said with regards to FX risk:

The total managed positions for each currency shall not exceed the net exposure of that currency over the pre-defined period. The use of any derivatives transactions for speculation is prohibited. Specifically, no positions can be entered without having a corresponding exposure.

While the company has no outstanding interest rate hedging, as this is managed by the parent company, in terms of FX deals, they mentioned that all FX trading is done via an electronic trading platform. The Head of Treasury and Manager of the Treasury department were interviewed as both authorities address issues pertaining to EMIR implementation and bank trading.

As table 18 below shows, NFC4 financed 38.5% of its assets with equity and net leverage ratio is at 2.2x, thus, the financial situation is stable. Also, the company's liquidity situation as per the accounting date of the last full financial year is satisfactory (current ratio of 1.5x and cash ratio of 0.2x), while less conservative compared to NFC1 or NFC2. Operating profitability was on a good and upper end of the industry average with 12%. Also, return on equity was at a good level of 19% and return on total assets stood at 9.0%. With regards to the hedging strategy, the company has a hedge ratio of 100% for both foreign exchange and interest rate risk.

Table 18: Financial and performance indicators NFC 4

Financial, liquidity and performance indicator	Value
Equity ratio	38.5%
Net leverage ratio	2.2x
Current ratio	1.5x
Cash ratio	0.2x
Operating profit margin (EBIT margin)	12,0%
RoE (Return on Equity)	19%
RoA (Return on Assets)	9.0%

e) NFC5

NFC5 is a leading chemicals company that operates worldwide in more than 30 countries and manufactures products for various industries. Given their worldwide activities, NFC5 is exposed to opportunities and risks resulting from FX change. With regards to the financing, the company uses several financial instruments with fixed and

variable interest rates, which also exposes them to opportunities and risks resulting from changes in market interest rates.

NFC5 has instated a hedging policy that aims to minimise adverse effects from FX and interest rate changes. The company uses derivatives financial instruments in the form of forwards, swaps and have provisioned for several options for the same. They hedge via banks with an investment grade rating.

While existing exposure is hedged to 100%, different to the most other interviewed NFCs, NFC5 uses a value at risk approach to managed planned foreign currency exposure. To that end, the senior treasurer of NFCs 5 said:

We use a value at risk approach to manage our planned FX exposures which arises from planned receivables and liabilities. We have defined limits where we feel comfortable with planned FX exposure. For example, planned FX exposures were not hedged in the last year since they did not exceed the limit defined. They are hedged using forward exchange contracts if the foreign currency risk increases to or above the defined limit.

The senior treasury manger, who addresses all the EMIR issues at NFC 5, was interviewed by phone for this study. He opted for a telephone interview due to time constraints. He is in his late thirties and at the time of the study, had been employed with NFC5 for more 3.5 years. However, owing to his prior more than 12 years of experience in treasury, he did not experience the implementation of both EMIR and Basel III with NFC5. He mentioned that Treasury Department in NFC5 consists of 12 professionals, of which two deal with the FX and interest rate risk on the front-end operations and another two on the back-office support functions. With regards to the experience of the employees he said, “The employees have experience in the FX and interest rate risk management sector of between 5y and 20y,” however, he also highlighted that relevance of long term experience for the daily business is limited saying, “More than 90% of the hedging transactions are done through the electronic trading platform for which it does not really matter if you have 5y or 20y experience.”

As table 19 below shows, NFC5 has a solid financial structure with a stable equity ratio of 32% which is in line with industry average. Indebtedness as represented by the leverage ratio is relatively high at 2.5x. However, the liquidity situation is sound as emphasized by

the current ratio of 1.8x and the cash ratio of 0.5x. Operating profitability is also in line with industry average with an operating margin of 7%. Overall, the financial performance of the company was positive with a return on equity of nearly 10% and a return on total assets of nearly 6%. In terms of the hedge the company has a conservative approach hedging out 100% of interest rate risk and at least 75% of all foreign exchange risk.

Table 19: Financial and performance indicators NFC 5

Financial, liquidity and performance indicator	Value
Equity ratio	32%
Net leverage ratio	2.5x
Current ratio	1.8x
Cash ratio	0.5x
Operating profit margin (EBIT margin)	7,0%
RoE (Return on Equity)	9.8%
RoA (Return on Assets)	5.8%

f) NFC6

NFC6 is a family/foundation owned company and active globally in the healthcare industry. The company operates in more than 50 countries in Europe, the Americas, Asia-Pacific, and Africa and finances those operations amongst other with financing with a variable interest rate. Thus, NFC6 is exposed to FX risk and to interest rate risk and uses derivative financial instruments for hedging those risks. With regards to their hedging strategy the Group Treasurer said:

For FX trades, we pursue a rules-based strategy that is called layered hedging. This strategy allows us, that we achieve coverage of average prices for the period of our hedging horizon, which is in our case 12months. This reduces the effects of currency translation on the P&L. With regards to interest rates, we use payer swaps at times for variable rate financing to reduce interest rate risk, but this is currently not necessary.

NFC6 made around 1,800 derivatives transactions in 2017 with the usage of derivatives being necessarily linked to the existence of an operational underlying transactions or related investments and financings. The hedging transactions are only concluded with banks with a prime credit rating of the least BBB and are subject to strict internal controls.

The company has instated a hedging policy that regulates the trading and management of derivatives financial instruments. The Group Treasurer of NFC6 mentioned that the policy is very strict and requires hedging booked risk with 100% and does not allow the usage of any market forecasting or own opinion with regards to the development of FX and interest rate markets. With regards to planned FX exposure he said, “We hedge 60% for 12 months and when the invoice comes or is sent, depending on whether it is a sales or purchase, subsequently the remaining 40% are hedged.”

The Head of Group Treasury of NFC6 was interviewed by phone. He has more than 20 years of work experience and has also experienced the implementation of both EMIR and Basel III with NFC6. As the Head of Group Treasury, he is responsible for the adequate financing, liquidity provision, and risk management operations of the group.

He mentioned that overall, 12 professionals work in the treasury department of which six people are engaged with the risk management section. The majority are part time workers, wherein, three staffers are deputed in the front office, i.e. responsible for the trading with the banks and four are allocated responsibilities pertaining to booking and reporting those and other transactions, while the remaining employees are in the cash management section of the treasury department and in the subsidiary financing section. Those employees have experience in the risk management area of between 2y and 20y.

In terms of systems, the Head of Group Treasury mentioned that hedging in front office is done completely through an electronic trading platform and subsequently administered and evaluated in the company's treasury system. In contrast to other companies, he mentioned a lack of automatic linkage between the electronic platform and the company's treasury systems and cited the use of manual data transfer mechanisms.

Table 20 shows that like the other family owned companies, NFC 6 possesses a strong equity ratio of 45%. Indebtedness is relatively high like NFC 5 at 2.5x. However, the liquidity situation as per the accounting date was strong as the high current ratio of 3.0x shows but with relatively average level of cash at hand as the cash ratio of 0.3x indicates. Operating profitability was on an average level of the industry with 6.5%. Also, return on

equity was on a solid level of 12%. The overall return on assets was on the lower end of the industry given that income was burdened with high negative financial result and high tax payments.

NFC 6 has a conservative way of hedging risk. The company has a hedge ratio of 100% for existing exposure to both foreign exchange and interest rate risk.

Table 20: Financial and performance indicators NFC 6

Financial, liquidity and performance indicator	Value
Equity ratio	45%
Net leverage ratio	2.5x
Current ratio	3.0x
Cash ratio	0.3x
Operating profit margin (EBIT margin)	6,5%
RoE (Return on Equity)	12%
RoA (Return on Assets)	4.0%

g) NFC7

NFC7 is a listed company that is active in the construction industry. The company uses derivatives only for hedging purposes. Their hedging policy aims to achieve maximum hedge effectiveness and distinguishes that derivatives are solely used for hedging purposes and not speculating. The company mentioned initially using natural hedging and subsequently as regards the hedging via derivatives to mainly use forwards and swaps. Like the other interviewed NFCs, the company has instated a hedging policy that lay out the rules for the usage of derivative instruments. As regards, what their hedging policy states on FX and interest rate risk, the Team Leader Treasury and Corporate Finance said (for FX risk):

To hedge against FX risk, we use derivatives mainly in the form of forwards. We generally hedge all existing FX risk centrally over the parent company. Through our policy, the usage of derivatives and the segregation of control and responsibilities in all group companies are ruled. Any form of speculation is not allowed.

The rules are similar for interest rate risk as he explained, i.e. also clear binding to the underlying business and rules that do not allow a speculative approach. While they

mainly use forwards and swaps, the policy of NFC7 allows also the usage of other options. Furthermore, with regards to the counterparties, it highlights to only engage in trades with banks having top credit quality.

The Team Leader Treasury and Corporate Finance and one risk management staff of NFC7 were interviewed in the office of the Team Leader - Treasury and Corporate Finance at the premises of NFC7. The Team Leader - Treasury and Corporate Finance is 41 years of age and has been employed with NFC7 for 8 years, while the risk management employee is 39 years old and employed with NFC7 for 6 years with NFC7. As such, both are experienced in the implementation of EMIR and Basel III with NFC7. The responsibilities of the Treasury and Corporate Finance department include adequate financing, liquidity provision, and risk management operations of the group.

The treasury and corporate finance department of NFC7 contains a team of 12 professionals and is divided in front office, middle office, and back office. Five of those twelve are engaged in the completion and booking of derivatives transactions, two in the front office-section, one in the middle-office section and two in the back-office section.

As table 21 below shows, NFC7 has a less conservative financing structure than most of the other companies. The equity portion is relatively low with 17% of assets being financed by equity. Also, financial indebtedness serves as a key financing instruments as the leverage ratio shows. Thanks to the strong cash position, the net leverage ratio is still at a moderate level of 1.9x. While the current ratio is only at 1.3x, showing that the liquidity position is not as comfortable as most of the NFCs that have been interviewed, the cash ratio is still high, as a significant portion of short term assets was held in the form of cash and cash equivalents. Operating profitability was on a low level with an EBIT margin of only 3.2% and a return on assets of 5.4%. Given the low equity ratio and the low level of tax payments in the fiscal year, return on equity stood at very good 22%.

NFC 7 has a conservative way of hedging risk. The company has a hedge ratio of 100% for existing exposure to interest rate risk and hedges out 75% of all foreign exchange risk.

Table 21: Financial and performance indicators NFC 7

Financial, liquidity and performance indicator	Value
Equity ratio	17%
Net leverage ratio	1.9x
Current ratio	1.3x
Cash ratio	0.5 x
Operating profit margin (EBIT margin)	3,2%
RoE (Return on Equity)	22%
RoA (Return on Assets)	5.4%

h) NFC8

NFC8 is the provider of travel management solutions for its clients with worldwide operations. The company uses derivatives singularly for hedging of the underlying risk and does not speculate on the development of rates. The company mainly uses forward rate agreements to hedge the FX risk, while in the current interest rate environment, they have not hedged interest rates. The company is the subsidiary of a large travel company, and, as such, is supported on various hedging activities from the parent company.

The treasury department deals with the hedging of FX and interest rate risk. The department comprises of six professionals, of which two work in the front office, while four deal with the middle and back-office work. The company has instated a hedging policy that is guided and developed by the parent company but adjusted to the business model of the company, i.e. travel management solutions, which mainly deals with short term (below one month) revolving risk from FX movements and interest rate risk from financing activities. In this regard the Head of Treasury said:

There is an overall risk outline which has been created for the whole group and that guideline is subsequently also applicable to us. We have in general to follow that outline but out of the special nature of our business, we have a light different approach as the normal hedging team of the group. This is done to reflect our business model.

The Head of Treasury of NFC8 was interviewed on the company premises. He has been with the company for more than 10 years and has implemented the EMIR compliant procedures of the company and is also experienced in the implementation of Basel III with the company. His task is to lead and manage the risk management, cash management, and liquidity management of the company. A speciality of NFC8 is that it is connected to the systems and processes of the parent company and thus most of their hedging is done via the parent company (who consolidates the hedges for the whole group) with banks. Consequently, also the EMIR reporting systems have been primarily implemented by the parent company, and the task of NFC10 is subsequently mainly checking and confirming the trades while they are reported through the parent.

As table 22 below shows, NFC 8 mainly finances itself via payables to its clients and less through financial debt to banks and equity. This set up is connected to the business model of NFC8, where receivables have a general turnover of only 21 days and payables of more than 30 days. Consequently, the equity financing portion and the net leverage are very low. However, the liquidity situation as per the accounting date was satisfactory as the current ratio of 1.0x shows but with relatively low level of cash at hand as the cash ratio of 0.1x indicates. Operating profitability was at a solid level with 12.5% EBIT margin. Also, return on equity was on a solid level of 18%. However, given the high volume of assets as per accounting date return on assets was on a low level of 2.1%. NFC 8 has a conservative way of hedging risk. The company has a hedge ratio of 100% for existing exposure to both foreign exchange and interest rate risk.

Table 22: Financial and performance indicators NFC 8

Financial, liquidity and performance indicator	Value
Equity ratio	6.8%
Net leverage ratio	0.1x
Current ratio	1.1x
Cash ratio	0.1x
Operating profit margin (EBIT margin)	12.5%
RoE (Return on Equity)	18.1%
RoA (Return on Assets)	2.1%

i) NFC9

NFC9 is a German utility group that is active in Europe, Asia, and the US with operations in the energy and environmental sectors. Through its operations, NFC9 has been exposed to FX and interest rate risks from purchasing and selling products and other transactional and financing activities. The company has a hedging policy in place which guides to a centralized approach to risk management. NFC9 is the parent company of the group and as such oversees several pertinent functions, such as the currency risk of most subsidiaries and aggregates the risk to a net financial position in each currency. This is subsequently hedged using derivative financial instruments mainly consisting of swaps and forwards. Options are seldom used but they are allowed by the hedging guidelines. The company has sophisticated risk management operations in place, for example, they are one of few that use the value at risk method (VaR) to calculate interest rate related price risk of capital investments and their maximal FX risk.

NFC9 makes around 20,000 derivatives transactions per year with the usage of derivatives being necessarily linked to the existence of operational business transactions or related investments and financings. The hedging transactions are only concluded with banks with a prime credit rating of the least BBB and are subject to strict internal controls. Like the other NFCs, booked FX exposure is to be hedged with 100% while planned FX exposure at NFC9 is not hedged at all in contrast to other NFCs. IR risk is currently hedged using interest rate swaps and cross currency swaps. However, the Senior Manager interviewed mentioned that a project is in the pipeline which will also include a certain level of planned exposure in the future.

NFC9 employs 38 people in the Treasury and Corporate Finance Department of which six are working in the treasury's front office, i.e. making the FX and IR trades with banks, while 16 people are working in the middle- and back-office. A Senior Manager from the Treasury Department was interviewed for this study. He is responsible for FX and IR trading and has been working with NFC9 for 12 years, and thus is also experienced the implementation of EMIR and Basel III with NFC9.

As table 23 below shows, NFC9 has a solid financial structure with a satisfactory level of equity which amounts nearly 18% of total assets. Net indebtedness was zero given the high level of cash at hand at accounting date. Also, the liquidity situation of the company is very strong, as emphasized by the current ratio of 2.9x and the cash ratio of 1.5x. Operating profitability is also in line with industry average with an operating margin of 11.6%. Overall, the financial performance of the company for shareholders was satisfactory with return on equity of 9.2%. The return on total assets was only at 2% given the high number of total assets. In terms of the hedge the company has a conservative approach hedging out 100% of interest rate risk and at least 80% of all foreign exchange risk.

Table 23: Financial and performance indicators NFC 9

Financial, liquidity and performance indicator	Value
Equity ratio	17.8%
Net leverage ratio	0.0x
Current ratio	2.9x
Cash ratio	1.5x
Operating profit margin (EBIT margin)	11,6%
RoE (Return on Equity)	9.2%
RoA (Return on Assets)	2.0%

j) NFC10

NFC10 is a supplier of products for industrial uses and is active in various countries. Given its international reach with regards to business and financing activities, NFC10 is exposed to currency risk and interest rate risk. To guide the hedging of those risks, the company has instated relevant hedging guidelines. According to their policy, the Group Treasurer of NFC10 said:

Currency and interest rate risk are managed centrally at the head office level. Our policy tells us to hedge using plain vanilla instruments, mainly consisting of forwards and swaps. We try to fix our interest rates at a low level and as part of our risk management systems, we are continually monitoring currency risk, market values of foreign currency derivatives and development in foreign exchange markets.

NFC10 concludes to hedge with banks with a prime credit rating of the least BBB. They make around 10,000 derivatives-based transactions per year with the usage of

derivatives being necessarily linked to the existence of operational business transactions or related investments and financings. NFC10 hedges booked exposure with a hedge ratio of 100% and planned is booked gradually up to 75% within a hedging horizon of 18 months.

NFC10 employs eight people in the Treasury department of which three work in the front office and five in the back-office. The Head of Group Treasury was interviewed for this study, in his office at the premises of NFC10. He is 45 years old and has been with NFC10 for more than six years, and thus is experienced in the implementation of both EMIR and Basel III with NFC10. As the Head of Group Treasury and Corporate Financing, he is responsible for the adequate financing, liquidity provision, and risk management operations of the group.

Regarding the company's financial health and financial performance as per the last full financial year, table 24 below shows that NFC10 has a healthy financial structure with an equity ratio of nearly 25% and net leverage of 1.2x. The liquidity situation, as emphasized by the current ratio of 2.0x and the cash ratio of 1.2x, was very comfortable and shows that the cash portion within the current assets was high. Operating profitability is sound with 9.5% margin and overall returns were strong with return on assets of 10.9%. Additional extra-ordinary income that led to a higher net income led to the strong return on equity of nearly 29%. Regarding the hedging strategy, NFC 10 has a conservative strategy. The company is hedging out 100% of existing exposure to foreign exchange risk and 100% for interest rate risk.

Table 24: Financial and performance indicators NFC 10

Financial, liquidity and performance indicator	Value
Equity ratio	24.8%
Net leverage ratio	1.2x
Current ratio	2.0x
Cash ratio	1.2x
Operating profit margin (EBIT margin)	9,5%
RoE (Return on Equity)	28.7%
RoA (Return on Assets)	10.9%

k) NFC11

NFC11 is a leading global German transport company that is operating in more than 50 countries. Foreign exchange risk for NFC11 arises from international revenue generation and purchases of materials and spare parts. Furthermore, NFC11 is centralizing the hedges of their subs, they explained:

All our group subsidiaries have to report their planned currency exposure over a timeframe of at least 24 months to us and we subsequently aggregate that at group level to a net position for each currency. The goal is the look for natural hedging possibilities. Overall in the last year, we hedged around 25 currencies out of 62 currencies because that exposure was relevant for us.

Also, NFC11 aims to finance all of its financial liabilities at the floating rate of interest and therefore makes use of interest rate swaps to deal with borrowings and lease liabilities at fixed rates of interest and cross-currency swaps to hedge liabilities in foreign currencies.

NFC11 has instated a hedging policy that has been approved by the executive directors and serves as the basis and guideline for derivatives transactions. In line with the policy, the company uses derivatives financial instruments in the form of forwards, swaps and options and hedged with banks with an investment grade rating of BBB- or better. With regards to the question on the hedge ratio, they said:

We generally aim to hedge all or at least a significant portion of the risk that we see. We hedge exposure gradually over a period of 24 months, while the hedge ratio within the last 24month of a contract would be around 90%. We sometimes have long term exposures where we initially only hedge 50% when the contract is signed and review the level and increase it when necessary.

The Senior Treasury Manager, who has been with NFC11 for eight years, is experienced in the introduction of EMIR and Basel III. He was interviewed at the offices of NFC11; moreover, this 42-year-old professional has around 15 years of experience in the treasury section dealing with FX and interest rate issues. He explained that the Treasury Department in NFC11 contains ten professionals (including cash management and subsidiary financing), of which two deal with the FX and interest rate risk on the front

office and two in the middle office side and another two in back-office. With regards to the experience of the employees he said, “Including the Head of Treasury, the experience in the FX and interest rate risk management sector of that department are between 3y and 30y”.

Like the other NFCs, also NFC 11 has a stable financing structure of its operations and a strong financial performance as per the last full financial year. As table 25 below shows, 25% of assets are financed by equity and financing through external debt was low as the net leverage ratio of 0.6x shows. The liquidity situation of NFC 11 as emphasized by the current ratio of 1.2x and the cash ratio of 0.2x was less comfortable as most of the other companies but still shows that short term financings are covered by short term assets. Operating profitability is sound with an operating margin of 8.2% and overall returns were good with return on assets ratio of 7.8%. Additionally, a good financial result and moderate tax payments resulted in a good level of net income and a return on equity of nearly 22.5%. With view to the hedging strategy, NFC 10 is hedging out 100% of existing exposure to foreign exchange risk and 100% for interest rate risk.

Table 25: Financial and performance indicators NFC 11

Financial, liquidity and performance indicator	Value
Equity ratio	25.1%
Net leverage ratio	0.6x
Current ratio	1.2x
Cash ratio	0.2x
Operating profit margin (EBIT margin)	8,2%
RoE (Return on Equity)	22.5%
RoA (Return on Assets)	7.8%

1) NFC12

NFC12 is a family owned company that is active in niche markets of the specialty chemicals sectors and operates in various countries, worldwide with more than 50 production sites worldwide. Correspondingly, the company is subject to currency risk associated with its international operations as well as to interest rate risk from interest

sensitive assets and liabilities. NFC12 hedges those risk mainly with derivatives financial instruments. As regards their hedging policy, NFC12 said:

We have established policies and procedures in place to assess risks related to derivative financial instruments and use OTC derivatives only hedging purposes. That means that the underlying business must be there. In that our policies are very strict. We mainly use swaps for rate risk and forwards for currency risk, which mainly consists of US Dollar and Japanese Yen.

NFC12 made around 1,000 derivatives transactions in the year 2017 with the hedging transactions only concluded with banks that have an investment grade rating of the least BBB-. The Head of Treasury of NFC12 was interviewed for this study, wherein, he mentioned that the policies and guidelines about derivatives usage are very strict and require hedging booked risk with 100%. With regards to planned FX exposure, he said, “We have a 12-month horizon and hedge 75 % of the forecast transactions of the first six months, 60 % of the second six months, and 30 % of the last six months.”

In terms of experience, the Head of Treasury has more than 18 years of work experience and has also experienced the implementation of both EMIR and Basel III with NFC12. As the Head of Group Treasury, he is responsible for the adequate financing, liquidity provision, and risk management operations of the group. He mentioned that overall eight people work in the treasury department of which five are engaged with the risk management section. Those employees have experience in the risk management area of between 2y and 15y. In terms of systems, the Head of Group Treasury mentioned that hedging is done completely through an electronic trading platform.

Table 26 shows that NFC 12 possesses a very strong equity ratio of 70%. Consequently, indebtedness is low and even not existent on a net basis. Also, the liquidity situation of the company as per the accounting date was very comfortable as the strong current ratio of 4.0x shows. The portion of cash at hand as per accounting date was comfortable as well with a cash ratio of 1.2x. NFC 12 operations generated solid profits for the shareholders. The Operating profitability was with nearly 15% on the upper range compared to industry average and performance in the last years was stable. Also, return on equity was on a solid

level of 11.6% and return on assets at a ratio of 10.7%. NFC 12 has a conservative approach to risk from interest rate volatility and foreign exchange volatility. The company has a hedge ratio of 100% for existing exposure to both foreign exchange and interest rate risk.

Table 26: Financial and performance indicators NFC 12

Financial, liquidity and performance indicator	Value
Equity ratio	70%
Net leverage ratio	0.0x
Current ratio	4.0x
Cash ratio	1.2x
Operating profit margin (EBIT margin)	14,9%
RoE (Return on Equity)	11.6%
RoA (Return on Assets)	10.7%

m) Summary

Fourteen participants that work in the treasury or corporate finance departments of twelve NFCs were interviewed for this study. The interview questions have been sent to the participants via email around 3-5 days before the interview date. This allowed the participants to get the required internal approvals to conduct the interview. The semi-structured interviews lasted between 60 and 90 minutes. Seven participants from six of the participating NFCs were interviewed face-to-face in their offices at work and seven participants opted to be interviewed by telephone due to time constraints. While the characteristics of the participants are not relevant for this study, the characteristics of the NFC can be relevant. The NFCs were homogeneous on several variables, they were all located in Germany and all of them are hedging by using OTC derivative financial instruments via their core banks. However, the interviewed NFCs were heterogeneous in terms of the actual revenues generated (range between EUR 500m and EUR 40bn revenues per year), use of diverse type and number of derivatives and their industry domain.

As highlighted in the previous section, the selection of the NFCs was purposeful. Importance was attached to choose NFCs of different size and industry that are hedging with short-, medium-, and long-term derivatives. That allows seeing if there are industry

and size-specific differences that can be relevant for the impact-analysis-model. Also, the selection helps to detect potential impact differences, in short, medium- and long-term derivatives. Therefore, the results of this study are based on NFCs in Germany that use OTC derivatives singularly for hedging purposes and are exposed to long, medium- and short-term FX risk and interest rate risk.

4.3. Interview Findings

This section describes the findings of the interviews based on the research questions and the study objectives (see Table 27). Furthermore, all detailed research questions that resulted from the literature review are answered in this section. To answer the first research question, an initial impact-analysis-model should be created that shows how the impact of regulatory initiatives on corporate hedging activities can be analysed. On that basis, the first research question, the impact of EMIR and Basel III, should be analysed and evaluated in the context of risk and return considerations. Thus, this section starts with the results as regards the impact-analysis-model and subsequently goes over to the findings pertaining to the two research questions.

Table 27: Research Questions and Objectives

Research Questions	Research Objectives
1. How do EMIR and Basel III regulations impact corporate hedging activities of NFCs in Germany in the context of risk and return considerations?	<ul style="list-style-type: none"> a) To create a model that helps analysing the impact of regulatory initiatives on corporate hedging activities b) To analyse and evaluate the impact of EMIR and Basel III in the context of risk and return considerations of NFCs
2. How do NFCs response in terms of alignment of internal processes and strategy to manage the regulatory impact?	<ul style="list-style-type: none"> c) To analyse and evaluate NFCs response in the context of risk and return considerations d) To conceptualise NFCs' response to regulation

4.3.1. Impact-analysis-model

The initial impact-analysis-model consists of the elements that determine an NFC's willingness and ability to conduct corporate hedging (see figure 19 below) as derived from the literature review. This section examines whether each of those elements is the key determinant for the willingness or ability of NFCs to do corporate hedging. Those six elements (i.e., Risk Aversion, Trust, Costs, Systems and Processes, Knowhow and Derivatives Market) served as a priori deductive codes, during the construct. This section reviews, in case, the interview data fits into these initial codes and answers the first eight detailed questions that relate to the first research objective.

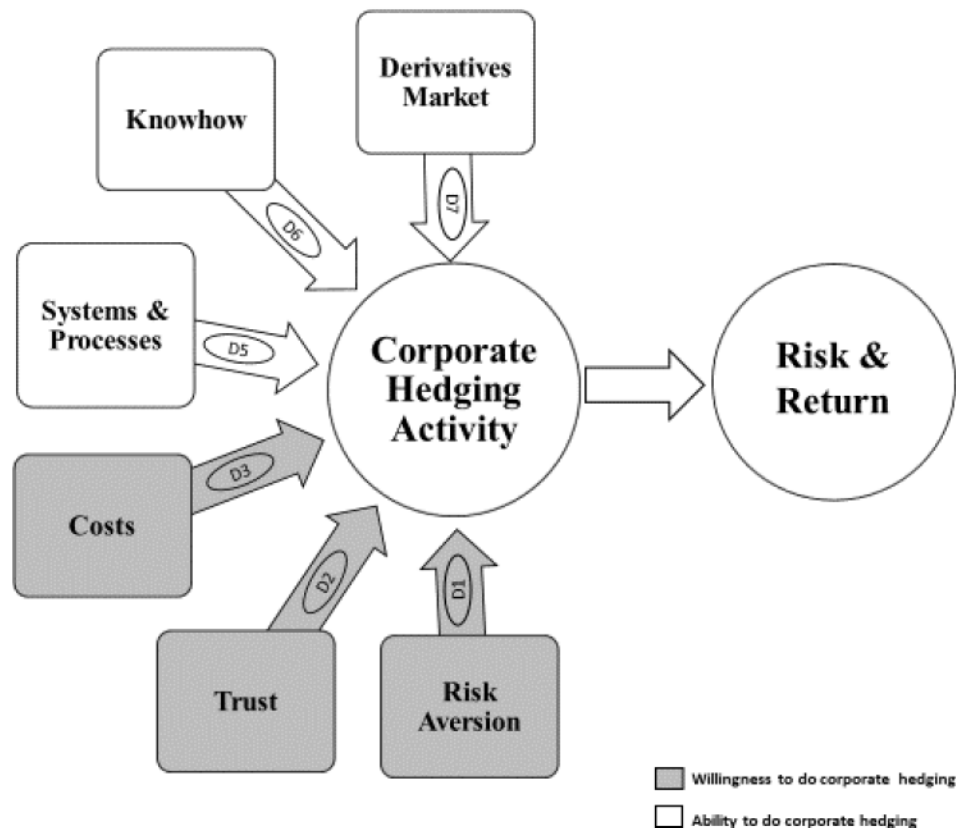


Figure 19: Initial Impact-analysis-model

a) Key Determinant 1 - Risk Aversion

The theories on rationales for corporates to hedge, be it from the shareholder or managers' side, suggest that an important reason for hedging is the elimination of volatility which brings with it the risk of lower cash flows and profits and subsequently can lead to

lower firm value. Risk in this study is related to the probability that a business or financing transaction can result in higher costs or lower, and potentially even negative, profits than initially anticipated due to negative development of interest rates and foreign exchange rates. The higher the volatility of the interest rates and foreign exchange rate in a business and financing transaction, the higher the risk that it can turn negative. Hedging leads to elimination of volatility and subsequently can reduce financial and tax costs, both in line with the general aim of a company to maximise profits and subsequently, firm value. This is done through usage of financial derivatives to eliminate volatility of profits and cash flows. This suggests that shareholders' and managers' risk aversion (elimination of volatility) marks the starting point of any hedging decision and thus constitutes a key element of the willingness to hedge. Shareholders and managers are assumed to be risk averse, which is the basis for their decision to hedge risk exposure partly or fully. Within that framework, the hedge ratio shows the portion of expected risk that is hedged through using derivatives financial instruments. A high level of hedge ratio such as 100% of expected risk would indicate a high degree of risk aversion while a lower level of hedge ratio such as 75% would indicate some willingness to take risk. Thus, depending on the ownership structure of the NFC and managements' incentives there might be differences between companies with regards to the degree of risk aversion, which subsequently would be reflected in the company's hedging policy.

From the interview findings, apparently, the management and owners' stance towards risk is closely aligned and constitutes the fundamental reason for the NFCs to hedge. All NFCs have instated a hedging policy and aim to hedge out financial risk via natural hedging or derivatives. This already points to a high level of aversion from risk stemming from foreign exchange and interest rate markets and not the operating business. The risk management employees are asked to hedge out all the existing and a significant part of the foreseeable foreign exchange and interest rate risk. Overall, all NFCs confirmed that risk aversion of owners and management is a key determinant and pertinent to their willingness to hedge with derivatives.

The analysis of the interviews and the hedging policies of the twelve interviewed NFCs suggest four criteria that can help identifying and evaluating the degree of risk aversion of the NFCs. These criteria basically consider the way how the risk is calculated, how much of the identified risk is hedged and with which strategy and what tenor. These four criteria guide the analysis pertaining to identifying a change in the risk aversion of the NFCs due to the implementation of EMIR or Basel III. Those four criteria are:

- Risk evaluation: To what extent is individual opinion/forecasting allowed when evaluating FX and interest rate risk exposure in the underlying business?
- Hedge ratio: To what extent the existing and planned risk to FX and to interest rate changes must be hedged? A high hedge ratio is indication for high degree of risk aversion.
- Strategy: Which instruments and strategies (simple or complex) are used for hedging?
- Tenor: Are all or parts of the tenor of the risk exposure covered? The higher the coverage of the risk exposure, the lower the degree of risk aversion.

Table 28 summarizes the answers of the NFCs with regards to the affiliation of risk aversion of shareholders and management to the impact-analysis-model as part of the willingness of NFCs to hedge. The NFCs were asked as to what the role of risk aversion in their hedging decision is; and why (if) it is a key determinant for the willingness to hedge; and how risk-averse are their management and shareholders. The table also shows the answers of the NFCs with regards to the way of calculation of interest rate risk and foreign exchange risk. The question here is, if the way of calculation allows the inclusion of own forecast, as the more risk averse the NCF, the less inclusion of forecast in the hedging decision. Also, the hedge ratio of existing exposure, the instruments used as well as the tenor of the risk hedged are included. Based on these criteria the degree of risk aversion of each NFC can be evaluated. Also, any changes to risk aversion due to the impact of external and internal action such as the implementation of regulation or changes to the ownership structure can be evaluated on the basis of the changes in the values numbers of these criteria. For example, when the hedge ratio would be lowered because of regulatory impact or ownership/management changes, that would hint to a decrease of risk aversion.

Table 28: Affiliation of Risk Aversion to Impact-analysis-model

Case Company	Determin. of IAM (Yes / No)	Willingness /Ability /Other	Way of Risk evaluation	Hedge ratio	Hedging instruments	Tenor of risk hedged
NFC1	Y	W	No forecast	100%	F and S	Full tenor
NFC2	Y	W	No forecast	100%	F, S, and O	Full tenor
NFC3	Y	W	Forecast considered	75% FX 100% IR	F, S, and O	Full tenor
NFC4	Y	W	Limited forecasting	100%	F, S, and O	Full tenor
NFC5	Y	W	Limited forecasting	75% FX 100% IR	F, S, and O	Full tenor
NFC6	Y	W	No forecast	100%	F and S	Full tenor
NFC7	Y	W	Limited forecasting	75% FX 100% IR	F, S, and O	Full tenor
NFC8	Y	W	No forecast	100%	F	Full tenor
NFC9	Y	W	Forecast considered	80% FX 100% IR	F, S, and O	Full tenor
NFC10	Y	W	No forecast	100%	F and S	Full tenor
NFC11	Y	W	Limited forecasting	100%	F, S, and O	Full tenor
NFC12	Y	W	No forecast	100%	F and S	Full tenor

All interviewed NFCs confirmed that management and owners' stance towards risk is seen as the most important criteria for their willingness to hedge and all NFCs stated to consider their owners' and managements' stance towards risk to be very conservative. However, some NFCs presented more scope to consider own opinion and not entirely hedge (i.e., always 100%). When talking about the importance of owners' and managements' risk aversion for their willingness to hedge via derivatives, NFC1 said "Management and owners' stance towards risk, as the management acts on behalf of the owners, are accordingly a fundamental element of our willingness to hedge with derivatives and become noticeable in our daily routine through the hedging policy".

Similarly, NFC2 said "It is the starting point. We as a family owned company have no desire to have risks from the non-operating business. I would describe the role of our willingness to hedge as very important. I would even say it is the most important criteria."

Thus, in the case of NFC1 and NFC2, owners and management do not want them to enter any risk (no speculation/forecasting) and hedge out 100% of existing risk exposure and part of planned exposure which is higher than EUR 1M. The hedging policy also mentions which instruments to use and what tenors to hedge. All this reflects a high degree of risk aversion. In a similar way, most of the interviewed NFCs demonstrated a high degree of risk aversion (no willingness to take the risk).

However, NFCs can include their individual opinion to a limited degree and can hedge existing exposure with a ratio below 100%. For example, NFC3 has its own planning system which allows them to consider own opinion to a certain but limited level, thus NFC3 said on that question, “ Hedging policy is saying to all group entities to look on their planning for 15 months and subsequently they have to look on their planning in foreign currency and subsequently they should hedge at least 75%”. In the same manner as NFC3, also some other NFCs, namely NFC 4, NFC5, NFC7, NFC9 and NFC11 stated to be able to include own forecast with regards to the planned and existing risk exposure. This indicates a higher willingness to take risk with regards to those NFCs that do not include forecast in their hedging decision making. However, NFC 3, NFC 5, NFC7 and NFC 9 are to be highlighted here, as they also mentioned to have room in their hedging policies with regards to the required hedge ratio. Most of them mentioned that a minimum level of 75% (80% for NFC 9) of existing and planned exposure needs to be hedged, while they have room for own opinion on the remaining 25% (20% for NFC9).

In general, all the interviewed NFCs cited risk aversion is the starting point of the hedging decision and claimed that this is reflected in the daily business via their hedging policies. It can be safely inferred that all NFCs have a high degree of risk aversion, resulting in high hedge ratios and the usage of plain vanilla instruments. Also, all NFCs do not enter transactions for speculative purposes and hedge out the full tenor of risk exposure to interest rate risk and foreign exchange risk. Nevertheless, there are some differences in the degree of risk aversion mainly as some NFCs also consider own opinion/forecast while others exclude this in total.

Thus, the first detailed research question (D1) can be answered (A1) as follows:

D1: Is the risk aversion of shareholders' and managers' a key determinant of the willingness of NFCs to engage in corporate hedging and subsequently of the impact-analysis-model?

A1: Yes, all NFCs confirmed that risk aversion is a key determinant of their willingness to engage in corporate hedging and subsequently it emerges as a key determinant of the impact-analysis-model.

b) Key Determinant 2 - Trust

Given that NFCs are replying to the volatility of cash flows by hedging through derivatives, there must be a certain level of trust, in terms of feeling more secure, by the NFCs into the derivatives market and the counterparty that is trading with them. Otherwise, NFCs would not feel more secure after the hedging with derivatives. Thus, it was assumed in the initial impact-analysis-model that the degree of trust displayed by the NFCs in the derivatives market and the counterparty that is trading with them also influences their willingness to hedge.

The interview findings revealed that trust is not specifically mentioned with regards to the market but with regards to the counterparty of the NFCs. All NFCs mentioned that they do not really feel a specific trust with regards to the market but rather only monitor the events in the market. Trust comes into play, only when the NFCs are looking on their counterparties, more specifically the banks. During the interview, all NFCs mentioned to regularly monitor the rating of the banks, with which they hedge. The analysis of the interviews and the hedging policies shows that all NFCs only hedge with their relationship banks, i.e. the banks that they know very well through various businesses, and that the NFCs expect a good creditworthiness of their banks based on the ratings from external rating agencies (for example, Moody's, Standard and Poor's or Fitch).

This suggest following two criteria to evaluate and analyse the degree of trust of NFCs:

- Counterparty: Who are the counterparties that the NFCs hedge with?
- Conditions: What are the minimum conditions to trade with that counterparty?

Overall, the NFCs mentioned that trust is important but somehow also implicit for businesses that includes risk. The affiliation of trust to the impact-analysis-model as part of the willingness of NFCs to hedge has been confirmed by all the case companies. The level of trust that each of the interviewed NFCs demonstrated with regards to the market and their counterparties is difficult to evaluate, but however all interviewed NFCs confirmed to fully trust that the market and their banks can deliver on their obligations. Nevertheless, the confirmation of all NFCs that they expect a certain rating from their banks demonstrated a limitation of that trust to only banks with an investment grade rating and in some cases even only A- or better rated banks.

Table 29 summarizes the affiliation of trust to the impact-analysis-model as part of the willingness of NFCs to hedge and the rating that each of the interviewed NFCs expects from their banks. The NFCs were asked what the role of trust in their hedging decision is and why (if) it is a key determinant for the willingness to hedge and how is their trust in the market and their counterparties established.

Table 29: Affiliation of Trust to the Impact-analysis-model

Case Company	Determinants of IAM (Yes / No)	Willingness /Ability /Other	Minimum Rating
NFC1	Y	W	A- or better
NFC2	Y	W	A- or better
NFC3	Y	W	BBB- or better
NFC4	Y	W	BBB- or better
NFC5	Y	W	BBB- or better
NFC6	Y	W	A- or better
NFC7	Y	W	BBB- or better
NFC8	Y	W	BBB- or better
NFC9	Y	W	BBB- or better
NFC10	Y	W	BBB- or better
NFC11	Y	W	BBB- or better
NFC12	Y	W	BBB- or better

The results show that all interviewed NFCs consider trust a key determinant for their willingness to hedge with derivatives. When talking about importance of trust, most NFCs mentioned that they only hedge with their core banks, which they know very well

from other financing contracts and where they know that they have a good investment grade credit rating by the rating agencies (for example, Moody's, S&P and Fitch).

Correspondingly, NFC2 said:

We have counterparty limits for our banks that are monitored regularly in connection with the rating and the financial situation of the bank. The minimum required rating that we require is A-. Our trust in the banking world is limited but is not highly questioned as otherwise we have to question the whole market.

He further mentioned that on certain occasions they had stopped trading with core banks because the banks ratings had dropped below the A- level. However, he also mentioned that this is not just a question of trust but especially for long term derivatives also a question of accounting treatment and costs, as the drop of the rating to lower levels can imply establishing higher level of provisions for that trade and restriction of the bank in offering competitive quotes.

In the same manner, the other two family-owned names in the sample, NFC1 and NFC6 mentioned to aim to hedge with banks with a rating of A- or better. Both mentioned to monitor the exposure to the banks in terms of nominal value of the trade and the value of the derivatives in their monthly treasury committees and ensure that a good diversification level of the exposure amongst their banks. NFC6 said in that context, "We regularly monitor the situation of the banks and if there is a bank in that could be critical, in order to exclude a Lehman Case or to reduce the risk of such a case."

The other NFCs require an investment grade rating (BBB- or better) from their banks. NFC7's hedging policy mandates, for example, a minimum rating of BBB- from their banks, but most of the time NFC7 is looking to hedge with a bank that has an A rating, given they have higher internal limits for those banks. The Group Treasurer of NFC7 said in that context:

Our company's view on the banks and derivatives market has been negatively affected by the last financial crisis and led to the deeper look into the ratings of counterparties, nevertheless he considers his core banks with that kind of good credit rating to honour their obligations.

Also, the other NFCs mentioned to have minimum rating requirement from their banks of BBB-, and mentioned, regularly preferring to hedge with banks with better ratings. Overall, all NFCs confirmed that trust is a key factor for their willingness to hedge with derivatives, however the trust is rather directed to the banks and not the market. All NFCs confirmed that they only hedge with their relationship banks and their hedging policy guides them to hedge with those that have a certain credit rating. Thus, it can be safely inferred that trust is a key determinant that influences NFCs' willingness to hedge with derivatives.

Thus, the second detailed research question (D2) can be answered (A2) as follows:

D2: Is the trust in the counterparties and the derivatives market a key determinant of the willingness of NFCs to engage in corporate hedging and subsequently of the impact-analysis-model?

A2: Yes, all NFCs confirmed that trust is a key determinant of their willingness to engage in corporate hedging and subsequently it is a key determinant of the impact-analysis-model. However, the trust is directed to the banks and not the market overall.

c) Costs

The theories on the rationales for corporates to hedge show that firms aim to reduce or control costs (financial costs and/or tax costs) through hedging. Thereby they aim to increase firm value. Subsequently, when the reduction in costs through hedging does not lead to increase of profits, for example due to higher transaction costs, this rationale for hedging would be meaningless. Therefore, it has been assumed that costs considerations, such as the premium that need to be paid for the hedge and the costs to accomplish the transaction as well as the fees of the banks, also impact the willingness of NFCs to hedge through derivatives.

All NFCs mentioned in the interviews that they do not hedge with derivatives with the aim to actively reduce existing costs or gain profits, i.e. they do not speculate on certain movements of FX and interest rate movements. They rather prefer to deal with derivatives in order to secure existing level of FX and interest rates and avoid negative future

movements. However, all NFCs mentioned that costs are of relevance when deciding if a certain currency is to be hedged or not hedged. The affiliation of costs to the impact-analysis-model as part of the willingness of NFCs to hedge and it being one of the drivers of the willingness of NFCs to hedge with derivatives was confirmed by all case companies.

The interviews suggested that the involved costs can be differentiated in three types and based on that one can analyse impact of regulatory changes on the transaction costs of hedging transactions:

- Communication: How do NFCs communicate with their banks to accomplish the trade and does the change impact the same?
- Pricing: How much premium and other fees are included in the prices offered and are the changes influencing the prices of banks?
- Monitoring: How much does it cost NFCs to monitor the hedge post trading?

All the participating NFCs confirmed that cost consideration plays an important role in the decision to hedge with derivatives. The most relevant part of it is the pricing of the transaction, i.e. premium NFC has to pay in addition to the bank fee. The NFCs further confirmed that the hedge communication and accomplishment mainly is done via an electronic trading platform and all NFCs have rules showing preference to the economically most reasonable offer, i.e. to take the cheapest offer. The strictness of rule is further emphasized by the usage of the electronic platforms, as it only shows the best offers.

Table 30 summarizes the affiliation of cost considerations to the impact-analysis-model as part of the willingness of NFCs to hedge and the sensitivity to costs of the interviewed NFCs based on the strictness of the rules towards the cheapest offer for hedges. Evidently, all NFCs have strict rules to trade with the bank which brings the best price. In case more than one bank offer the same pricing, the NFCs mentioned to consider relationship aspects, i.e. the bank that they have a good relationship with will get the trade.

Table 30: Affiliation of Costs to the Impact-analysis-model

Case Company	Determinants of IAM (Yes / No)	Willingness /Ability /Other	Sensitivity ⁴
NFC1	Y	W	4
NFC2	Y	W	4
NFC3	Y	W	4
NFC4	Y	W	4
NFC5	Y	W	4
NFC6	Y	W	4
NFC7	Y	W	4
NFC8	Y	W	4
NFC9	Y	W	4
NFC10	Y	W	4
NFC11	Y	W	4
NFC12	Y	W	4

The interview findings show that costs are an important factor for all interviewed NFCs, as a significant increase of costs would reduce the expected profitability of the business. All interviewed NFCs confirmed that cost is a key determinant for their willingness to hedge with derivatives. Considering the different costs components, the premium that the NFCs pay for the trade is the most pertinent component with the margin that banks include in the pricing being also important but not visible for the NFCs. NFC6 mentioned, that high premium, i.e., increase above a certain level, could prompt a decision to not hedge. They mentioned as an example the hedging of the Argentinian Peso, where they stop hedging the currency because the premium required was high. NFC6 said:

What surely is relevant is the interest difference between the two currencies, these are in our language use the costs, the hedging costs. That has led for example to the fact that we do not hedge the Argentinian Peso, as the premium for the hedge is so high, that we say we do not hedge but rather wait what happens. That means we leave the exposure open and maybe the depreciation of the currency is at the end less than the interest rate difference between the currencies.

⁴ Sensitivity to costs: 4: very sensitive (strict rules, no room to consider relationship aspects), 3: sensitive (a lot of rules on costs and only slight room to consider relationship aspects), 2: Some sensitivity (some rules on costs but also room to consider relationship aspects), 1: not sensitive (no rules on costs,).

However, with regards to the other components of the costs, i.e. communication and monitoring, all NFCs mentioned that these costs are relatively low, in particular for FX transactions which are done through electronic trading platforms and evaluated and monitored through other electronic systems. Due to which, most NFCs mentioned a shift to electronic platform trading and most of the FX trades implemented those platforms and only used telephone trade (which can be more expensive as it is less competitive) to the rather complex transactions. For example, as regards of the role of costs considerations with regards to the willingness to hedge with derivatives, NFC5 said:

Costs are of course important from an economic point of view and as such important when we make the hedging decision. But I must say that the transaction costs for hedging transactions have decreased significantly in recent years in particular since we are trading through the electronic platform and that limits the importance of transactions costs for the hedging decision.

Thus, the third detailed research question (D3) can be answered (A3) as follows:

D3: Are cost considerations a key determinant of the willingness of NFCs to engage in corporate hedging and subsequently of the impact-analysis-model?

A3: Yes, all NFCs confirmed that cost considerations are a key determinant of their willingness to engage in corporate hedging and subsequently they constitute a key determinant in the impact-analysis-model. The pricing of the trade, i.e. premium for the currency and the margins that banks take, is the most important part of the costs considered while communication and monitoring costs are rather on a low level and thus less important.

d) Accounting Treatment

During the questioning about the key determinants of the NFCs' willingness to engage in corporate hedging via derivatives, NFCs were also asked if any other essential factors impact their willingness to hedge by using derivative financial instruments. Some NFCs mentioned here the imperativeness of the accounting treatment of the hedge for them, given that they want to avoid unnecessary volatility of financial statements. As described in the background section, hedge accounting rules allow the reduction of volatility in financial figures through aligning the value movements of the hedged item with the hedging

instrument. Besides NFC2, all of the interviewed NFCs apply hedge accounting and mentioned that a change in accounting treatment of the derivative could also influence their willingness to hedge with certain instruments. For example, NFC4 said:

For us, it is important that our P&L is not influenced too much from currency or interest rate volatility. One of our most important KPIs is earning per share and we do not want it to be too volatile. Thus, it is also important how trades are treated under US GAAP. We are closely monitoring looking and trying to ensure that the trade also is fine from an accounting perspective. That is mostly quite easy as we mainly use plain vanilla instruments.

Correspondingly, NFC4's willingness to apply a certain hedging strategy is also influenced by the accounting treatment of that hedge. In alignment, NFC7 explained about their aim to give shareholders and creditors a view of their financial and income situation without valuation of derivatives bringing too much volatility. They said, "We very much look on hedge effectivity, not using hedge accounting would be an issue for us as our shareholders and our creditors cannot deal so good with volatile figures".

Also, NFC 6 confirmed to use hedge accounting, which often is easily achieved given that they largely use plain vanilla derivatives, where the hedge effectiveness can be demonstrated easily. The interviewee said:

We use hedge accounting and the accounting is also important. Hedge accounting is also a reason for us to use plain vanilla products, because it is very easy to use hedge accounting with those products. That would be much more difficult when one would use structured hedge solutions, because you normally will have higher ineffectiveness there, which subsequently have to go through the P&L. So, we have the normal forwards where the spot component can be simply extracted and so to speak taken in the hedging while the forward component can go through the P&L.

Table 31 summarizes what the NFCs said about the importance of accounting treatment as regards their willingness to hedge with derivatives and consequently the affiliation of accounting treatment to the impact-analysis-model as part of the willingness of NFCs to hedge. Furthermore, it shows the application of hedge accounting by the interviewed NFCs.

Table 31: The Affiliation of Accounting to the Impact-analysis-model

Case Company	Determinants of IAM (Yes / No)	Willingness /Ability /Other	Hedge accounting (Yes / No)
NFC1	Y	W	Y
NFC2	N	./.	N
NFC3	Y	W	Y
NFC4	Y	W	Y
NFC7	Y	W	Y
NFC6	Y	W	Y
NFC7	Y	W	Y
NFC8	Y	W	Y
NFC9	Y	W	Y
NFC10	Y	W	Y
NFC11	Y	W	Y
NFC12	Y	W	Y

This interview finding shows that most of the interviewed NFCs apply hedge accounting. They mentioned to consider hedge accounting as an important factor with the aim to reduce volatility in figures. However, they would also trade when it makes economic sense but would not be applicable to hedge accounting. For example, NFC5 said, “Accounting consideration clearly follows the business consideration, if hedging the business makes sense, subsequently the hedge would be done, independent of accounting issues.”

In a similar manner all other NFCs that mentioned to apply hedge accounting, citing accounting treatment as an important factor to consider, but also hinted upon its exclusion as a deal-breaking factor. Rather, accounting treatment is introduced in the transaction during the consideration of the deal from risk and costs perspective. For example, NFC8 said, “We try to get the perfect hedge and apply hedge accounting. Most of our deals are in that way, but when it would not be possible for a specific deal subsequently that would not be a deal-breaker. Because the important point is to get the FX risk out.” NFC2 is not using hedge accounting at all. As regards why it is not applied, NFC2 mentioned that for them as a non-listed family owned company, ratios such as KPIs are not relevant and they only consider the operational business. Furthermore, according to NFC2, the advantages of less

volatility in the figures do not justify the burdensome and costly requirements of hedge accounting such as designation, documentation, and measurement of effectiveness.

Overall, one can summarize that most of the interviewed case companies mentioned accounting treatment of derivatives as a factor impacting their willingness to use certain instruments. Those companies, however, also confirmed that the risk and economic evaluation of the appropriateness of the derivative to hedge the risk effectively is their primary concern, but they also care about less volatility in their financial figures. Thus, implying they would not abstain from using certain instruments when it is the most effective instrument to hedge the risk, but would take the accounting treatment into consideration.

Thus, the fourth detailed research question (D4) can be answered (A4) as follows:

D4: Are there any other factors that can be considered key determinants of the willingness of NFCs to engage in corporate hedging and subsequently of the impact-analysis-model?

A4: Yes, most NFCs mentioned that the accounting treatment of the hedge also influences their willingness to engage in corporate hedging with certain derivatives and subsequently it is a key determinant of the impact-analysis-model.

Excuse Accounting Treatment of Derivatives and Hedge Accounting

As mentioned in the background section, NFCs use derivatives, such as forwards and swaps, in order to mitigate the risk stemming from negative changes in exchange rates and interest rates. In terms of accounting, derivatives are recognized at the accounting date at fair value, also called mark-to-market, as assets or liabilities on the balance sheet (Kawaller, 2004). The international accounting standards (IFRS) and the US accounting rules (US GAAP) define fair value as “The price that would be received to sell an asset or paid to transfer a liability in an orderly transaction between market participants at the measurement date” (FASB, 2006, p.9; IFRSF & IASB, 2013, p.2).

The document also explores the question, as to how changes in the fair value of those derivatives are treated in the balance sheet and income statement is subject to the purpose of the derivative, for example if it is used for hedging purposes or not. While the changes in the fair value of derivatives not used for hedging purposes would simply be recognized in the profit and loss account, transactions are more complicated for those cases, wherein derivative instruments are used to hedge certain risks. When derivatives are used for hedging purposes, changes going directly through earnings can lead to increased volatility in corporates' financial statements and corporates may face an accounting mismatch between the derivative instrument and the hedged item (KPMG, 2011). This can be attributed to the fact that the derivative is measured at fair value while the hedged item can for example be measured at cost, at amortized cost basis or in some cases it contains future transactions that have yet to be recognized (KPMG, 2011).

Applying hedge accounting, assures that gains and losses from both components of the hedging relationship, thus the hedged item and the hedging derivative are recognized in the same accounting period, thereby, reducing income volatility (Kawaller, 2004) and offering an offsetting of accounting mismatch between the derivative instrument and the underlying exposure being hedged. The IFRS offers three options with regards to hedge accounting depending on the nature of the risk that is being hedged. However, there are qualifying criteria to qualify for the application of hedge accounting, such as providing evidence of the hedge relationship, i.e. that the derivative instrument is related to the hedged item in possession. Furthermore, an assessment of effectiveness of the hedge has to be demonstrated before one can apply hedge accounting (IASB, 2012). This is computed by analysing the correlation of changes in fair value or cash flow of the derivative and the hedged item.

The companies are expected to show highly effective hedges and also to demonstrate any ineffectiveness, i.e., the extent to which the change in the fair value or cash flow of the derivative does not offset the change in fair value or cash flows of the hedged item (IASB, 2012).

As presented in Figure 20 below, the three hedge account methods are:

- Fair value hedge
- Cash flow hedge
- Net investment hedge

A fair value hedge is protection against exposure to changes in the fair value of certain risks that will affect the net income reported (Jawad, Xia, Alshamam, & Alnuaimi, 2014). In a fair value hedge, according to IAS 32, the gain or loss from the change in fair value of the hedging instrument is recognised in terms of profit or loss; and the gain or loss on the hedged item with regards to the hedge risk shall adjust the carrying amount of the hedged item and be recognised in profit or loss (IASB, 2012). In case of available-for-sale financial assets, changes in fair value are recognised in the profit and loss account (IASB, 2012).

The cash flow hedge offers protection with regards to variability of cash flows caused by a certain risk, such as interest rate risk on a floating rate bond, or against variability in cash flow that could affect profit or loss (Forsberg, Lindholm, Muhoza, & Örtenvik, 2013). The derivative instrument used for hedging is recognised at fair value for each period the change is divided in an effective and ineffective portion, depending on their ability to fulfil certain criteria (KPMG, 2011). The changes in the fair value of the effective portion is recorded directly in the shareholder's equity (i.e., other comprehensive income), while, the changes in the fair value of the ineffective portion goes through the income statement (IASB, 2012). In a cash flow hedge, ineffectiveness is measured when there is an over-hedge, that is when the change in the fair value of the derivative instrument exceeds the change in the present value of the future cash flows of the hedge exposure (KPMG, 2011).

When corporates' have net investment in foreign operations, there is volatility in the shareholders' equity upon consolidation of the foreign operations into the parent company's financial statements. Correspondingly, the net investment hedge aims to eliminate or reduce the volatility in shareholders' equity due to the foreign currency exposure. The hedging

instrument can be based on debt denominated in foreign currency or via a derivative, such as an FX forward. When the company decides to use a derivative to hedge, the effective portion of the change in fair value of the instruments is recognized in shareholders' equity while the ineffective portion is recognized directly as profit or loss (IASB, 2012).

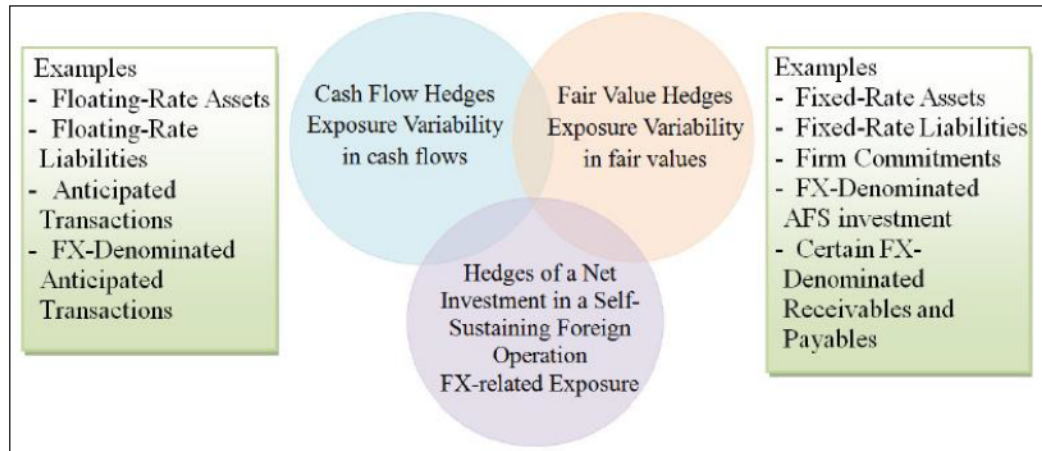


Figure 20: Three hedge accounting methods

Source: (Jawad et al., 2014), Hedge Accounting as a Strategic Tool in Financial Risk Management: A Review. Research Journal of Finance and Accounting, 5(11), p. 56.

On the back of the overwhelming view that the old hedging model (IAS 39) was not consistent with companies' risk management (IASB, 2010b), in November 2013, the IASB commenced the project to replace the accounting standard on financial instruments IAS 39 through a new standard on financial instruments, namely IFRS 9. The replacement has been divided into several phases with hedge accounting being the third and final phase (IASB, 2010a). IFRS 9 adopts a principles-based approach to hedge accounting and aims to align hedge accounting to corporates' risk management (Forsberg et al., 2013). The changes mainly affect the classification of hedged items and hedging instruments, in that there are fewer restrictions (Forsberg et al., 2013). Figure 21 below presents the timeline and different steps of the implementation of IFRS 9.

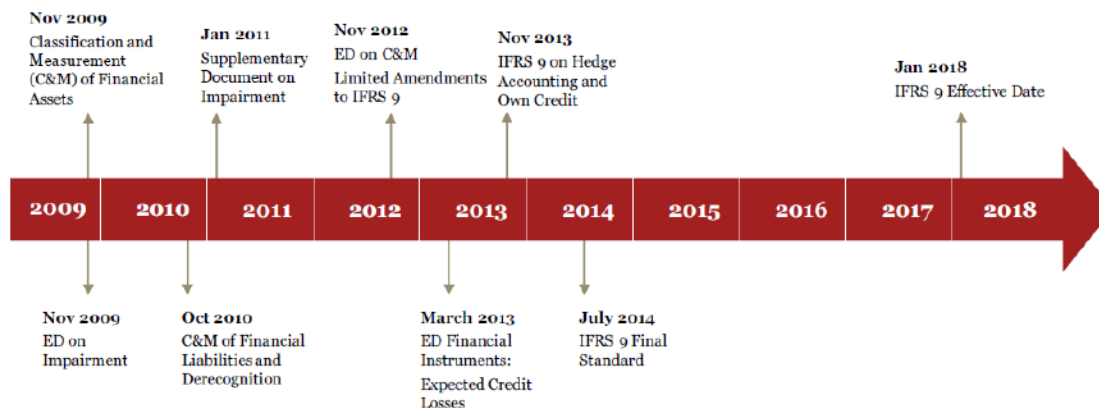


Figure 21: Timeline IFRS 9

Source: pwc (2014) Tools, practices aids and publications: In depth and Practical guides INT2014-05 IFRS 9: Classification and measurement Retrieved 19.10. 2016, from <https://inform.pwc.com>

Also, after the implementation of IFRS 9, the three hedge accounting models have remained analogous in the construct as in IAS 39. With regards to fair value hedge of an equity instrument that is accounted at fair value through other comprehensive income, changes in the fair value of the hedging instrument are also recorded in OCI without recycling to profit and loss statement, since gains/losses of equity instruments are never recycled to profit and loss statement (PWC, 2017). Also, with regards to cash flow hedge accounting, IFRS 9 aims to instate the fluctuations of assets and liabilities values directly in equity and not through the P&L. For example, in the forecast transactions' (either as assets or liability) the carrying values are adjusted (when necessary) directly through equity sans the provision of any choice, as was in IAS 39 (PWC, 2017).

In summary, IAS 39 was largely rule-based and included many limitations on what can be used as the hedged items and hedging instruments while IFRS 9 will be more principle-based, removing several tests and relaxing limitations (Forsberg et al., 2013).

Figure 22 summarizes the major reforms under IFRS 9.

Subject of change	IAS 39	IFRS 9
Hedged item	Derivatives cannot qualify for hedged items. Only risk components of financial items are allowed to qualify for hedged items. Non-financial items can only be hedged in their entirety.	Derivatives will be included within the hedged items. In addition to what is required in IAS 39, even risk components of non-financial items will qualify for hedged items.
Hedging instrument	Other assets or liabilities than derivatives are eligible only if the risk is a foreign currency exchange risk	Any financial asset or liability valued through profit and loss will be eligible.
Effectiveness	Prospective and retrospective effectiveness tests required. Actual result must be within 80-125 per cent. Hedge is discontinued if it fails any of the tests.	No retrospective test. Qualitative test allowed. Rebalancing rather than discontinuation.
Ineffectiveness	Ineffectiveness is only recognized when the change in fair value on the instrument is greater than the change in value on the item.	Ineffectiveness on fair value hedges is recognized as any difference between the changes in fair value.
Fair value hedges	Changes in fair value are recognized in profit and loss.	Changes are recognized in other comprehensive income.

Figure 22: Major IFRS 9 reforms

Source: Adapted from Forsberg et al. (2013), Hedge Accounting-Simplified with new rules? IFRS Accounting in Progress, p. 160

The interviews and the associated discussion on the accounting treatment of derivatives suggest the following two criteria to analyse any changes to the accounting treatment of the hedging transactions:

- Hedging purpose: Can derivatives be designated as derivatives for hedging purposes according to the accounting rules?
- Hedge effectiveness: Can hedge effectiveness be demonstrated at inception and during a lifetime?

e) Systems and processes

An important factor determining the ability of NFCs to hedge is the systems and processes of NFCs. The NFCs need to implement appropriate systems and processes to conduct and accommodate the derivatives trades. This includes the technological means to connect with the trade counterparties and accomplish the trade as well as to depict the

trades in their accounting and booking systems. Also, appropriate processes, including guidelines, are required to manage the trade, booking, and monitoring. This includes the separation of front-office and back-office within the risk management department, with the first doing the trade and the latter booking and monitoring it. The interviews suggest the following four criteria to analyse any changes to the required systems and processes of the hedging transactions:

- Systems: What systems are used to trade and depict the trades in the booking and accounting systems of the NFC and is that changing?
- Automatization: What level of automatization is required to make the trades and depict them in the books and does the change affect that?
- Workflow: How is the hedging workflow and is that changing?
- Processes: What is the current construct of other processes and guidelines and is the change affecting them?

The affiliation of systems and processes to the impact-analysis-model as part of the ability of NFCs to hedge and that this factor is important as a driver of the ability of NFCs to hedge, has been confirmed by all NFCs. Table 32 depicts the level of automatization of the NFCs hedging activities:

Table 32: Affiliation of Systems and Processes to the Impact-analysis-model

Case Company	Determinants of IAM (Yes / No)	Willingness /Ability /Other	Level of automatization ⁵
NFC1	Y	A	4
NFC2	Y	A	4
NFC3	Y	A	4
NFC4	Y	A	4
NFC5	Y	A	4
NFC6	Y	A	3
NFC7	Y	A	3
NFC8	Y	A	2
NFC9	Y	A	4
NFC10	Y	A	4
NFC11	Y	A	4
NFC12	Y	A	3

The systems and processes are confirmed to be of key importance for all NFCs corporate hedging activities and their importance has increased over time, given the higher and ever-increasing interconnect between the systems and the NFCs automatizing the whole trading process, from conducting the trade to displaying it in their treasury systems to confirmation in their accounting systems. When asked about the importance of the systems and processes NFC1 said:

We have today a situation, where we upload the transaction on 360T, it is subsequently automatically copied and installed in our SAP system as well as in our Treasury Management system and even the potential internal back-to-back transactions are created, also automated. By the way, also autoconfirmed. And subsequently the deals that are dealt external are transferred from our treasury management system to Mysis and the bank also uploads the deals to Mysis and subsequently the automatic matching is done. Subsequently, the confirmations are sent back to our treasury management system so that the complete middle and back-office activities are highly automated.

Most NFCs mentioned having diverse automated processes in place, where the trade is done via an electronic trading system and subsequently automatically transferred to their treasury systems and subsequently matched via a confirmation matching system. However,

⁵ Level of automatization of systems and processes: Fully automated: 4, Mostly automated:3, Only few automated: 2, Not automated: 1

some NFCs also mentioned to still not have fully automated the entire workflow with the process including some manual steps due to lack of sufficient IT resources. For example, NFC6 said:

Regarding the confirmation itself, our process is not automated, and thus currently more laborious and manual, also due to the segregation of duties. You have on the one side the dealer, who enters the deal into the systems, subsequently, you have the back-office people who control the deal and subsequently you still have other people who manually sign the confirmation. That means you always involve at least 4 people. And subsequently, you still have the people that make the payment related to that deal so that at the end 6 people are involved in a transaction. That is sometimes painful and burdensome. Technical support would have been very helpful and desirable but that so far failed due to lack of IT resources.

NFC8 has even less automation than NFC6. As regards if their systems and processes are automated, the Group Treasurer said:

They are not. On the trading, it is the electronic platform 360T but our treasury system in excel. In the end, it is a little bit more subsequently excel but it is Excel-based. So, what we have built up over the last years is more or less an automated excel tool, where we have auto imports of several items, so this is full of VBA but at the end it is excel.

Overall, the NFCs mentioned and highlighted that the middle-office and back-office work of their hedging activities is highly automated and allows the centralisation of hedging activities in one treasury hub. As regards the importance of the appropriate systems and processes for their hedging activities, all NFCs confirmed that appropriate processes and systems are fundamental for their ability to hedge efficiently with derivatives.

Thus, the fifth detailed research question (D5) can be answered (A5) as follows:

D5: Are the systems and processes related to corporate hedging a key determinant of the ability of NFCs to conduct corporate hedging and subsequently of the impact-analysis-model?

A5: Yes, all NFCs confirmed that the systems and processes are a key determinant of their ability to engage in corporate hedging and subsequently they are a key determinant of the impact-analysis-model. Appropriate systems and processes can ease various tasks within the corporate hedging workflow.

f) Knowhow

The theories on the optimal hedging strategy suggest that the expertise of the employees, that engage in hedging, propose the hedging policy, and decide on hedging policy are of importance for the corporate hedging activities. At all stages of the corporate hedging transaction, i.e., from calculating the risk exposure, to determining the appropriate hedge ratio and choosing the right instrument, the know-how of the employees play a major role. Therefore, it was assumed in the initial impact-analysis-model that the know-how of the employees and management with regards to corporate hedging influences their ability to conduct corporate hedging. In the interviews with the case companies, the affiliation of know-how to the impact-analysis-model as part of the ability of NFCs to hedge was confirmed by all participants.

Furthermore, the interviews show that all NFCs have employees in the risk management department that have several years of experience with FX and interest rate risk and hedging them with derivative financial instruments. The interviews suggest, that the knowhow of the employees is mainly required during three steps, namely in the hedging transaction itself; in advising the management when creating the policy; and with regards to any currency and interest rate market movement, and when monitoring the development of the accomplished trades. Thus, the following three criteria can be used to analyse any changes to the knowhow for hedging transactions:

- Advising: Is the advising activity of the risk management employees towards management and owners impacted?
- Hedging: How much expertise do employees have in hedging with derivatives and is that impacted by the change?
- Monitoring: Is the expertise of employees on monitoring the hedges impacted by the change?

Table 33 summarizes the findings regarding the affiliation of knowhow to the impact-analysis-model as a factor that influences the NFCs ability to hedge and the experience of the employees (the most experienced employee) with hedging FX and interest rate risk with derivatives.

Table 33: Affiliation of Knowhow to the Impact-analysis-model

Case Company	Determinants of IAM (Yes / No)	Willingness /Ability /Other	Experience in years
NFC1	Y	A	15y
NFC2	Y	A	20y
NFC3	Y	A	30y
NFC4	Y	A	20y
NFC5	Y	A	20y
NFC6	Y	A	15y
NFC7	Y	A	15Y
NFC8	Y	A	20Y
NFC9	Y	A	30Y
NFC10	Y	A	20Y
NFC11	Y	A	30Y
NFC12	Y	A	18Y

The employees of all NFCs have various years of experience in the derivatives markets and with derivatives instruments, with the experience in years ranging between 5 years and 30 years. In the interviews, all NFCs confirmed that the knowhow of the employees is very important in the daily business as they need to analyse the risk and decide on the right instruments based on their knowhow. Nevertheless, all NFCs also mentioned that the day-to-day business is largely standardised through the usage of electronic platforms and the fact that they only use plain vanilla derivatives. Furthermore, in most NFCs the treasury department acts as advisors for the management and other operating entities with regards to the right hedging policy or hedging strategy. For example, NFC2 considers the know-how of the employees to be a key element for their ability to hedge, the interviewee said on those questions:

Yes, I think the knowhow is an important element for the ability to hedge efficiently despite that the business is very standardised. The reason for that is that in my company the employees have to choose the right instrument and timing and to make various risk analysis scenarios as well as to propose the hedging policy and adjustments to the policy.

In the same manner, NFC5 said:

The knowhow of employees is not only important in the daily work as they are looking on the risk exposure and decide on how to hedge it in line within the policy but also because they propose the adjustments to the hedging policy and usage of adequate instruments that are outside the policy. But when I look at the daily work, that is the hedging via the platform, subsequently, I must say that it is very simple.

Overall, all NFCs confirmed that knowhow of employees is a key factor for appropriate hedging. However, all NFCs also confirmed, that they mainly hedge with plain vanilla instruments and do not engage in any speculation, and given that, the required knowhow is limited to hedging for means of risk reduction and lack of any additional gains of profits.

Thus, the sixth detailed research question (D6) can be answered (A6) as follows:

D6: Is the knowhow about corporate hedging a key determinant of the ability of NFCs to conduct corporate hedging and subsequently of the impact-analysis-model?

A6: Yes, the knowhow of employees and management is a key determinant of the ability to engage in corporate hedging and subsequently emerges as a key determinant of the impact-analysis-model. However, the importance is limited given the standardised approach to FX and interest rate hedging and usage for risk reduction purposes only.

g) Derivatives Market

Another determinant that was assumed as a static factor in the theoretical models on optimal hedging strategy is the availability of the required instruments and the required tenors. This is, of course, dependent on the derivatives market's situation because when the right instruments and tenors are not available for the NFCs, it might adversely impact their ability to hedge efficiently. Thus, the situation on the derivatives market (be it directly the market or via the banks), was assumed to influence the ability of NFCs to conduct corporate hedging. As such, the affiliation of the derivatives market to the impact-analysis-model as part of the ability of NFCs to hedge has been confirmed by all NFCs. The analysis of the interviews and the hedging policies suggest two criteria to analyse any changes with regards to the derivatives market's situation, namely:

- Instruments: Are all required instruments available or is the availability of required instruments changing?
- Tenors: Are all required tenors available or is the change impacting the availability of some tenors?

All the interviewed NFCs confirmed that the availability of required instruments and tenors impacts the way they hedge. Correspondingly, in case of a shortage of the required instruments and tenors, the NFCs would need to adjust their hedging strategy. Table 34 summarizes the interview finding regarding the affiliation of the derivatives market to the impact-analysis-model as a factor that influences the NFCs' ability to hedge. Furthermore, it shows the instruments and main tenors used by the interviewed NFCs.

Table 34: Affiliation of Derivatives Market to the Impact-analysis-model

Case Company	Determinants of IAM (Yes / No)	Willingness /Ability /Other	Instruments / Tenor
NFC1	Y	A	Forwards/Swaps / 24 months
NFC2	Y	A	Forwards/Options/Swaps / 24 months
NFC3	Y	A	Forwards/Swaps / 15 months
NFC4	Y	A	Forwards/Swaps / 18 months
NFC5	Y	A	Forwards/Swaps / 24 months
NFC6	Y	A	Forwards/Swaps/12 months
NFC7	Y	A	Forwards/Swaps/Options/24 month
NFC8	Y	A	Forwards/Swaps 1 month
NFC9	Y	A	Forwards/Swaps/Options/24 months
NFC10	Y	A	Forwards/Swaps/18 months
NFC11	Y	A	Forwards/Swaps/Options/24 months
NFC12	Y	A	Forwards/Swaps/12 months

The interviews conducted with the companies show that the availability of the right derivatives instruments and the required tenors constitutes significant importance when NFCs want to hedge effectively with derivatives. When the required instruments would not be available in the market, the NFCs could not hedge out their risk exposure. However, all NFCs also confirmed that in their daily hedging decision, the situation on the market is not regularly looked on and analysed. This can be attributed to the fact that the market was so far always open for the NFCs and offered the required instruments and tenors. Besides the fact that the market volume continually increased, also the fact that most corporates hedge with plain vanilla instruments and moderate tenors helped with regards to availability. As the table above shows, most NFCs hedge with forwards, swaps and sometimes options

within a 12 to 24 months hedging horizons (NFC8 hedges for a significantly lower tenor, given that its payments are mainly done within 21 days)

As regards the importance of the market situation for their hedging decision, for example, NFC3 said:

“I must say that we never had any issues to get the right instruments and tenors on the market. But this is mainly due to the fact that we are doing plain vanilla derivatives within the 1- or 2-years spectrum. Nevertheless, the market needs, of course, to be there in order to hedge efficiently.”

As regards, the categorisation of right instruments as a key determinant further added:

“Of course, when there is no bank offering the required instruments subsequently you might be pushed to take alternative instruments or make cross hedges and also alternative maturities, which would not make sense at all. So yes, the availability of the requested instruments and tenors is a very important factor.”

Correspondingly, NFC4 said:

“The market for derivatives is a continually increasing market. When you look to the volumes subsequently you will see that it goes into the trillions. Thus, availability was always there. We never experienced a case where we did not have an offer for our demand. Of course, we felt the financial crisis, that there were some uncertainties in the market and many players wanted to wait how the regulation will look like, but there were always enough instruments available. But we only use standard instruments, which of course supports that.”

Thus, in the daily hedging decision of the interviewed NFCs, the market situation is not explicitly taken into consideration, as the market always offered the required derivatives. In a scenario projecting a reduction of the required instruments, subsequently, the NFCs would need to conduct a proper analysis of the market. Against that background, the market situation is relevant as a general key determinant for the ability to hedge efficiently, as it provides the instruments and tenors required.

Overall, all NFCs confirmed that the situation on the derivatives market is a key factor for the ability to do hedging properly, thus the seventh detailed research question (D7) can be answered (A7) as follows:

D7: Is the situation on the derivatives market a key determinant of the ability of NFCs to conduct corporate hedging and subsequently of the impact-analysis-model?

A7: Yes, the situation on the derivatives market is a key determinant of the ability to conduct corporate hedging and subsequently a key determinant of the impact-analysis-model.

h) Summary

This section presented the interview findings of the key determinants that construct or significantly influence the hedging activities of the interviewed NFCs. Seven key determinants have been presented by all interviewed NFCs, who cited not to consider any other factors that construct or significantly influence their willingness or ability to hedge, so that the eighth detailed research question (D8) can be answered (A8) as follows:

D8: Are there other factors that are important for the ability to hedge with derivatives and can be considered key determinants?

A8: No, there are no other factors that can be considered key determinant for the ability of the interviewed NFCs to do corporate hedging

The identification of the key determinants supports the completion of the first research objective of this study, i.e. to create an impact-analysis-model that helps to answer the first research question of this study, which is how the regulatory changes (EMIR and Basel III) impacted corporate hedging activities of NFCs in Germany. Based on the interviews with the fourteen individuals from twelve case NFCs, support was found for the importance of the priori codes for the impact-analysis-model. The interviewed NFCs confirmed each of the a priori codes as a key determinant of their corporate hedging activities and explained the reason for the importance of that determinant. Furthermore, the primary research could extract details on how the impact of changes can be analysed, thus provide further detail to the initial model. In addition, most companies mentioned that the accounting treatment of the derivatives is also a relevant point for their willingness to conduct corporate hedging so that the impact-analysis-model was adjusted and extended by the key determinant “Accounting”.

Figure 23 presents the final impact-analysis-model with the grey coloured points covering the key determinants of the willingness to engage in corporate hedging and the white coloured points the key determinants of the ability to do corporate hedging. The details to each of the key determinants help to categorize the associated impact.

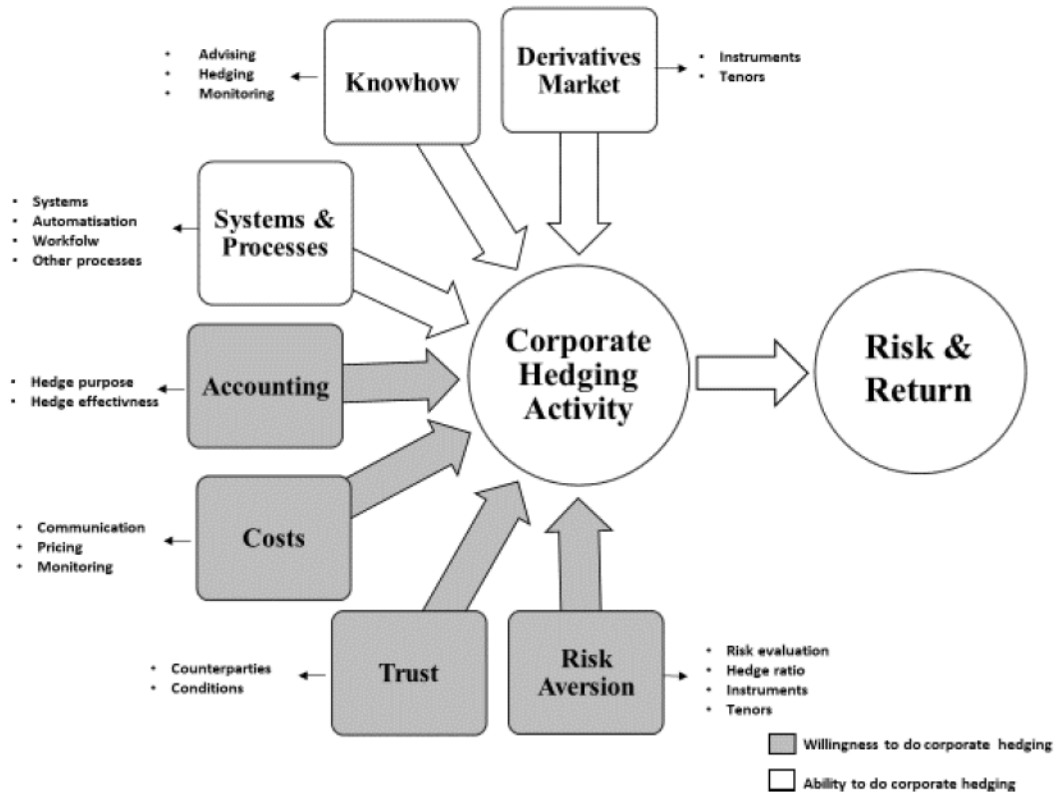


Figure 23: Final Impact-analysis-model

Based on the impact-analysis-model, one can analyse, how, i.e. through which determinant, regulatory or any other changes have impacted the corporate hedging activities. The impact result can subsequently be evaluated in the context of the risk and returns of the NFC, by determining if the NFC is hedging less, same level or more and if the NFC is hedging with higher, same level or fewer costs. On that basis, the author approached the second objective of this study, namely the answering of the first research question.

4.3.2. Research Question One

The first research question examined how EMIR and Basel III impacted the corporate hedging activities amongst the NFCs in Germany and how that is to be evaluated in the context of risk and return considerations. This can be examined using the impact-analysis-model that has been created, by investigating the impact of both regulations on each of the seven key determinants of the model and by evaluating the impact in the context of risk and return considerations. The interview participants were asked, how EMIR and Basel III impacted each of the key determinants that influence their willingness and ability to conduct hedging via derivatives.

a) Risk Aversion

The operating businesses of the interviewed NFCs are affected by fluctuations in exchange and interest rates and all NFCs have instated a risk policy in order to limit these risks. These policies are based on the risk aversion of the management board and the owners of those corporations. Larger NFCs in Germany are mostly in the form of capital companies and include a two-level management structure with the first consisting of the management board and the second of the supervisory board, representing the owners. In the case of the interviewed NFCs, the hedging policy is proposed by the management board and approved by the supervisory board representing the owners/shareholders. With regards to the day-to-day business, the decision-making bodies are the treasury employees but committees for foreign currencies, and investments that meet at regular intervals and undertake ongoing compliance checks with instructions and guidelines set by management and owners.

As regards, if the risk aversion of management and owners has been influenced by the implementation of the regulatory changes, all twelve NFCs replied that risk aversion has not been impacted by the changes from Basel II to Basel III and EMIR, which obviously can be attributed to the disassociation between the regulatory changes and the risk sensitivity of management and owners. For example, NFC5 answered to that question, “Management and owners’ risk aversion has not been influenced as their readiness to enter into risk positions and the implementation of regulation to increase the transparency of market for regulators

are two different things.” In the same manner, NFC8 said, “No, the way we approach risk and our hedge ratio is not changed, also not the instruments used or the tenor.”

Also, all other NFCs mentioned that this factor has not been impacted by the implementation of EMIR and Basel III. Overall, all interviewed NFCs mentioned that none of the four criteria regarding risk aversion (i.e., risk evaluation, hedge ratio, derivative instruments used, tenors hedged) has changed due to EMIR and Basel III. Also, the analysis of the risk report of the NFCs, as disclosed in their annual reports, shows the absence of any change to the hedging policy.

b) Trust

Trust is a fundamental parameter when conducting a business that includes risk, otherwise one would not feel comfortable doing the business. By deciding to hedge their FX and interest rate risk by using derivatives, the NFCs demonstrated that they have a certain level of trust in the market for derivatives and their banks to deliver on their obligations. A change of the level of trust that the NFCs have in the market, could result in more hedging or less hedging and subsequently on the risk that the company encounters with regards to FX and interest rate changes.

As regards, if their trust in the market and their banks have been impacted by EMIR or Basel III, all twelve NFCs said that it has not been impacted. For example, is NFC 9 who said:

Generally, we do have a certain level of trust in our core relationship banks and certainly want to avoid a Lehman scenario. However, the regulation of the market in its current form is not impacting our decision-making process positively or negatively. In our decision making, we consider our banks to be able to comply with their obligations irrespective of their reporting requirements and clearing requirements.

Also, according to the comparison of the publicly disclosed statements about their hedging counterparties in annual reports of the NFCs before and after the regulation, there is no change of the counterparties they hedge with, i.e. their relationship-banks, and the conditions such as the minimum ratings. In the interviews, all twelve case NFCs mentioned that they generally understand the wish of regulators to ensure transparency in the OTC

derivatives market and regulate the financial institution's side. That generally should be positive for the transparency of the market and subsequently for the trust of users of derivatives. However, they also mentioned that they do not know how the data sent to regulators is analysed and perceive that any action of the regulators can probably be post fact, i.e. after the market or the financial institution has failed, which limits any significant increase of trust in the markets.

Against that background, all of them confirmed that more regulation does not incentivise them to do more hedging with derivatives. For example, NFC7 said:

We do not know exactly what is happening with the data collected but would rather consider it positive with regards to the trust in the market and the market players, when there would be a central third party that monitors the market and takes appropriate actions. However, in our opinion, this regulation should not be for normal NFCs that use derivatives only for hedging purposes.

With regards to their banks, all NFCs said that they do not trust more in their banks due to the reporting requirements but based on their financial performance and rating. They said trust in their banks is not affected by the regulatory measures. Both criteria (Criteria and Conditions) that are used to analyse the impact of the regulation on the determinant trust has not changed due to EMIR and Basel III. Overall, it can be summarized that trust in the market has not been impacted in a manner that would result in more hedging or less hedging.

c) Costs

The literature review highlighted that NFCs are very much concerned about the impact of EMIR on the cost and effectiveness of their hedging activities especially due to the various reporting and monitoring requirements. On Basel III the concerns that NFCs mentioned are tendencies of higher costs for hedging as banks try to establish higher prices and a decrease of availability of required derivatives and potential urging of banks towards the cash collateralisation of OTC derivatives. The provision of cash collateral for derivatives directly impacts the liquidity situation of the corporates and could result in higher costs. When asked about the impact of EMIR and Basel III on the costs related to corporate hedging activities, the overall message of the interviewed NFCs was that EMIR

led to increased costs and administrative tasks for the NFCs and Basel III's impact is to find in higher prices that the banks take.

Also, some of the interviewed NFCs mentioned that they felt a decrease in the number of banks that were willing to offer long term derivatives after the implementation of Basel III, but they themselves never experienced a reduction of required derivatives due to EMIR or Basel III. The reason for that is mainly because they only use plain vanilla derivatives and only hedge with their relationship banks. Furthermore, none of the interviewed NFCs mentioned having felt an urging of the banks towards cash collateralisation of OTC derivatives. For example, NFC2 said:

We had due to EMIR one-off costs in the amount of a mid-five-digit number for setting up and updating systems and for consultancy services. Furthermore, we have yearly costs of another middle five-digit number to continue complying with the regulatory requirements. That includes LEI number for more than 40 subsidiaries at EUR 150 per LEI per year, deal matchings EUR 1.50 per deal match, EMIR audit once per year at around EUR 25k and continual update by the consultants, etc.

In the same manner, NFC6 said as regards what costs are added due to EMIR:

Yes, there are the costs for the LEI number, that are around EUR 150 per year per entity. We have now more 30 Group companies that need a LEI, in particular, there are still many smaller Asian entities and they all need a LEI, even though they are not falling under EMIR regulation, but as they trade with an EU financial counterparty it is required, thus there are some entities. Subsequently, we also have the yearly audit which also costs around 20 thousand Euros and the delegated reporting is free of charge, that is we do not pay the banks for that service. Also, we also do not have bought new systems but had a one-time big effort to get this excel solution.

On Basel III, the NFCs confirmed to have been informed by some of their banks that following Basel III prices offered include XVA, the banks' costs for credit risk, funding, and capital. This is not so relevant for short term tenors but can be high in case of long-dated derivatives and differs from bank to bank.

However, none of the NFCs mentioned having experienced a reduction of availability of required derivatives while some of them acknowledged having a feeling that the number of banks that offer long-dated derivatives had decreased for a short period after

the implementation of Basel III. For example, NFC7 said with regards to the costs, “On Basel III it is so, that we know, that the costs for derivatives and especially for long-dated derivatives have increased because our banks calculate in increased capital costs.”

Similarly, NFC10 said, “We think that our costs have increased because our banks price us with the higher capital costs. We do not know how much it is and it differentiates between the banks, but it is there.”

NFC4 and NFC8 did not experience significantly higher costs due to the EMIR reporting. While the running charges were like the other NFCs, the costs for system set-up were significantly lower, as the systems were already implemented by their parent companies and it only required an extension of the systems. Also, the consultancy on how to use the systems was done by the parent companies. On the Basel III side, both NFC4 and NFC8 confirmed that they did not have higher costs, given that they only used very short-term derivatives (below 1year for NFC4 and on average 21 days for NFC8). Table 35 summarizes the EMIR and Basel III impact on costs for each of the interviewed NFCs.

Table 35: EMIR and Basel III Impact on Costs

Company	Increased costs due to EMIR	Increased costs due to Basel III
NFC1	Yes, implementation costs of around 100k and running charges of more than 40k EUR per year.	Yes, due to the pricing-in of XVA, however relatively moderate increase in FX since hedging tenors only up to 2y. Only few long- dated trades in IR, thus also increase is moderate.
NFC2	Yes, implementation costs of around 50k and running charges of more than 50k EUR per year.	Yes, due to the pricing-in of XVA, however relatively moderate increase in FX since hedging tenors only up to 2y. Only few long- dated trades in IR, thus also increase is moderate.
NFC3	Yes, implementation costs of around 50k and running charges of more than 30k EUR per year.	Yes, due to the pricing-in of XVA, however relatively moderate increase in FX since hedging tenors only up to 15months. No long-dated trades outstanding.
NFC4	Yes, running charges of around 30K per year.	No significant increase since tenors mainly below 1 year.
NFC5	Yes, implementation costs of around 50k and running charges of around 50k EUR per year.	Yes, due to pricing-in of XVA, but relatively moderate increase in FX as hedging tenors only up to 2y. Only few long- dated IR risk trades outstanding, the increase amount is not known.
NFC6	Yes, implementation costs which are not quantifiable and running charges of around 40k EUR per year.	Yes, due to the pricing-in of XVA, however relatively moderate increase since hedging tenors in FX only up to 15 months. No long- dated trades.
NFC7	Yes, implementation costs of around 60-70k and running charges of 50k EUR per year.	Yes, due to the pricing-in of the XVA, however increase amount not known, several long-dated trades per year in both FX and IR.
NFC8	Yes, running charges of around 10K per year.	No significant increase since tenors on average below one month.
NFC9	Yes, implementation costs of around 40k and running charges of more than 60k EUR per year.	Yes, due to the pricing-in of XVA, however relatively moderate increase since hedging tenors in FX only up to 2y. Only few long-dated trades with IR hedging in place.
NFC10	Yes, implementation costs of around 30k and running charges of more than 40k EUR per year.	Yes, due to the pricing-in of XVA, however relatively moderate increase since hedging tenors in FX only up to 18months. Several long-dated trades with IR risk hedging outstanding.
NFC11	Yes, implementation costs of around 50k and running charges of similar size.	Yes, due to the pricing-in of XVA, however relatively moderate increase since hedging tenors in FX only up to 24 months. Various long dated trades where increase is unknown.
NFC12	Yes, implementation costs of around 50k and running charges of more than 30k EUR per year.	Yes, due to the pricing-in of XVA, however increase amount not known, no long-dated trades outstanding.

Overall, all NFCs confirmed that the costs of their hedging activities showed an increase due to the EMIR implementation and the change from Basel II to Basel III. In the case of EMIR, it is for mainly implementation costs, i.e., to get systems and processes up to date, the costs for the LEI number; deal matching; and the costs for the yearly audit. In the case of Basel III, it is the costs of the banks that they partly forward to the NFCs. The three criteria to analyse the increase of costs, namely communication, pricing, and monitoring, help assess the impact of Basel III on the pricing side of the costs and EMIR's on the monitoring side of the costs. Not included in this cost view is the manpower costs to fulfil the EMIR obligation, e.g. the additional admin efforts that employees must monitor, report, and collect everything for audit or the efforts to conclude the EMIR documentation with their banks, etc. Overall, the development of costs for NFCs explains their dissatisfaction about the dichotomy that regulations that are designed to regulate the banks are at the end leading to higher costs for non-financial corporates.

d) Accounting Treatment

The interview findings on the key determinants of NFCs' hedging activities have shown that some NFCs also attach importance on the accounting treatment of derivative instruments, as they aim to reduce earnings volatility. One of the twelve interviewed NFCs applies US GAAP accounting rules, given its US parent company is applying US GAAP, while the rest applies IFRS or HGB. All the interviewed NFCs denied any effect, as regards, the question, if the accounting treatment of derivatives has been impacted by the implementation of EMIR or the change from Basel II to Basel III. The way that derivatives are treated in the accounting rules has not been changed due to EMIR and Basel III, however some NFCs mentioned that apparently the organizations that develop and set the accounting rules such as IASB (International Accounting Standard Board) in Europe or the FASB (IFRSF & IASB, 2013) in the US have been influenced by the financial crisis and by the pressure of politicians to try to make the accounting of derivatives more transparent. For example, the IASB replaced IAS39 with IFRS 9 which is the new standard on the accounting of financial instruments. In fact, through IFRS9 the IASB is trying to reduce the complexity in reporting financial instruments and to simplify the application of hedge accounting for corporates. To that direction, for example, NFC7 said:

No, EMIR and Basel III had no impact on accounting, it was rather the financial crisis and the pressure of European Union politicians that has boosted the implementation of IFRS 9. We fully apply that standard from January 1, 2018, and according to our assessment, the impact will not be significant on the classification of our financial assets or on the valuation of their financial liabilities, as we do not hold any financial liabilities at fair value. However, the new standard will require extensive new disclosures, surrounding hedge accounting, credit risk and expected credit losses and considering all that we have implemented a new accounting model to bring hedge accounting more closely in line with the other risk management activities.

However, NFC7 also confirmed that those adjustments have already been discussed before the financial crisis but has been implemented after the crisis but are not impacted by EMIR or Basel III. Another example is NFC10, where the Group treasurer said,

EMIR had no impact on our hedge accounting treatment and Basel III is anyway not directed to us, but after the financial crisis the accounting authorities have revised IAS39 through IFRS9. The hedge accounting requirements were also revised under IFRS 9 to allow financial statements to better reflect the company's risk management strategy. The standard requires extensive additional quantitative and qualitative note disclosures as well. In accordance with the option provided for hedge accounting in the transition requirements of IFRS 9, we will continue to apply the hedge accounting requirements of IAS 39 and intend to initially apply the hedge accounting requirements of IFRS 9 at a later date, i.e. after January 01, 2018.

Thus, overall it can be summarized that EMIR and Basel III had no impact on the accounting considerations of the interviewed NFCs.

e) Systems and Processes

In the context of the factors determining the ability of NFCs to hedge, an important factor is that the NFCs need to have the appropriate systems and processes in place to conduct and accommodate the derivatives trades. This includes the technological means to connect with the trade counterparties and accomplish the trade as well as to depict the trades in their treasury and accounting systems. Also, appropriate processes, including guidelines or policies, are required to handle the trade, the booking, and monitoring properly. EMIR obliges NFCs in article 11 paragraph 1 to confirm OTC derivatives in a timely manner (within 1 day) and to have processes in place to handle all risk associated with derivatives. The confirmation should be done via a transaction register as soon as possible but within a given short time-period (depending on the asset class) and when

possible electronically. Furthermore, the portfolio of OTC derivatives is to be reconciled with the Bank and processes need to be in place to make portfolio compression in place.

In the interviews, all NFCs mentioned that the importance of the appropriate systems increased significantly in the last years, given that the increase in the degree of automation in the last years. Furthermore, with regards to the impact of the regulatory changes, all NFCs confirmed that the changes from Basel II to Basel III had no impact on their systems and processes, as this regulation was directed to the banks and not NFCs. However, all twelve NFCs confirmed that EMIR led to further upgrades/changes to their hedging and treasury management systems. It appears that the aim to comply with the EMIR requirements promoted the connectivity of the applied systems for trading, reporting, and booking. Furthermore, for the reconciliation requirement under EMIR the NFCs had to implement a new software, while none of the twelve interviewed NFCs conduct portfolio-compression and clearing, using an exemption rule for NFCs.

The interview findings show that all NFCs had already appropriate processes in place as this was already a requirement before the implementation of EMIR and that most of them also had already automated systems and needed only small adjustments to comply with the reporting and confirmation requirements. However, some NFCs did not have fully automated systems in place and used this opportunity to make a bigger system change, such as the implementation of 360T for automated trading and Mysis for automated confirmation. For example, for NFC1 the implementation of EMIR was a catalysator for having fully automated processes, i.e. implementation of an electronic trading platform that is connected to their treasury management systems which automatically splits internal and external trades and confirms them automatically in the system for automatic matching and confirmation. To that direction NFC1 said:

The new regulation was a catalysator for system and process updates, which were already planned but where management was still hesitant to invest the amount and on timing. The implementation of 360T with run through data management to our treasury systems and the confirmation through Misys has been supported by the implementation of EMIR. In the past, the respective department was responsible for the trading with derivatives, the input into the systems and the confirmation to the counterparties. Segregation of duties has been implemented now and I am inclined

to say that EMIR has also accelerated that, but also those changes were on the way. Another change what the centralisation of the German hedging activities to make sure that audit requirements for external audit stay within reason. In addition, the whole European confirmation process has been consolidated and the implementation of Misys, while before they were done on a local level.

Other NFCs had already implemented automated systems and processes so that the implementation of EMIR only led to minor changes or updates of the systems and processes. For example, NFC3 said, “No we do not need new systems, we can do it with our treasury management system, it has just been updated with new functionalities regarding EMIR reporting.” In the same manner, NFC9 said, “The only thing that we really needed to do is to update our systems for the reconciliation and reporting requirements”.

Overall, the interview findings show that Basel III had no impact on NFCs’ corporate hedging activities through systems and processes. However, EMIR had impacted the NFCs’ corporate hedging activities through required updates on systems and processes for reporting and confirmations and the implementation of new software for portfolio reconciliation requirements. Table 36 summarizes the case companies’ answers as regards, which EMIR requirement led to updates or changes of their systems and processes (✓ = required an update/ × = did not require an update).

Table 36: EMIR Impact on Systems and Processes

Company	Reporting	Clearing	Confirmation	Reconciliation	Compression
NFC1	✓	×	✓	✓	×
NFC2	✓	×	×	✓	×
NFC3	✓	×	×	✓	×
NFC4	×	×	✓	✓	×
NFC5	✓	×	✓	✓	×
NFC6	×	×	✓	✓	×
NFC7	✓	×	✓	✓	×
NFC8	×	×	×	×	×
NFC9	✓	×	×	✓	×
NFC10	✓	×	✓	✓	×
NFC11	✓	×	×	✓	×
NFC12	✓	×	✓	✓	×

As the table above shows, on the reporting side, all NFCs had to connect themselves with one of the allowed trade repositories, which costs them a certain fee per year depending on the number of trades reported. Only for NFC6 and NFC8, this was not required as the former uses delegated reporting through banks and the latter hedged through the parent company who subsequently needs to report the trades. On the confirmation side, the answers were mixed as some NFCs had already implemented automatic confirmation while others such as NFC1, NFC5, NFC6, and NFC7 had to implement automatic confirmation systems. On the reconciliation side, all NFCs had to implement a reconciliation software, which also cost them a certain amount per year. From a risk and return perspective, this means higher costs for the NFCs as mentioned in the previous section.

f) Knowhow

The expertise of the employees, that conduct the hedging, and hedging policy deciders are of importance as they are relevant in every stage of the hedging decision. As regards, how the regulatory changes impact the knowhow of employees and management, all NFCs generally mentioned, that it increases the required knowhow as all relevant employees need to know the regulatory requirements for implementation and compliance purposes. For example, NFC 2 said, “Our employees attended a few conferences about EMIR and we hired a consulting firm to help us understand and implement the requirements. We have one person that is the main contact for all EMIR issues”. NFC4 reasoned in the same direction, saying:

Employees had to make some training on EMIR and attend some conferences on EMIR and Basel III, but this does not change their know-how and expertise about derivatives and derivatives used for risk management purposes. We did not have high costs for training employees, most of it was learning by doing. Most of the regulatory requirements are fully fulfilled system-wise and employees only need to monitor the results.

However, all NFCs confirmed that most of the EMIR requirements are handled directly by the systems, thus with a manageable impact on the daily tasks of employees. Nevertheless, the risk management employees still must make additional agreements with

banks (which include a lengthy negotiation process) and monitor that all is going well. As regards, if the required knowhow from employees changed, NFC6 said:

Yes of course about the regulatory requirements, as the employees must understand the regulation and our obligations thereof, but it is not much more than that. So, I would say that the knowhow about hedging itself has not changed but the required knowhow for the middle office and back office people includes the regulatory requirements.

As regards, if Basel III had any impact on the required knowhow, the answers of the NFCs clearly confirmed that this was rather nice to know but did not even slightly impact the required knowhow of employees. This could be accounted to the fact that the Basel III requirements only directly impact the banks and not the non-financial corporates.

Overall, it can be summarized from the interviews with the case companies that the required know-how on employees has obviously increased by the requirement to understand and implement the EMIR regulation but the daily business with the derivatives instruments and the tenors has not been affected by that.

g) Derivatives market:

The last determinant of the impact-analysis-model, that can impact the ability of NFCs to hedge with derivatives, is the situation on the derivatives market, in terms of the availability of the required instruments and the required tenors. To this end also the situation and relationship with banks are of relevance as NFCs deal derivatives with banks.

The interviewed NFCs have been asked if there was an impact of EMIR and Basel III regulation on the availability of the required derivatives instruments and the required tenors. Even though the impact on banks was big as they now needed to provide increased transparency and capital underpinning, the impact on the NFCs was very moderate. With regards to EMIR, none of the interviewed NFCs experienced the non-availability of required instruments and tenors. The banks continued to trade with them forwards, swaps and option in the same manner as before the implementation of EMIR. Furthermore, most banks offer support with EMIR reporting through delegated reporting as a service to their

clients. In that case, the banks report for their clients but nevertheless, the NFCs remain responsible for the reported data.

For example, with regards of the impact of the new regulation on the availability of required instruments and tenors, NFC3 said, “I must say that we never had any issues to get the right instruments and tenors on the market. But this is mainly because we are doing plain vanilla derivatives within the 1- or 2-years spectrum. NFC8 reasoned to that question in a similar way, saying “we have only plain vanilla hedging in place and the required tenor is so short, we have no shortage of offers and due to that, we do not need to look to the market before we hedge.”

However, the answers were a bit different in relation to Basel III as nine of the twelve interviewed NFCs (all besides NFC3, NFC4, and NFC8 who had no longer dated derivatives) mentioned to have experienced less interest from their banks for long-dated derivatives, i.e. 5 years or more. This generally reflects itself partly in less availability of offers but much more in higher pricing for those derivatives. For example, As regards of the impact of the Basel III on the availability of required instruments and tenors, NFC7 said:

EMIR had no impact on that, but Basel III led to fewer offers we received from our banks for long-dated cross-currency swaps. The reason for that, as some banks explained on enquiry is, that those swaps are very expensive for them in terms of capital underpinning, i.e. the longer the swap the more capital must be underpinned to that trade and the more difficult it is for them to close the trade in the market, both making the trade very expensive for them.

Another interesting example was NFC2, who realized that the banks are more hesitant to quote for the long-dated instruments and made sure that availability remained unchanged, by communicating with their banks. Thus, based on its market-leading position and very good rating, NFC2 ensured that all their core banks were continuing quoting on the same level as before the changes from Basel II to Basel III. NFC2 said:

After we saw the uncertainty of banks after Basel III. we confirmed with our banks before the implementation of Basel III that they continue business as usual or inform us before-hand in case something changes so that we can take appropriate action. All our core banks continued quoting but with more spread offers.

Overall, the interview findings show that EMIR had no impact on NFCs' corporate hedging activities through the availability of required instruments and tenors. However, Basel III had impacted the NFCs' corporate hedging activities through the availability of long-dated tenors, as fewer banks are willing to enter long-dated derivatives, given the costs of those derivatives have increased for the banks after the implementation of Basel III. Nevertheless, all NFCs continued trading long-dated derivatives, however to less beneficial pricing than before, which means higher costs for the NFCs from a risk and return perspective.

h) Summary

This section presented the findings on the first research question which was: How do EMIR and Basel III regulations impact corporate hedging activities of NFCs in Germany and how is that to be evaluated in the context of risk and return considerations of the NFC. The analysis has been done based on the created impact-analysis-model. The impact-analysis-model facilitated the systematic analysis of the regulatory impact through reviewing the impact of both regulations on each of the key determinants:

Based on the interviews with the case NFCs' following observations have been made:

- 1) NFCs responses show that EMIR has impacted the costs, the required systems and processes and the knowhow of employees.
- 2) Basel III impacted the interviewed NFCs through increased prices from banks and through the key determinant derivatives market.
- 3) NFCs regard both regulations as increasing their cost base, i.e. reducing returns, without any improvement of risk situation.

Thus, the related detailed research questions (D9 and D10) can be answered (A9 and A10) as followed:

D9. Which of the key determinants of the impact-analysis-model are impacted by EMIR and what is the consequence for risk and returns of NFCs?

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A9: EMIR had led to an increase in costs of corporate hedging, led to an update of the systems and processes and to the increase of knowhow required from employees. All that resulted in higher costs for corporate hedging activities with the consequence from the NFCs point of view being fewer returns.

D10. Which of the above-mentioned key determinants are impacted by Basel III and what is the consequence for risk and return considerations?

A10: Basel III impacted the key determinants Costs, through the increased prices from banks, and Derivatives Market, through fewer offers for long-dated derivatives (which often subsequently resulted in higher prices). All that resulted in higher costs for corporate hedging activities with the consequence from the NFCs point of view being fewer returns.

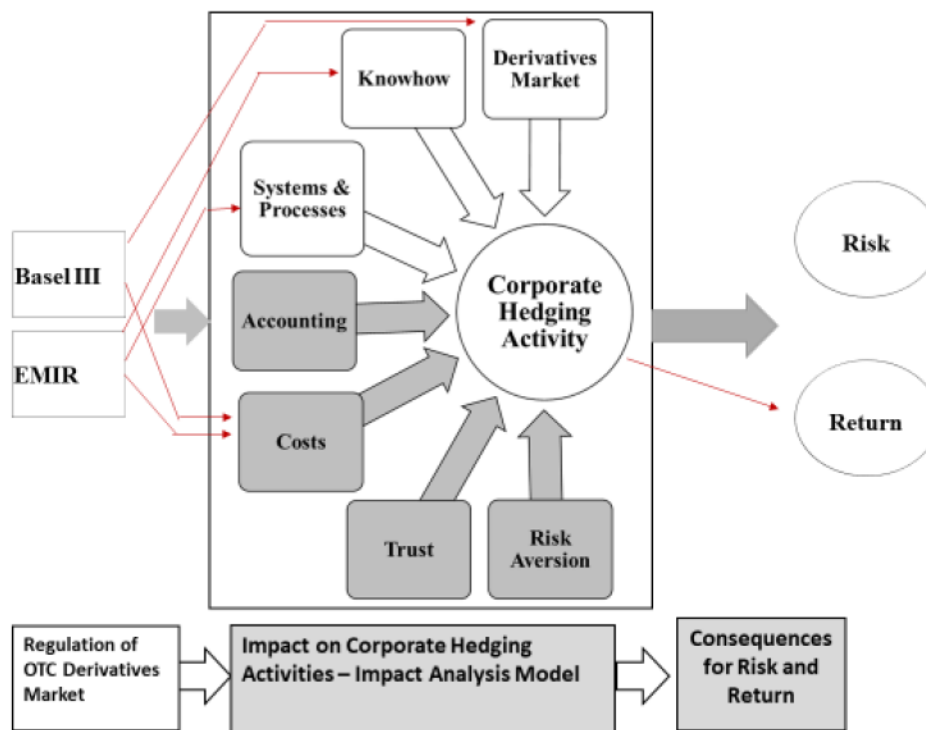


Figure 24: Impact of EMIR and Basel III on CHA

Figure 24 illustrates the study findings mentioned in the preceding section. The red arrows illustrate that Basel III impacts the corporate hedging activities through the determinants Derivatives Market and Costs and EMIR's impact is to find through the determinants Knowhow, Systems & Processes and Costs. Given that the impacts make the corporate hedging activities more expensive from the NFCs' perspective, they would naturally lead to a reduction of returns.

It is also worth mentioning that the impact of EMIR was felt differently by each of the interviewed NFCs. While some had already automated processes in place and only required moderate additions to be able to comply with EMIR, others needed to implement various new systems and automation of their corporate hedging activities. On Basel III, the larger NFCs showed a tendency to have felt fewer problems with the availability of long-dated derivatives, given that they have a larger number of banks to do business with vs. smaller companies so that they can easier absorb when some banks are not quoting for long-dated derivatives.

4.3.3. Research Question Two

The second research question deals with the response of NFCs in terms of alignment of strategy and processes or any other alignments that NFCs incorporated due to the implementation of EMIR and the change from Basel II to Basel III. Thus, the second research question investigates the measures taken by the interviewed NFCs to deal with the regulatory impact. The results are subsequently conceptualised within the initial conceptual framework.

First, this chapter describes the way that NFCs reacted on the implementation of EMIR and Basel III. Subsequently, the second part of this section explains how the NFCs responded to the above-mentioned impact on the key determinants of their corporate hedging activities. With respect to EMIR, which is a direct regulation of NFCs, it shows that the interviewed NFCs first tried to understand and subsequently analyse the regulatory changes and the impact on their operations. Subsequently, they planned the required

adjustments to their systems and processes and then implemented the required adjustments. While they implemented the reporting and reconciliation requirements, they did not implement any reconciliation and clearing requirements. On Basel III, which is not a direct regulation of the interviewed NFCs, it shows that the NFCs were rather reactive. They waited until they felt the impact through the banks and subsequently some reacted to that impact by optimizing their banking strategy, i.e. some NFCs tied their derivatives business to other fee business, to ensure that their banks are continuing to offer the trades, even when the profitability for the banks changed due to Basel III.

a) NFCs reaction to EMIR and Basel III

This section describes how NFCs reacted to the regulatory changes in terms of alignment of strategy, processes, systems and so on. It shows that NFCs first analysed the regulatory changes to gain a firm understanding of their obligations and subsequently planned the required adjustments to their systems and processes and finally implemented the necessary adjustments.

Table 37 shows a summary of the steps implemented by the NFCs in reaction to the implementation of EMIR regulations. Basel III did not impact the NFCs approach to corporate hedging as it was targeted to banks, and thus none of the NFCs conducted such analysis to better understand the impact.

Table 37: Process of Adjustment

Analysis	Planning & Preparing		Implementation & Monitoring	
Understanding	Planning	Preparing	Implementing	Monitoring
Background Impact Compliance	Project team Consulting Benchmarking Alternatives	Coordination Training	System adjustment Communication	Process control Reporting

Analysis

The interviews show that the starting point for all twelve NFCs after the announcement of the introduction of EMIR was to understand the impact on them and how they can comply with the regulation. All twelve NFCs said that they first had problems to fully

understand as to how EMIR works, given that most of the standards were not fixed to shortly before the implementation. For example, NFC7 said:

The announcement and implementation process from the regulator's side was very unorganised. We had no idea of the exact aim of the new regulation or who the regulatory bodies were, or how reporting standards looked like. So, we first tried to understand what our new regulatory reporting obligations would be and the impact on our processes.

All the twelve interviewed NFCs mentioned that in order to gain a better understanding, the NFCs attended at least one conference on that subject and some of them even hired external advisors to have a full picture of the new regulation. As regards, of how they experienced the implementation of EMIR, the twelve interviewed NFCs, without exception, expressed their dissatisfaction with the communication of the regulators, which led some of them to look for external advice, either from their banks or consultants. For example, NFC1 said:

So that was, of course, helter-skelter, well when I think back, I think it was in 2013 where the whole issue began. In January, I had an event about that subject organized by HSBC, who informed us, what they expect to come from the regulation. So I sat there with 7 to 8 other corporates and all of them said that they do not expect this to come in that way as no one can really work with that type of massive data. And subsequently, we walked out looking for a consulting firm that advised us on Dodd-Frank. And we saw that fundamental questions were not decided at that time, that is who will report, where are the thresholds, will the whole portfolio be used as measurement including the intercompany trades, which would significantly increase the volumes, do we need to clear subsequently and so on.

The main questions that arose for the NFCs in the analysis phase were on the understanding of the background of EMIR and their obligations as well as the impact of the new obligations on their current processes and the compliance with the new regulation, i.e.:

- Background: - What their obligations are?
 - Why is the regulation required?
 - Who are the regulatory bodies and other involved parties?
 - When does the regulation start?
- Impact: How will this impact the firm, in terms of obligations that need to be fulfilled?

- Compliance: How can the firm comply with those obligations and what happens if not?

From the interviews, the author observed that the analysis was not straightforward for the NFCs. While the background of the regulation, i.e. what the regulation is and why it is required as well as where the regulation will take place were relatively clear from the beginning, the other points of the regulation were not clear from the beginning or underwent several changes through the implementation process. Thus, the NFCs tried to stay updated by reading through financial newspapers, visiting conferences on the topic organised by their banks, reading through the web pages of the regulatory authorities and through treasury and industry association. NFC5 said to that direction:

We have hired consulting firms from the beginning to understand the situation thoroughly. Nevertheless, up until the very start of the reporting requirement, several important standards had not been clarified and it was uncertain whether IT providers and trade repositories were able to receive the reports.

The question of how this will impact the firm was of major importance for the NFCs and constituted an ambiguous criticality which underwent several changes through the implementation process. The first point is basically to establish the EMIR category that the corporate falls into to ascertain which EMIR obligations apply.

All case companies mentioned to have understood from the beginning that they will need to report risk positions but did not know which one (e.g. if it should also include intercompany transactions) and were not clear with regards to the threshold to the clearing. All NFCs confirmed that it would be a big challenge for them when they would have been asked to clear derivatives transactions. NFC1 explained it by saying:

Our primary goal as corporate finance and treasury department is securing the liquidity of the group and such clearing obligation would make up a not calculable liquidity risk for us, as we would require a flexible credit line that moves along the trades and it is questionable if banks would provide such lines to us.

Overall, while the exact ways and standards of reporting, risk mitigation, and portfolio reconciliation were not clear from the beginning, all NFCs confirmed to have understood that these would be their new obligations, as the regulators have decided that

the compliance would be audited within the scope of the yearly financial audit. Against that background, it came as a surprise that none of the NFCs mentioned to not have organized themselves via a lobby or special interest group in order to influence the regulatory initiatives.

After obtaining an understanding of the background of the regulation and their new obligations, the NFCs went over to the question: how they can cover these obligations, in terms of required systems, operations, and manpower? For that, the NFCs progressed to the planning phase.

Planning

After understanding the regulatory changes, the NFCs started to plan their response in terms of adjustments to the internal processes and systems in order to comply with the EMIR requirements. As mentioned above Basel III has not led to any adjustment in systems and processes, but rather in the way that NFCs do business with Banks.

The author has grouped the activities under two sub-headings, namely:

- Planning: Creating a project team, provide details and propose solution and alternatives (plan B)
- Preparing: Prepare the organization for the alignments

Setting up a project team is a common form of strategy as seen in the development organizations to get more detailed information on an issue that is affecting the organization. The project team subsequently conducts additional research on the issue, scopes out different implementation scenarios, and prepares the organization on the required alignments to comply with the regulations. All this is regularly reported to a steering committee that consists of senior management and in turn, coordinates these activities with other functionalities in the organization.

Ten of the twelve interviewed NFCs (all besides NFC4 and NFC8) mentioned having set up a small project team in order to elaborate in greater detail about the impact that the regulation will have on the internal processes. They mainly designated one or two persons

from the treasury and corporate finance departments as the most suitable functional representatives for that project. The aim of the project team was to work out in detail, how the regulatory requirements can be implemented, what changes would be required to existing processes and systems and what consequences that would have for the costs related to hedging. However, given that the treasury departments are generally lean staffed, and the project work was needed to be done in addition to the daily work, those NFCs had support from consulting and information technology firms with regards to the IT solutions.

NFC7 said to that regards, “We formed a project team and hired a consulting firm. We designated two persons from the risk management department to coordinate that project. The project aim was to bring more detail and propose solutions that should be as much automatized as possible.”

The NFCs also mentioned that they researched and conducted benchmarking, i.e. they looked on their peers or other regions. Through benchmarking those NFCs can compare themselves with other regions that have already gone through such regulations as well as with peers, namely other NFCs in Germany. Benchmarking also helps to better evaluate the regulation in terms of anticipation of any possible future changes until implementation. NFC1 said to that direction, “We had some experience with Dodd-Frank where we reported deals manually and that was our fallback position in case automatic reporting through our systems would not have been possible.” For NFC1 the implementation of EMIR was a catalysator to implement new trading systems while most other NFCs decided to comply with EMIR based on the extension of their existing systems. As a plan B, in case automatic reporting would not work, few NFCs prepared themselves also for manual reporting.

However, not to follow the regulatory guidelines was not an alternative for the NFCs. To that regard, NFC5 said, “We did not know if the systems would be able to report as required automatically so that our plan B was manual reporting.” With regards to outsourcing the reporting obligation as an alternative, the author noted that only two NFCs did that (NFC4 and NFC6) with the reason being that the NFCs preferred doing it themselves as the data continues to remain their exclusive responsibility.

Overall, notably, the planning process was complicated by the fact that various reporting standards of EMIR were not finalised during the project work and as such, NFCs were not aware if there would be any additional requirements that would adjust the proposed solutions necessary. The final step subsequently was the preparation of the organization to the planned changes. This was done through internal seminars, meetings or other information sessions with the relevant persons.

Implementation

After planning the alignments required to comply with the regulatory reporting requirements, the adjustments of the processes and systems was rather simple as pointed out by the interviewed companies. To that end, most NFCs mentioned that the extension of their existing treasury systems with some features was sufficient to comply with the regulatory requirements. The only issues that some NFCs faced during that time were to ensure the automatic creation and receipt of the LEI numbers (legal entity identifier) by their systems. The LEI number is the number that highlights to the regulators which entity they are dealing with.

Following the implementation of the alignments, the next step for the companies was to accordingly commence internal communication, i.e., within the organization, which was done through with memos and process manuals, explaining the adjusted systems and processes. The final step subsequently was to monitor the changes and make further alignments in case necessary, which is a continuous process.

b) Response of NFCs

The impact-analysis-model showed that EMIR impacted the corporate hedging activities of the interviewed NFCs through three key determinants, Costs, Systems, and Processes as well as Knowhow. Basel III impacted the corporate hedging activities through the increased prices requested by banks and decreased availability of the long-term derivatives, i.e. Costs and Derivatives Market. Table 38 below summarizes the response of each of the interviewed NFCs to the impact showed through the impact-analysis-model:

Table 38: NFCs response to Impact of EMIR and Basel III

	Costs	Systems/Processes	Knowhow	Derivatives Market
NFC1	EMIR - No response. Basel III - increase competition between banks.	New systems for trading and reconciliation and updated processes for confirmations, reporting, and reconciliation	Conferences, consultants, learning by doing	Increase competition, optimisation of bank strategy
NFC2	EMIR – No response. Basel III - Optimisation of bank strategy.	Updated systems for reconciliation and process for reporting and reconciliation	Conferences, consultants, learning by doing	Optimisation of bank strategy
NFC3	EMIR – No response. Basel III – No specific response.	Updated systems for reconciliation and processes for confirmations, reporting, and reconciliation	Learning by doing	No specific response
NFC4	EMIR - Reporting outsourced Basel III – No specific response	Update systems for reconciliation and processes for confirmations	Conferences, learning by doing	No specific response
NFC5	EMIR – No response. Basel III – Increase competition between banks.	Updated systems for reconciliation and process for reporting and reconciliation	Conferences, consultants learning by doing	Increase competition, optimisation of bank strategy
NFC6	EMIR - Reporting partly outsourced Basel III – No specific response	Updated systems for reconciliation and processes for confirmations	Conferences, learning by doing	Increase competition
NFC7	EMIR – No response. Basel III - Optimisation of bank strategy	Updated systems for reconciliation and process for reporting, confirmation, and reconciliation	Conferences, learning by doing	Optimisation of bank strategy
NFC8	EMIR - Reporting outsourced to parent Basel III – No response	Updated systems and processes for confirmations	Learning by doing	No specific response
NFC9	EMIR – No response. Basel III – Increase competition between banks.	Updated systems for reconciliation and process for reporting and reconciliation	Conferences, consultants learning by doing	Optimisation of bank strategy
NFC10	EMIR – No response. Basel III – Optimisation of bank strategy.	Updated systems for reconciliation and process for reporting confirmation and reconciliation	Conferences, consultants learning by doing	Increase competition, optimisation of bank strategy
NFC11	EMIR – No response. Basel III – Increase competition between banks.	Updated systems for reconciliation and process for reporting and reconciliation	Conferences, consultants learning by doing	Increase competition, optimisation of bank strategy
NFC12	EMIR – No response. Basel III – No specific response.	Updated systems and process for reporting, confirmation, and reconciliation	Conferences, learning by doing	No specific response

Costs

The first key determinant of the impact-analysis-model as revealed through the discussion entailing changes impacted by the EMIR and Basel III is the costs that are related to corporate hedging. As shown in the previous section, both EMIR and Basel III, lead to increase of transaction as well as monitoring costs for NFCs.

The interviews with the twelve NFCs show that most NFCs accepted the EMIR related increase of costs without any response, i.e. any strategy to reduce the costs. Three NFCs (NFC4, NFC6, and NFC8) made use of the option to outsource the reporting requirements to their banks, however, this did not lead to any significant reduction of those costs as the NFCs remain responsible for the reported trades and still need to acquire the LEI number pay the audit costs. The author noted that there were two reasons for the NFCs acceptance of those costs, (1) there was a general acceptance by the NFCs for the goal of regulators to increase transparency of the OTC derivatives market and (2) the costs related to EMIR were very moderate compared to the hedging activities of the NFCs. For example, with regards to the question, if there were any tries to avoid or reduce those costs, NFC2 said:

When we look on the cost, that EMIR brought, subsequently I would say, that we first had larger implementation costs, which was a high five-digit number, this is the for the LEI, matching, consulting and IT processes. The remaining costs are subsequently only a couple of thousand Euros per year, thus rather manageable and not crucial for a corporate of our size.

Also, the costs that must be considered by banks due to Basel III have been accepted by the interviewed NFCs. However, the NFCs mentioned that this led to greater differences between the quotes of banks so that as a reply NFCs increased the number of banks that they ask for quotes, i.e. increase competition. For example, NFC5 said in the context of their response to increased prices from banks due to Basel III:

We understand that the banks have now higher costs involved and they want to put it forward to us, so we expected that and thought about how to react to that. What we did is subsequently, we have added further banks on our list of banks that we make hedging with. We saw some new banks offering very lucrative quotes.

Furthermore, some NFCs mentioned that they had tied-up the hedging business to other more lucrative business that they allocated to their banks to make sure that the overall bank fees remain unchanged. NFC7 said to that direction, “We have as a condition with our banks that the banks that are getting the bond mandate have also to do the associated swap and that the economics need to be viewed in combination.”

NFC10 went the same path and said, “As we started seeing that the banks reduced their interest for various long-term hedging products, we linked it to other businesses that were of interest for the banks.”

Overall, with regards to the costs of the hedging activities (irrespective of the regulation), the author noted with most NFCs that those costs decreased significantly since the implementation of the electronic platforms. Especially in the FX section it is to see that hedging by using plain vanilla derivatives has become a commodity product as all NFCs use electronic platforms for their trades and the trades are accomplished on a very standardized and automated basis. All NFCs mentioned that transaction costs significantly reduced through the usage of those platforms and required personal as well.

Systems and Processes

With regards to the systems and processes related to corporate hedging, the interviews showed that EMIR required an update of systems and processes to include the reporting, timely confirmation, and reconciliation requirements. Especially the reconciliation requirement required an update from all NFCs as Table 38 shows. The interviews further show that all NFCs accepted the requirement and accordingly updated the systems and adjusted their processes. Some NFCs, such as NFC6, took the offers of their banks to report for them but given that the responsibility for the data reported remained with the NFCs and there was still the reconciliation requirement, all of them nevertheless updated their systems and processes.

NFC6 said to that direction:

We had to adjust the processes in a way that, we had to accelerate the confirmation process, as we must confirm the trades with 1 or 2 days. That took in the past

significantly more time as those confirmations were in the past signed by our Finance Director and CFO. So actually, total nonsense, as that is waste of time for such type of executive employees and when they are for a week or so on business trips, that the confirmations had to wait until they came back and that is not possible under EMIR. We have now to confirm in a timely manner and so we defined a new pool of employees that can sign those confirmations. Now we have a clocked process, we trade between 9:00 a.m. and noon, so in about 80% of the cases, subsequently the back-office comes into play and to control the deals until 2 p.m. or 3 p.m. Subsequently it goes to the people that have to sign the confirmations. That is clearly planned and clocked process, time resources for the people signing the confirmations, are blocked and subsequently, it is sent back to the bank. The process in the past was rather lost, it went from one person to another and when it took more time subsequently that was not so bad. That was a significant point and the EMIR reporting as such must also be completed within one day and that process is now standardised and clocked with clear blocked times for the people that must do it. That has, in fact, changed our processes.

The system update was generally connected to one-off expenses for implementation of the new software. Those costs were borne by the corporate finance or treasury departments as cost centres in the case of all interviewed NFCs. As explained in the costs section, the one-off expenses were relatively moderate for the size of the interviewed NFCs, and as such, they readily adjusted the systems and processes. Some NFCs, such as NFC1 took the opportunity to overhaul their systems and processes. To that direction NFC 1 said:

EMIR was a catalysator for changes to our systems and processes, which were already planned but not implemented as management was not clear that the costs were worth the results. The EMIR requirement accelerated the implementation of the trading platform 360T with data automatically passed through for data management to the treasury systems and the confirmation via the confirmation matching system Misys.

Knowhow

In the same manner, the knowhow of the employees has been influenced by EMIR as they need to understand the regulation and to deal with it in their daily work. As a response to this, most of the interviewed NFCs sent their employees to comprehensive training programs and conferences on this matter. Those conferences were organized by their banks or by the German Treasurers' Association and were for free. Additionally, most NFCs, as the table above shows, hired consulting services to support them in the planning and implementation of the adjustments while did not hire any external advice and relied on

the self-training abilities of employees. For example, NFC2 said, “Our employees attended some conferences on EMIR, and we had mandated a consulting company to help us with the implementation of EMIR. Subsequently, we had defined a person who is responsible for EMIR and the rest was learning by doing.”

In the same manner, NFC 9 said:

The impact on knowhow is in two ways. First, the number of employees that are dealing with regulatory issues has increased significantly. Those employees are also dealing with other regulations that are relevant to us. Also, the knowhow has increased based on the training of the employees. Overall, you can say that we had to build up expertise in order to comply with the different regulations that we have in terms of systems and knowhow.

Six of the twelve interviewed NFCs had not hired external consultants to support them on the subject, mainly due to budget restraints. Thus, the management expected the employees to train themselves in that subject. For example, NFC4 said, “We dealt with it by sending employees to conferences that were free of charge but also with instructing them to do self-training”. Another example is NFC7 who confirmed that finding by saying:

I had no specific training on EMIR. I have visited three conferences to that subject, which were organized by one of our banks, a consulting firm and the VDT. The rest I have read myself. Also, with regards to Basel III, I have read the key themes myself and had one training at the VDT. I would not say that this is a big issue for me or one of my team members, thus all is on a tolerable level.

NFC3 and NFC8 respondents did not attend any conferences on the subject and did not have any support from external consultants. Here again, the main reason was budget constraints and the fact that most of the EMIR requirements should have been covered by systems or the parent company, in the case of NFC8. As regards the impact of EMIR and Basel III on the employee's knowhow, NFC 3 said:

It was all learning by doing, I did not have any specific training, but I had a lot of guidance from our treasury systems provider, they have also some knowledge. We had initially some sessions with them here for the first implementation but the rest we are doing on our own. But we did not have any special consultants here for that or attended any conferences.

NFC8 said, “Yes, there were several meetings at the beginning, for all relevant group members where we got introduced to MEIR but besides that, we just had some kind of self-training and reading through the EMIR stuff but that’s it.”

Derivatives Market

The final determinant that has been impacted by the regulatory changes is the Derivatives Market. As to be seen in the impact-analysis-model, that is the third key determinant that influences the NFCs ability to do proper corporate hedging. As the interviews showed, EMIR had no impact on that determinant, but Basel III did influence this determinant. Due to banks’ reaction on Basel III, NFCs saw fewer offers from banks for long-dated derivatives, given that this became costlier for banks and banks wanted to avoid exposure that is longer than 5 years. Furthermore, all the interviewed NFCs opined that the prices have increased as the banks would at least partly forward higher costs from their side.

As a response to that, some NFCs reviewed the business strategy with their banks. In some cases, those NFCs increased the number of banks that they trade with. For some currencies, there were banks that were offering good quotes but were not in the panel of some NFCs. The increased competition, especially in the FX hedging side, was also supported by the implementation of electronic platforms which allows the NFCs to add banks to the list, which were not relationship banks but still had a good rating. Some NFCs also looked on the long-dated trades and did not want to risk not to get quotes for their risk positions. They tied the hedging business to the allocation of other fee-related businesses that banks were very much interested in. For example, with some NFCs the bank that is getting the bond mandate has also to make the associated swap. NFC5 for example said:

We have noticed that fewer banks are quoting for the long-term derivatives. We experienced that with the swaps for our financing that are 5 years or longer. On the FX sided, we felt nothing as only work with shorter tenors, we do only have a hedge horizon of 24 months. In terms of prices, our banks are telling us that they need to include certain capital and funding costs in their pricing, so we know that, but we do not know how much that is. Nevertheless, we are seeing higher differences between the quotes of banks for longer-dated trades.

As regards how they reply to that NFC5 said, “We talked to our banks in order to understand their issues and subsequently to tie the swap to the financing. The bank that gets the bond mandate has to do the swap as well if there is one.” Also, NFC11 adjusted the strategy with their banks. They said:

We saw some of our banks struggling with the capital requirements for some derivatives. The number of banks that were willing to hedge our 7y and 10y financing decreased significantly after the implementation of Basel III. It improved in the last two years again, with some banks obviously having better models and some new banks trying to enter the market. Nevertheless, as we saw that, we changed our policy with regards to both currency and rate hedging. Now we have no relationship approach on the FX side, that means the bank that offers the cheapest price gets it and the bank that gets the mandate for the long-term bonds or Schuldscheindarlehen has also to organize the hedge for that financing.

Finally, some NFCs, such as NFC3 and NFC4, NFC8 and NFC12 have not experienced Basel III as a factor that impacted the availability of their derivatives or the impact was not significant. Consequently, they did not specifically reply to the impact of Basel III on the key determinant Derivatives Market. NFC3, for example, said, “I must say that we never had any issues to get the right instruments and tenors on the market, but this is mainly because we are doing plain vanilla derivatives within the 1- or 2-years spectrum.” NFC4 and NFC8 did not have any long-term derivatives at all and did not feel a significant impact on the short-term derivatives.

c) Summary

Overall, it is to say that, all twelve NFCs confirmed in the interviews, that the overall impact of EMIR and Basel III is rather moderate and did not lead to adjustments of hedging behaviour or their corporate hedging strategy in general. The twelve interviewed NFCs have refrained from the portfolio compression requirements given that the trades were not compressible. Furthermore, the regulator has allowed an exemption for certain NFCs from clearing obligations. That applied to the interviewed NFCs and freed them from clearing obligations. The clearing requirements constituted the main concern of NFCs, given the attached liquidity risk. I note that the NFCs rather indifferently accepted the other mainly reporting requirements and three NFCs let their bank report for them.

Thus, the interviewed NFCs accepted the increase in the costs for EMIR reporting which were carried by the corporate finance department. Also, higher prices from banks due to higher capital requirements were accepted, as they were not visible for the NFCs. Furthermore, the NFCs updated their systems and processes to comply with EMIR requirements and employees attended conferences about the regulatory update. These adjustments lead to a further increase in the costs of corporate hedging for NFCs and thus negatively impacted the returns. However, the NFCs mentioned that the overall cost increase for them due to EMIR and Basel III was rather moderate and acceptable. With regards to the availability of the required instruments, those companies that mentioned to have experienced this, followed an adjustment of their bank strategy, either in the communication with their banks or in the actual tying up of the business to other lucrative business for the banks. The table below summarizes the response of the NFCs to the impact of EMIR and Basel III:

Table 39: Impact and Alignments as Response to EMIR and Basel III

Key Determinant	Impact	Response
Risk Aversion	No impact	No response
Trust	No impact	No response
Costs	Costs increased due to EMIR and Basel III	Increased costs accepted
Accounting	No impact	No response
Systems and Processes	Update of Systems and new software required due to EMIR	Systems updated and new software for portfolio reconciliation implemented
Knowhow	Training for employees required due to EMIR	Conferences/Seminars/Learning by doing
Market	Less offers for long dated derivatives due to Basel III	Optimization of bank strategy (including increase of competition)

Thus, the related detailed research questions (D11 and D12) can be answered (A11 and A11) as follows:

D11: What measures do NFCs take to manage the impact of EMIR and Basel III regulations?

A11: NFCs have accepted the increased costs, updated their systems and processes, increased the knowhow of employees about the regulation, and optimized their bank strategy.

D12: What is the consequence of the above-mentioned responses for risk and returns of NFCs?

A12: The increased costs, the updates on systems and processes, and the increase of knowhow led to higher total costs for the corporate hedging activities. The trading through electronic platforms and the optimization of the bank strategy, increased competition and reduced prices for NFCs.

4.3.4. Conceptualisation of Response

This section will review the responses of NFCs to the regulatory actions with view to the Organizational Response Set of Cook et al. (1983). Thereby reviewing the usefulness of the organizational response set for the conceptualisation of the responses of the NFCs. Cook et al. (1983) categorized the responses of corporates to regulation in three levels of responses, namely institutional level response, managerial level response, and technical level response. These categories have been used as codes for the analysis of the responses of NFCs. Table 40 below presents the codes and their definition.

Table 40: Summary of organisational response set

Codes	Sub-codes
Institutional level response	<ul style="list-style-type: none"> - Lawsuits - Involvement - Lobbying
Managerial level response	<ul style="list-style-type: none"> - Expertise - Consulting - Systems - Processes - Budgetary activities - Staff
Technical level response	<ul style="list-style-type: none"> - Instruments - Tenor - Hedge ratio

a) Institutional level response

Institutional level response was defined as a response form which can be categorised as the earlier and milder form of the regulation, i.e. when there is still uncertainty about type and degree of the regulation. Mechanisms used in this type of response would be responses such as attempting to become involved in the process and testing the legality of the imposed regulation through lawsuits or trying to adjust through lobbying. The idea here is to capture the activities of NFCs in early stages of the regulation that have been done to adjust the regulation and find exemptions for NFC.

The interviews showed that none of the twelve interviewed NFCs was involved in the creation or formation of the regulation and none of the NFCs in fact, attempted to be involved in the process of creation of the regulation. Furthermore, all NFCs said that they are not aware that any NFCs was involved in the creation of the regulation. Also, none of the NFCs questioned the regulation through lawsuits or similar means or participated in lobbying to influence the regulation. However, the author, particularly highlights that NFC 2 voiced their concerns with regards to EMIR through their industry association who was trying to support members by conveying the aggregated messages of the members to the regulators. Furthermore, NFC3 mentioned having voiced their issues with regards to EMIR by sending a letter directly to the BaFin. As regards, why there was not an institutional level response, most NFCs mentioned that initially from their perspective the regulations were rather aimed at banks and not on the NFCs and the rules were not clear at the beginning. NFC6, for example, said, “There were few answers on concrete questions.

The regulators have always contained themselves from being concrete so that you did not know which way to go and what actually can be critical or what is not critical.” Subsequently, their main concerns, namely the clearing obligations under EMIR and the CVA exemption under Basel III for hedging with NFCs were already adjusted at the initial phases of the regulation. Thus, for the NFCs the regulatory obligations were rather limited to reporting requirements. Furthermore, the political environment after the financial crisis made a regulatory involvement unavoidable so that the EMIR and Basel III regulation relatively quickly overcame institutional level responses from NFCs. To that direction,

IMPACT OF EMIR AND BASEL 3 ON CHA AND THE RESPONSE

NFC9 said, “It was clear that something has to change after the financial crisis and the avoidance of the next Lehman case was also in our interest so that we understood that this market needs regulation.”

b) Managerial level response

Managerial level responses come into effect as the regulations persist and their form and implementation are decided. The activities categorized to that level of response are the acquiring of additional expertise and input to deal with the regulatory changes, in form of training of staff, getting support from consultants in relation to EMIR or Basel III, systems changes or updates to comply with the regulation, any changes of processes as a consequence of the regulatory changes, any adjustment of budgeting to consider the related costs and any additional staff required in the department that deals with the regulation.

Table 41: Managerial Level Response

Company	Training	Consulting	Systems	Process	Budget	Staff
NFC1	No	Yes	Yes	Yes	Yes	No
NFC2	No	Yes	Yes	Yes	Yes	No
NFC3	No	No	Yes	Yes	Yes	No
NFC4	No	No	Yes	Yes	Yes	No
NFC5	No	Yes	Yes	Yes	Yes	No
NFC6	No	Yes	Yes	Yes	Yes	No
NFC7	No	Yes	Yes	Yes	Yes	No
NFC8	No	No	Yes	Yes	Yes	No
NFC9	No	Yes	Yes	Yes	Yes	No
NFC10	No	Yes	Yes	Yes	Yes	No
NFC11	No	Yes	Yes	Yes	Yes	No
NFC12	No	No	Yes	Yes	Yes	No

From the interview findings, evidently, all participating NFCs were very active in managerial level responses. Table 41 above shows the key managerial level responses of the NFCs , wherein, while none of the twelve interviewed NFCs considered it as necessary to acquire additional expertise in form of sending their staff to specific trainings on EMIR or Basel III (they rather were on free brief conferences organized by banks, consulting companies or the German treasury association), most interviewed NFCs hired consulting and/or audit firms (mainly advisory and IT services) that helped them make all updates to

their systems and processes to comply with their obligations under EMIR. NFC1 for example said:

Our employees have attended conferences on EMIR, but also the people there were not sure, how the regulation will look like. We have limited human resources in Treasury and therefore we have hired a consulting firm to acquaint us with the alterations. We have a central person for EMIR and Basel related questions.

With regards to systems and processes, as explained in the response section, all NFCs adjusted systems and processes. These adjustments were required to ensure they comply with the regulatory changes and/or optimise the costs of their hedging activities. Another managerial response was that some NFCs tied the allocation of fee-related banking business to the provision of appropriate hedging business, to avoid that Basel III reform leads to fewer offers from banks for certain derivatives.

Furthermore, the interviewed NFCs adjusted budgeting due to the costs that EMIR caused, namely for the acquisition of additional expertise in the form of consulting, systems updates, etc. Those costs have been borne by the corporate finance or treasury departments of the NFCs. However, for some NFCs, the EMIR was a catalyst to implement new systems such as 360T and connect financing and hedging decisions with core banks, so that total costs were even lower than before EMIR. Nevertheless, none of the NFCs adjusted staffing as the additional staff was not required to comply with EMIR.

c) Technical level responses

Technical level responses were defined as changes to the core of the products and services provided by the NFCs. Those changes include an adjustment in the actual services and products of the company. As EMIR and Basel III are not directly impacting the products and services of the NFCs, there is no change required to products and services of the company. However, under that code, the author summarised any responses that were connected to any adjustment of the corporate hedging strategy, in terms of the derivatives instruments used to hedge, the tenor of the hedging or the hedge ratio itself. Thus, these are changes that would go into the core of the NFCs hedging strategy.

However, the interview findings show that none of the NFCs adjusted their corporate hedging strategy, in terms of the derivatives instruments used, the tenors hedged or the hedge ratio, as a response to the EMIR and Basel III regulations. Some NFCs mentioned that they would have considered significant changes (and maybe also to their corporate hedging strategy) if they would have fallen under the clearing obligation under EMIR regulation. But given that this is not the case, they did not need to make any technical level responses.

d) Summary

The second part of this chapter categorizes the responses according to the organizational response set which is based on the theory of organizational responses to regulation from (Cook et al., 1983). The results can be conceptualised based on the three levels of organizational level responses to regulation, namely institutional, managerial, and technical. In relation to the intensity of the regulation, the theory suggests that there is a hierarchical ordering of responses to regulation that constrains financial resources, in view of the relative costliness of making the organizational changes. The theory predicts that organisations will first make adjustments at the institutional level, followed by managerial level changes, and only as regulation increases in intensity will changes be made at the technical level (Cook et al., 1983). Notably, the interviewed NFCs responded to EMIR only on managerial level and on Basel III either there was no response, or the response was also on a managerial level. For EMIR, they hired additional expertise in the form of consulting/advisory services, they upgraded their hedging systems and acquired additional software to comply with the reconciliation requirements. The compliance with EMIR did bring additional costs with it, which in all cases were borne by the corporate finance or treasury departments as costs centres. For Basel III some NFCs adjusted their processes, in terms of tying hedging and other fee business with banks and putting more banks into the list of banks to trade with.

However, the NFCs refrained from institutional level responses, as their main concerns, namely the clearing obligations under EMIR and the CVA exemption under Basel III for hedging with NFCs were already adjusted at the initial phases of the regulation.

Otherwise, they would have been more involved in institutional level responses. From their perspective, the regulations were primarily aimed at banks and the regulatory obligations for NFCs were limited to reporting requirements. Furthermore, the political environment after the financial crisis impacted excessive pressure to regulate the OTC market, so that a regulatory involvement was difficult to question. Also, there were not technical level responses required from the NFCs, i.e. there was no need to adjust hedging strategy or financial derivatives usage. The interview findings showed that from the perspective of NFCs the intensity of the regulation was rather moderate, as it was primarily aimed at banks and NFCs had mainly to comply only with reporting and reconciliation obligations.

Thus, the final detailed research question (D13) can be answered (A13) as follows:

D13: Is it possible to conceptualise the responses of NFCs based on the organizational response set of Cook et al. and is the theory of the level of organisational response to regulation applicable in this scenario?

A13: Yes, the responses can be conceptualized based on the organizational response set can and the theory of the level of the organisational response to regulation is applicable.

4.4. Participant checks

The participant checks were performed to confirm the researcher's interpretation of the interview data. For that, each interview participant received a summary of his interview and the reasoning why the comments support or not support the creation of the impact-analysis-model and the conceptual framework. The participants were emailed those summaries after they gave their permission and follow-up calls were made to each participant to explain the interpretation in case of any questions, to obtain the opinions of participants and to check in case there is any discrepancy in the interpretation of the data. The data interpretation summaries are available in appendix 5.

All the participants shared the feedback that the summaries were helpful in bringing a new perspective in analysing the impact of external and internal factors on their corporate hedging activities. During the follow-up call, NFC2, for example, said, "Was very

interesting to read the summary, the impact-analysis-model opens a different view on how to analyse this, we have not done this before”. Other examples are NFC6, who said, “This is an interesting way and systematic way to analyse any impact on corporate hedging, this will be helpful for future”, and NFC9, who said, “That is an accurate interpretation of the comments and the impact-analysis-model is interesting for us”.

Overall, very few changes to the interpretation were suggested. NFC1 found that one of their comments was misrepresented, namely, when they mentioned a prime minimum rating for their banks, they were referring to an investment grade rating of BBB and not A-. NFC3 added to the increase of knowhow, that in addition to the knowhow about the regulation, one also need to consider the required technical knowhow and that most of the older employees have issues to follow those requirements. The other NFCs found that the interpretations of their comments were accurate.

In total, the interpretation summaries and follow-up phone calls confirmed the researcher’s interpretation of the interview data and did not result in significant changes. The general view of the participating NFCs was that the impact-analysis-model captures the key determinants of their hedging activities very well and helps to systematically analyse the impact of regulatory or other changes on their hedging activities. They also consider that the conceptual framework on their response is a good way to categorize their response to the impact of regulation.

4.5. Contradictory findings

This section comments on contradictory findings of the study. The analysis of the findings shows that findings are consistent and there were no significant contradictory findings. The key determinants of the model were confirmed by all interviewed NFCs with some differences on the importance of each of the key determinants. Also, the responses revealed no conflicting results and could be consistently categorized as manager level responses.

However, one key determinant emerged already during the first interview, that was not captured by the initial impact-analysis-model. The interview findings show that the accounting treatment of the derivatives instruments is also of relevance for NFCs. This is because they want to reduce the volatility of figures and by that somehow have control over its financial figures. This was especially the case for the listed companies with management aiming at the positive development of earnings per share.

4.6. Chapter conclusion

This chapter presented the findings of the research regarding the two research questions and the four research objectives. The first research question - How do EMIR and Basel III regulations impact corporate hedging activities of NFCs in the context of risk and return considerations - were analysed based on a newly created impact-analysis-model. The findings from the interviews suggest that EMIR and Basel III are impacting NFCs' corporate hedging activities through the increase of costs, the required update of systems or implementation of new systems, the acquisition of additional knowhow, and the decrease of offers for long term derivatives.

The second research question - How do NFCs response to manage the regulatory impact in the context of risk and return considerations - was investigated and conceptualised on the basis of the initial conceptual framework. The interview findings suggested that NFCs response is to be categorized as managerial level responses, namely through update of systems, acquisition of additional knowhow and optimization of their bank relationship. From a risk and return perspective, the responses led to an increase in costs and consequently reduction of profits.

Finally, the participant checks resulted in only a few changes to the interpretation and no significant contradictory findings were found. However, the interviews suggested an additional key determinant that should be added to the impact-analysis-model, namely the accounting treatment of derivatives.

5. DISCUSSION AND CONTRIBUTION TO KNOWLEDGE

5.1. Chapter introduction

In this chapter, the author reflects on the findings of the research, discusses the results, and deduces implications to theory and practice.

This research project aimed at narrowing the research gap in corporate risk management research that deals with the systematic analysis of the impact that internal and external factors have on corporate hedging activities, which is defined in this study as the willingness and ability to hedge with derivatives. So far, as evident in the literature review and to the best knowledge of the researcher, no model is available that allows such systematic analysis. Using the impact-analysis-model, the first research question - How do EMIR and Basel III regulations impact corporate hedging activities of NFCs in the context of risk and return considerations? - has been answered. Furthermore, the responses of NFCs to the impact have been explored through the second research question - How do NFCs response to manage the regulatory impact? - and subsequently conceptualised based on the organizational response set of (Cook et al., 1983).

5.2. Discussion of findings

Probably the biggest challenge of this research study was the lack of literature and studies focusing singularly on regulation in the context of corporate hedging and that existing research in the corporate hedging field was purely quantitative and concentrated on the advantages of hedging and the optimal way of hedging when one is confronted with a certain type of risk. Therefore, the pre-conceptualisation of the model and the creation of the initial conceptual framework were less conventional. First, the author has defined the term corporate hedging activity and subsequently split it into two elements, namely the willingness and ability to hedge with financial derivatives. Subsequently, the author has extracted from existing theories on the rationales for corporates to hedge and from theories on the optimal way of hedging, the key elements that appear to determine the willingness and ability to hedge, i.e. the corporate hedging activity.

Overall, this study targeted four research objectives:

- The creation of a model that helps to systematically analyse the impact of internal and external actors on corporate hedging activities.
- The answering of the first research question, “How do EMIR and Basel III regulations impact corporate hedging activities of NFCs in the context of risk and return considerations?”, based on that model
- The answering of the second research question, “How do NFCs response to manage the regulatory impact in the context of risk and return considerations?”.
- The conceptualisation of answers based on the Organizational Response Set of (Cook et al., 1983).

A qualitative research methodology and semi-structured interviews with participants from the treasury and corporate finance departments of NFCs as the main method was chosen as the most suitable way to coherently and successfully answer the research questions and achieve the research objectives. This was particularly the case due to the exploratory nature of the research project, where relationships and concepts were still to be developed. The data required to create the impact-analysis-model and develop relationships between concepts mainly consisted of the multiple interactions between the management, shareholders' representants, employees and external environment, and included mainly data that is not measurable in a numeric way. The deductive and inductive elements of the study were considered through the usage of deductive qualitative analysis (DQA) as a research strategy, as it incorporates both deduction and induction. It begins with a structure or concept that guides the research process, data collection, data analysis, and interpretation as well as the writing of the results (Gilgun, 2005, 2010). This aligned perfectly with the study approach and goal, as it started with the verification of the initial conceptual framework and its subsequent adjustment in the empirical phase.

With regards to the first research objective, the interviews with the twelve NFCs confirmed a major part of the initial impact-analysis-model, that was pre-conceptualised after the extensive literature review. Each of the key determinants (Risk, Trust, Costs, Systems & Processes, Knowhow, Derivatives Market) of the model were confirmed by all twelve companies as important for the willingness or ability to hedge. There were

differences between the NFCs about the importance that they put on each of those determinants, but generally, those determinants were confirmed as the key determinants for the willingness and ability to hedge, thus for the corporate hedging activities. Furthermore, nearly all companies besides NFC2 mentioned that the accounting treatment of the derivatives is also a relevant point for their willingness to conduct corporate hedging, and accordingly the impact-analysis-model was extended by the key determinant Accounting. Thus, the impact-analysis-model consists of seven key determinants, namely Risk, Trust, Costs, Accounting, Systems & Processes, Knowhow and Derivatives Market. The first four are key determinants for the willingness of NFCs to hedge with derivatives and the other three are key determinants for the ability of NFCs to hedge with derivatives.

Based on that model, one can systematically analyse how, i.e. through which determinant, internal or external actors impact the corporate hedging activities. The result of the impact can subsequently be evaluated in the context of the risk & returns of the NFC, by determining if the NFC is hedging less, same level or more and if the NFC is hedging with the higher, same level or fewer costs. This depicts the first research question of this study - How do EMIR and Basel III regulations impact corporate hedging activities of NFCs in the context of risk and return considerations? Based on the interviews with the twelve participant NFCs' following observations were made:

- 1) NFCs confirmed that EMIR impacted the costs of the transactions, the required systems, and processes and the required knowhow of employees, i.e. through three of the key determinants of the impact-analysis-model.
- 2) Basel III impacted the interviewed NFCs through increased prices from banks for derivatives and through reduced offers from banks for long-term derivatives, i.e. through two of the key determinants (specifically, costs and derivatives market).
- 3) NFCs hedged at the same level as pre the regulatory changes but are paying more for their hedging activities. They regard both regulations as increasing their cost base, i.e. reducing returns, without any improvement of risk situation.

The author also noted that there were differences between the interviewed NFCs about the intensity of the impact of EMIR. While some had already automated processes in

place and only required moderate additions to be able to comply with EMIR, others needed to implement various new systems and automation of their corporate hedging activities. On Basel III, the larger NFCs tend to have felt fewer problems with the availability of long-dated derivatives, given that they have a larger number of banks to do business with vs. smaller companies so that they can easier absorb when some banks are not quoting for long-dated derivatives.

After having understood how EMIR and Basel III have impacted NFCs' corporate hedging activities, i.e. through different key determinants and all culminating in higher costs, the next objective of this study was to answer how NFCs are responding to the impact in term of alignment of strategy and processes to manage that impact. Notably, NFCs fully implemented all required systems and processes in relation to EMIR, which is the direct regulation on them. The implementation process was somehow chaotic and different between the interviewed NFCs, but all of them set up their systems and processes to comply with the regulation on time. The involved costs have been in all cases borne by the corporate finance and treasury departments. Given that those costs are relatively moderate, compared to the size and operations of the NFCs, there was no significant try from the NFCs to reduce the costs. Thus, there was no response from all NFCs on the impact of EMIR on the transaction costs and all NFCs have borne the higher costs. On the systems and knowhow side, all NFCs updated their systems as required by EMIR and acquired additional knowhow through hiring consultants and through attending conferences. Also, the cost of the consultants was borne by the treasury or corporate finance departments while the conferences were free of charge. On Basel III, however, which is an indirect regulation from the NFCs' perspective, most NFCs started using their banking relationships to get the required derivatives and to limit any significant reduction of offers from banks for the required derivatives.

The fourth objective of the study dealt with the conceptualisation of the response of NFCs based on the initial conceptual framework, which is based on an existing theory on hospitals response to regulation. The categorization of the responses into the three levels of responses showed that the NFCs are only using managerial level responses, which mainly

consists of internal adjustments of systems and processes and acquisition of expertise to comply with the regulatory changes. As Figure 25 below shows, EMIR impacted three key determinants of the impact analysis model, namely costs, systems and processes and the required knowhow of employees. To those impacts, the NFCs responded with managerial level responses, through adjustment of systems, processes, and training of employees. Basel III impacted two of the key determinants of the impact analysis model, namely costs and the situation on the derivatives market. The managerial responses of NFCs here were related to the banking strategy. Most of the NFCs increased the number of banks that they hedge with to counteract the increase of costs and reduction of trade offers that resulted from the implementation of Basel III. Thus, only one factor, that influences the willingness of NFCs to hedge with derivatives has been impacted, while all three factors that influence the ability to hedge have been impacted. In general, the organisational response set predicts that corporates would first respond with institutional level responses before they go over to managerial level responses. However, the interviews showed no response of the NFCs that is to be categorized as an institutional level response, as predicted by the theory. The reasons that justify the lack of institutional level responses are two-fold, (i) the regulation of the OTC market was already decided on the highest political levels and in the course of the set-up of the regulation, NFCs have already been exempted from burdensome obligations such as the clearing of derivatives and (ii) the impact of the remaining actions was relatively moderate vs the size of the corporate and the size of the derivatives portfolio and could be mitigated through some managerial level responses. Nevertheless, they confirmed that institutional level responses would be the first mean if the consequences of the regulation would be more severe for their hedging activities. Technical level responses were also not required given that the regulation did not impact the hedging strategy or the usage of certain derivatives instruments.

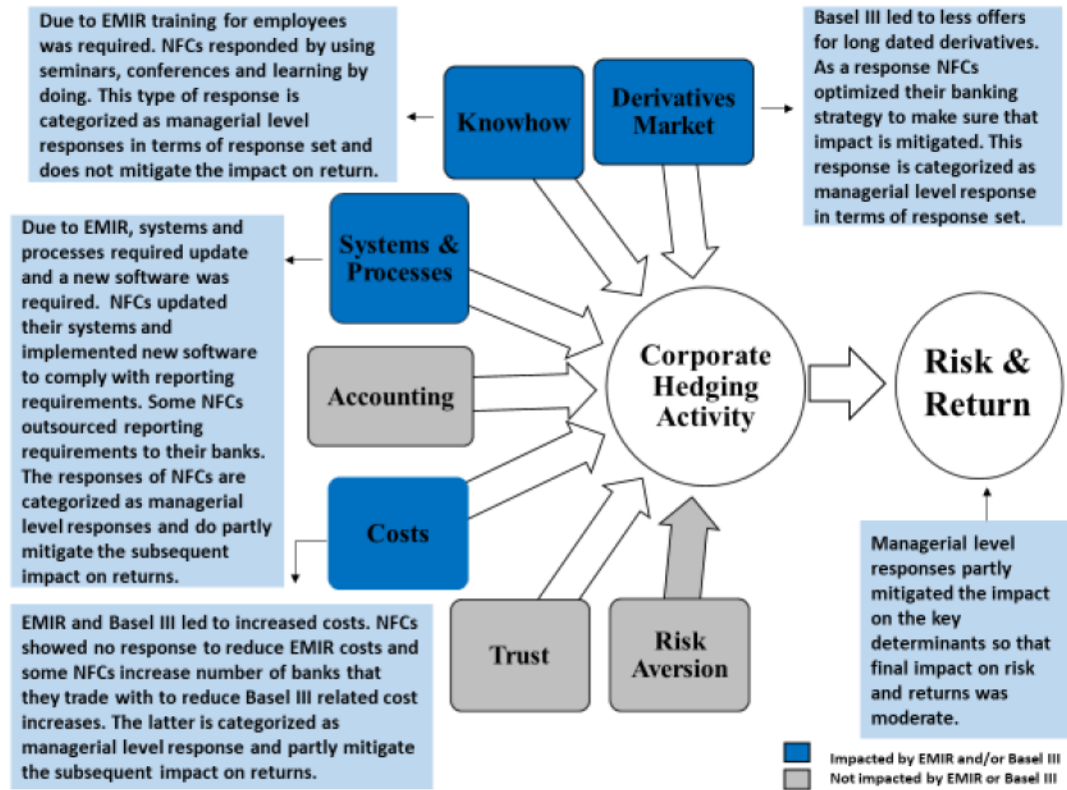


Figure 25: Impact of EMIR and Basel III and managerial level responses

5.3. Contribution to theory

This study attempted to make the following theoretical contributions: (1) Advancing the research on corporate risk management, (2) Development of a unique model that provides an overview of the complex hedging process within NFCs and offers researchers a tool to systematically analyse the impact of internal and external actions on corporate hedging activities of NFCs and be basis to predict potential results, (3) Confirming existing theory on organisational response to regulation and adding to it the response of NFCs to the regulation of OTC derivative, (4) Development of an integrated conceptual framework that contributes to the overlapping area of corporate risk management research and strategic management research, and (5) Finally, the study adds to further applicability of deductive qualitative analysis in general but also in corporate risk management field.

5.3.1. Advancing corporate risk management research

As presented in the literature review, the research in corporate risk management so far focussed on either the rationales for corporates to hedge at all or on theoretical and quantitative models of the optimal way of hedging when one is confronted with a specific type of risk. Thus, the existing body of research covered why corporates hedge and how they should hedge. In contrast, this study advances corporate risk management research by being the first study that provides corporate risk management research with a definition of corporate hedging activities, as the willingness and ability of NFCs to conduct corporate hedging but also by suggesting the key factors that influence corporate hedging activities, i.e. what key factors impact the corporates' willingness to hedge with derivatives and their ability to hedge with derivatives. This study further advances corporate risk management research by adding to the new institutional theory perspective on risk management by focussing on external actors' impact on corporate hedging activities.

The review of theoretical literature provided three different definitions of corporate hedging, namely (i) hedging as a generic insurance contract, (ii) hedging as any action reducing covariance between a firm's value and a state contingent variable or, and more specifically, (iii) hedging as the activity of holding derivative financial instruments to reduce the exposure to marketable risks. The latter is the most specific definition and was of relevance for this study. Based on that definition, this study provides to the existing research a definition of corporate hedging activity as: The willingness and ability of a corporate to conduct corporate hedging with derivatives. Furthermore, this study advances corporate risk management research by being the first study to bring into focus the key factors that determine the hedging activities of NFCs, which can be used for further research on impact of internal and external factors on corporate hedging.

Finally, this study also contributes to research on corporate risk management that is based on the new institutional theory perspective. As seen in literature review, most of the prior research in corporate risk management, including those that provided a definition of corporate hedging and explored the rationales for corporates to hedge as well as the optimal

way of hedging, has been created under neoclassical perspective of finance and agency theory. In terms of corporate risk management, new institutional theory offers an alternative explanation by predicting that corporate risk management may be determined by institutions or standard practise in the market or industry (Klimczak, 2007; Seamer et al., 2015). However, this theory is new to the field of corporate risk management and this study adds to that theoretical perspective.

5.3.2. Development of impact-analysis-model

This study advances corporate risk management research also by being the first study to present a model that helps the systematic analysis of the potential impact of the internal and external actors on corporate hedging activities. The model consists of the integration of the key elements that determine NFCs' willingness and ability to conduct hedging via derivatives. Impact Analysis has been defined as the activity of identifying the potential consequences of a change, based on Arnold and Bohner (1993), who defined impact analysis from a change management perspective, as the activity of identifying what to modify to accomplish a change, or of identifying the potential consequences of a change. The key determinants extracted from the prior research on rationale for corporates to hedge and the optimal way of hedging, were used as priori codes for the creation of the impact-analysis-model.

Based on this research, support was found for the importance of the a priori codes for the impact-analysis-model. The case companies confirmed each of the a priori codes as a key determinant of their corporate hedging activities and described why the key determinants are important. Furthermore, most companies mentioned that the accounting treatment of the derivatives is also a relevant point for their willingness to conduct corporate hedging, so that the initial impact-analysis-model was extended by the key determinant Accounting. The impact-analysis-model consists of seven key elements and is, to the best knowledge of the researcher, the first of its kind in corporate risk management research. It helps analysing how, i.e. through which determinant and key criteria, regulatory or any other changes or actors can impact the hedging activities of NFCs. It includes key

criteria of each key determinant that support the identification of any impact and the analysis of it. The importance of each key determinant to the hedging decision differs from NFC to NFC, depending on the hedging strategy, hedging volumes and organisational structure and ownership structure. Even the importance of each determinant could vary from one hedging decision to the other, depending on what type of risk the NFC is exposed to. Thus, a weighting of the importance of the key determinants of the model is not possible but rather one need to look on the individual company's set-up and hedging situation that the NFC is facing. Figure 26 shows the impact analysis model with its key determinants and the criteria that support the analysis process.

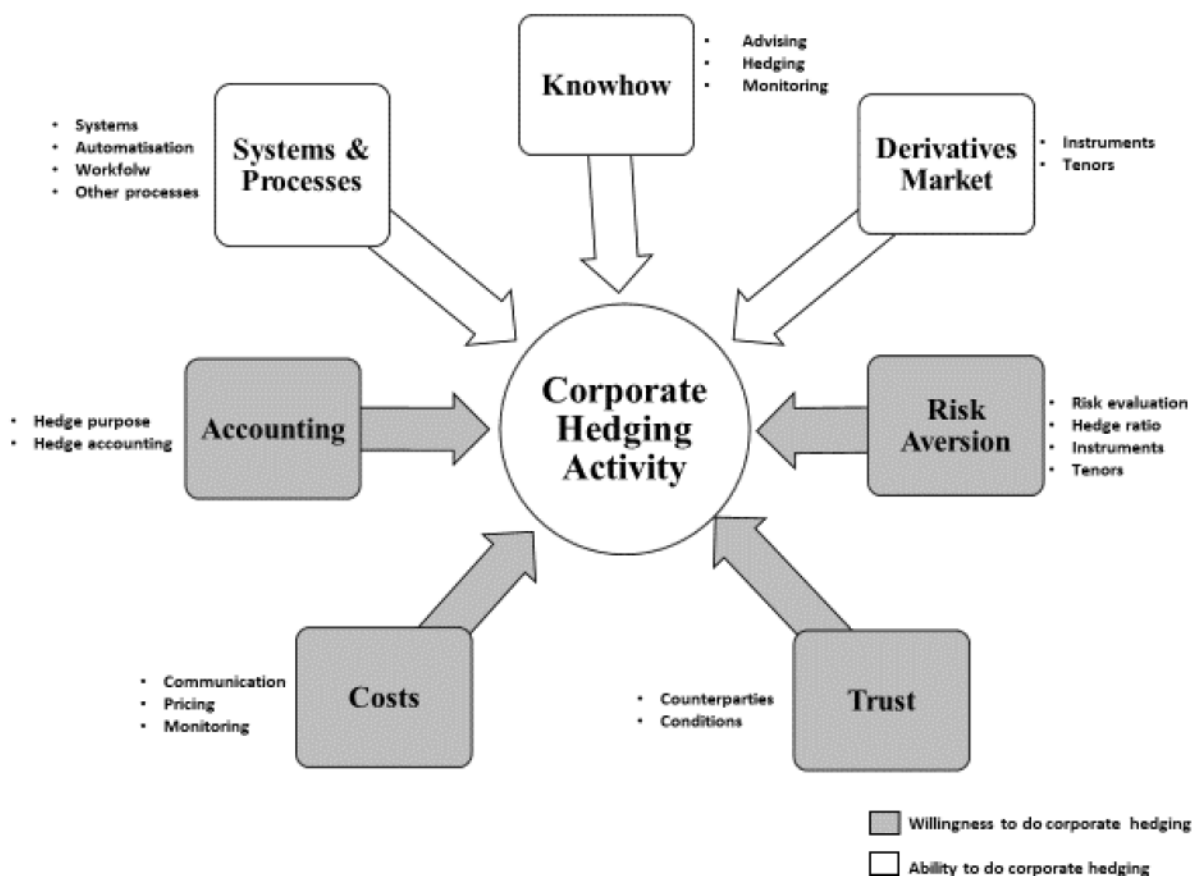


Figure 26: The Impact Analysis Model

As figure 26 shows, the key determinants of the impact-analysis-model are:

- **Risk:** Theory on organisational behaviour towards risk differentiates organisations by looking on their approach to risk, namely in those that have a proactive or a reactive approach to risk (Durst, Hinteregger, & Zieba, 2019; Smallman, 1996). While the reactive approach relies on institutions setting predetermined risk tolerances and then focusses on converting their goals into quantified decision rules, the proactive approach accepts that forecasting of risk is limited and focusses on avoiding, preventing and reducing the risk (Durst et al., 2019; Smallman, 1996). From the organisational behaviour perspective, the interviewed NFCs demonstrated a proactive approach to risk, as the risk towards negative interest rate changes and foreign exchanges are approached proactively with the aim to avoid the risk in total or at least significantly reduce the risk. The theory on organisational behaviour towards risk state one of the factors that can influence an organisations approach to risk management is the organisational structure and ownership. In line with that perspective, the interviews confirmed that the stance of shareholders and management of the NFCs is the most fundamental reason and starting point on the hedging decision and thus constitutes a key element of the willingness of NFCs to hedge with derivatives. All NFCs have instated a hedging policy and aim to hedge out all existing and a significant part of the foreseeable foreign exchange and interest rate risk. The analysis of an impact of any internal and external actions to the degree of risk aversion of an NFCs can be analysed based on four criteria, namely the risk evaluation process, the hedge ratio, the hedging instruments used and the tenors hedged.
- **Trust:** Organisational theory literature is generally united in the opinion that trust is essential for understanding interpersonal and group behaviour within organisations, managerial effectiveness, economic exchange and social or political stability (Durst et al., 2019; Fang, Palmatier, Scheer, & Li, 2008; Hosmer, 1995). However, there are various approaches within organisational theory which make a unified definition difficult and probably not appropriate given the different dimensions. From an organizational theory perspective, there are different levels of trust within organisations. Fang et al. (2008) differentiated three levels of trust within organisational theory in a marketing situation, namely inter-organizational trust

(trust between collaborating organisations), intra-entity trust (trust within a co-entity) and agency trust (trust in a firm's representatives). Within that framework, trust in this study is to be categorized in the inter-organisational trust level as it refers to the trust between two organisations, namely the NFCs and their banks. In line with organizational theory literature, the interviews revealed that trust is a key determinant that influences NFCs' willingness to hedge with derivatives. All NFCs stated to have a certain level of trust in the market and their banks, which however is based on a certain minimum rating that most NFCs expect from their banks. All NFCs mentioned that they do not really analyse the market, but they review and consider the rating of their counterparty, i.e., the banks. Thus, the degree of trust of the companies can be analysed and evaluated by looking on the counterparties that the NFCs hedge with and the minimum conditions that needs to be met to hedge with those counterparties.

- **Costs:** Organisational economics theories offer different views on costs associated with an organisation's business activities, such as agency theory, property rights theory and transactions costs theory (Kim & Mahoney, 2005). Within that framework, transaction cost theory suggests that the optimal organisational structure is one that achieves economic efficiency by minimizing the costs of exchange (Williamson, 1979, 2005; Young, 2013). According to transaction cost theory, all transactions create costs such as the costs for co-ordination, monitoring, controlling, managing transactions, however, those costs are to be differentiated from production costs and to be minimised using the optimal organisational set-up (Young, 2013). In line with that perspective, the interviews confirmed that costs considerations, such as the costs to accomplish and monitor the transaction and the fees of the banks, also impact the willingness of NFCs to hedge by using derivatives. The interviewed NFCs further confirmed that they aim to keep transaction costs as low as possible and have implemented electronic platform trading for that purpose. This is in line with transaction cost theory's suggestion to reduce transaction cost based on organisational structure optimisation. All NFCs mentioned in the interviews that they do not speculate on certain movements of FX and interest rate movements. They rather deal with derivatives to secure existing level of FX and interest rates

and avoid negative future movements. The sensitivity to costs can vary amongst the NFCs but all of them have specific rules to consider costs. There are three types of costs that need to be looked on to evaluate any impact of internal and external actions on the costs of hedging, namely communication costs, pricing of the trade and monitoring costs.

- **Accounting:** From an institutional theory perspective, organisations are viewed as operating within a social framework of norms, values, and assumptions about what constitutes appropriate or acceptable behaviour within their environment (Carpenter & Feroz, 2001; Oliver, 1997; Peters, 2019). Subsequently, organisations tend to conform to institutional pressures to adhere to the rules and norms as they are rewarded for doing so through increased legitimacy (Peters, 2019; Scott, 1987). Based on the institutional theory perspective, Carpenter and Feroz (2001) suggest that accounting rule choice and adaption are influenced by institutional pressures. New institutional theory shifts the perspective to institutionalized rules that cause organizations to adapt. These institutional rules are formed through interaction of the critical exchange partners, regulatory groups, professional associations and other relevant actors within the organizational field of the firm (Hoffman, 2001; Wooten & Hoffman, 2016). Confirming those perspectives, most of the interviewed NFCs mentioned that the accounting treatment of derivatives is a factor that can influence their willingness to use certain instruments. Those companies confirmed that the economic view on the appropriateness of the derivative to hedge the risk effectively is their primary concern, but they also care about less volatility in their financial figures. That means they would not abstain from using a certain instrument when it is the most effective instrument to hedge the risk but would take the accounting treatment into consideration. The two criteria that support the analysis of the impact to the accounting treatment are any changes to the hedging purpose and changes to the hedge effectiveness. The former deals with the question if the derivative be designated as for hedging purposes according to the accounting rules and the latter

with the question if the hedge effectiveness can be demonstrated at inception and during lifetime.

- **Systems and Processes:** Organisational design theories agree in suggesting that the structure of organisations, and with it the systems and processes, follows the strategy and goals of the organisation (Burton, Obel, & Håkansson, 2020; Hax & Majluf, 1981; Rivkin & Siggelkow, 2009). From that perspective, a proper organisational structure should consider the strategic positioning of the firm and facilitate its operational efficiency. There are various theories on the optimal organisational design offering different perspective, with some of them, such as Burton et al. (2020) focussing on the set-up of the optimal organisational infrastructure which fits to the specific firm. In line with that perspective, the interviews showed that appropriate systems and processes are important factors determining the ability of NFCs to hedge with derivatives. This includes the technological means to connect with the trade counterparties and accomplish the trade as well as to depict the trades in their accounting and booking systems. Also, appropriate processes, including guidelines, are required. The systems and processes are confirmed to be of key importance for all NFCs and their importance has increased over the time given that the systems are more and more connected to each other and allow the NFCs to automatize the whole trading process, from conducting the trade to displaying it in their treasury systems to confirmation in their accounting systems. Subsequently, four criteria (existing systems, the level of automatization, the hedging workflow and other processes/guidelines) can support the analysis of any changes to the required systems and processes of the hedging transaction.
- **Knowhow:** Knowledge management has been extensively researched by many researchers and recognizes the importance of employee knowhow for organizational performance (Hernaes & Aleksić, 2013; Tzortzaki & Mihiotis, 2014). Literature offers various theoretical models and concepts of knowledge management, which Fteimi (2015) categorized as either taking a holistic perspective to knowledge management or a specific perspective to knowledge management. While the former includes different elements of knowledge management, like knowledge process,

business process, external process in one view, the latter is focussing on specific and concrete knowledge elements, such as knowledge management definitions, knowledge management theories or knowledge management systems. Tzortzaki and Mihiotis (2014) divided the existing knowledge management theories in four categories, namely the positivistic, interpretive with a resource-based orientation, interpretive with a knowledge-based orientation and organic approaches. In line with suggestions of knowledge management theories, especially those that have a knowledge-based orientation, the NFCs, confirmed that knowhow of employees and management is a key factor for appropriate and successful hedging. Thus, knowhow emerged as a key factor that can influence NFCs' ability to engage in corporate hedging by using derivatives. However, given that all NFCs mainly hedge with plain vanilla instruments and do not engage in any speculation, the required knowhow is limited to hedging for means of risk reduction and not any additional gains of profits. The knowhow of employees is mainly used for advising services, the hedging itself and the monitoring of the trades over time. Any changes to those activities can be used to identify and analyse any changes to the knowhow for hedging activities.

- **Derivatives Market:** Strategic management literature defines a firm's environment as a set of external conditions and forces that have the potential to influence the firm, and break them down in the general environment (e.g. overall trends, demographics and economic conditions) and industry environment (competitive environment) (Edwards, 2018). Also, organization theorists have examined the impact of the environment of an organization to the working of complex organizations with the suggestion that an organization's internal structural set-up is subject to the demands of the external environment (Edwards, 2018; Schönbucher, 2010; Simonetti, 1974). In line with those suggestions, the external environment of the interviewed NFCs influences the corporate hedging business. The interviews confirmed that the situation of the derivatives market is a key factor for the NFCs' ability to do hedging. This is particularly the case for the availability of the required instruments and the required tenors, which is defined as the length of time till the financial contract expires. When the required instruments and tenors would not be

available, the NFCs could not hedge out the risk in an efficient way. Thus, also the situation on the derivatives market is confirmed to influence the ability of NFCs to conduct corporate hedging and the criteria to analyse any changes with regards to the derivatives market's situation is the availability of required instruments and tenors.

In summary, the impact analysis model provides risk management researchers with three outcomes that are relevant for future research and theories. First, the model presents a consolidated overview of the complex process that is included in the hedging decision-making process. This includes the interaction between the different stakeholders but also the corporate systems and processes. Second, the model is a tool for the systematic analysis of how, i.e. through which key determinants and criteria, internal or external actions can impact the willingness and ability of NFCs to do corporate hedging. Any change within the environment of the NFC that is relevant for the corporate hedging process can be analysed based on the impact to the key determinants and the sub-criteria. Also, this allows to run of various what-if scenarios. After repeated application, this model might also support prediction of changes to corporate hedging activities (or each key determinant) due to the impact of internal or external actions.

5.3.3. Advancing research on organisational response to regulation

Studies that deal with the impact of external actors on strategy show, that governmental and regulatory involvement is together with ownership structures the major considered external actor that can influence corporate strategy, structure, and processes. In the literature review, the studies on the influences of external/regulatory actors on corporate strategy and structure have been categorized into five clusters, corresponding to Frankenberger (2006) construct namely: (1) internal effects, in the form of adjustments of corporate strategy and structure; (2) external effects in the form of externally directed strategic responses of corporations; (3) proactive political strategies to influence the legislation and regulation process; (4) interactive strategies involving multiple actors; (5) macro-level studies. Most studies are in the first cluster and mainly deal with environmental regulations.

This study adds to the first cluster but is the first study to deal with the regulation of financial derivatives. Thus, this study also contributes to the research on organisational response to regulation by confirming existing theory on organisational response to regulation and adding results from the response of NFCs to the regulation of the OTC derivatives market.

In the first part, the author explained how NFCs have reacted to the regulatory changes in terms of the process of alignment of strategy, processes, systems and so on. It shows that NFCs acted in line with the four common phases of the strategic planning process (Jurevicius 2013), namely they first analysed the regulatory changes to have a firm understanding of their obligations and subsequently planned the adjustments required to their systems and processes, subsequently implemented the necessary adjustments and finally monitored the results.

In terms of the response of NFCs, this study confirmed existing theory on organisational response to regulation. The results showed that NFCs replied to the regulatory impact mainly through alignment of systems and processes, acceptance of higher transaction costs, the acquisition of additional knowhow, and optimization of banking relationships. With regards to the theory of organisation response to regulations, the milestone study of Cook et al. (1983) differentiated three levels of organizational responses to regulations, namely institutional, managerial, and technical and suggest a hierarchical ordering of responses to regulation that constrains financial resources, in view of the relative costliness of making the organizational changes. The theory predicts that organisations will first make internal adjustments at the institutional level, followed by managerial level changes, and only as regulation, which is also influenced by other exogenous factors such as political climate, increases in intensity will changes be made at the technical level (Cook et al., 1983).

The results of the study show that NFCs only catered to the managerial level responses to the regulation of OTC derivatives. However, the interview confirmed the

hierarchical order as suggested by that theory. NFCs initially considered institutional level responses but refrained from it as the regulation was primarily directed to banks and regulators already limited the impact of the regulation on the NFCs by exempting them from the clearing obligations and also from compression requirements. Thus, they only needed to comply with reporting obligations and reconciliation obligations which they incorporated through managerial level responses, i.e. adjustment of systems and processes, acquisition of expertise and so on. Also, the intensity of the regulation was moderate and did not require technical level responses as it did not hinder the NFCs to apply necessary hedging strategies and use of required financial derivatives.

Overall, this study adds the existing research on organisation response to regulation, by adding evidence from the response of NFCs to regulation of OTC financial derivatives, confirming that the general approach is in line with the four phases of the strategic planning process and confirming the applicability of concepts and theory of organizational response to regulation from the hospital industry to the regulation of OTC financial derivatives.

5.3.4. Development of an integrated conceptual framework

This study suggests an integrated conceptual framework that combines the results of the first part of the study, i.e. impact analysis, and the second part, i.e. the response of organisations. Such an integrated framework, to the best knowledge of the researcher, is not available in the existing research body. By adding that integrated conceptual framework, this study contributes to narrowing the gap in the overlapping area between corporate risk management research (how is risk management impacted by regulation) and strategic management research (how are organisations responding to manage impact) by creating an integrated conceptual framework.

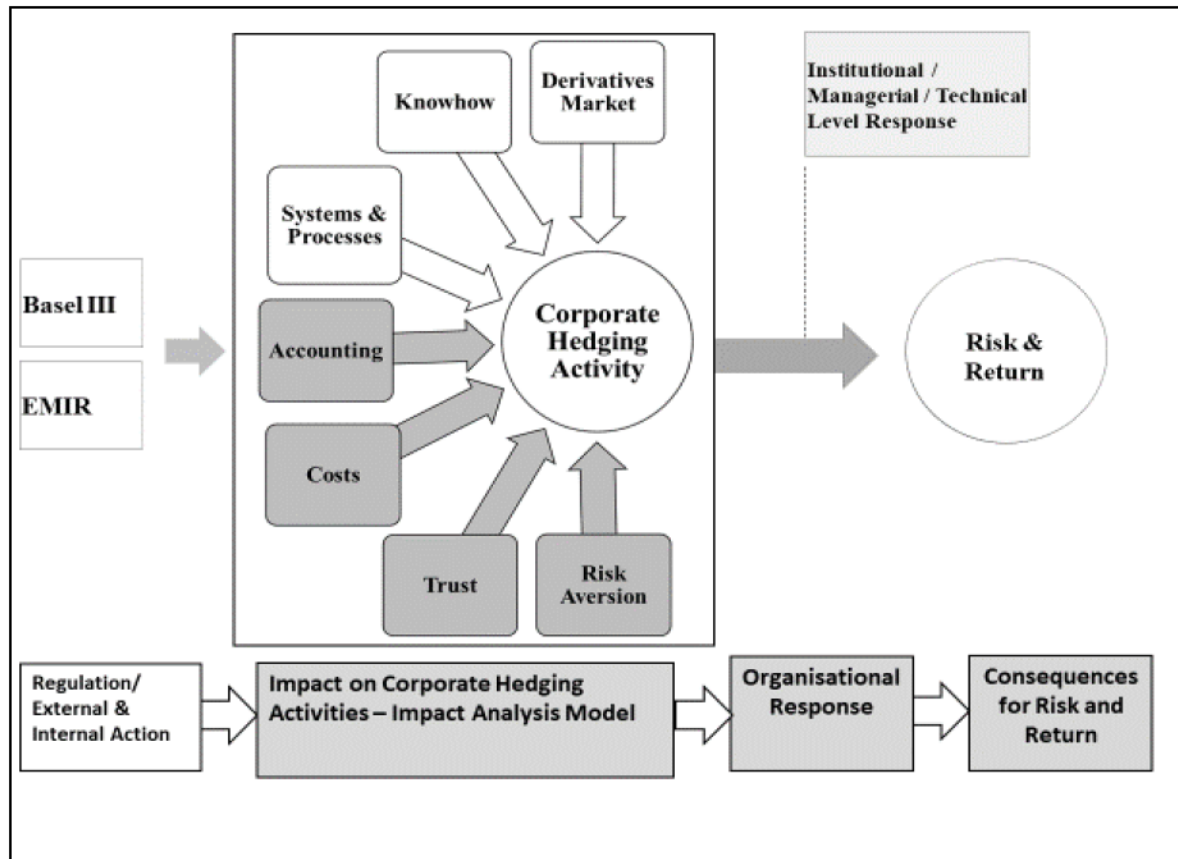


Figure 27: Integrated Conceptual Framework

The conceptual framework first deals with the impact of the regulation on corporate hedging activities and depicts how any regulation or other external action related to a corporate's hedging activities impacts the corporate. By that analysis, the corporates can evaluate, the severity of the impact on the specific determinant of the impact-analysis-model and how best to address this, i.e. through institutional level, managerial level, and/or technical level responses. In the case of this study, it was evidenced that NFCs used managerial level responses to manage the impact of regulatory actions. The conceptual framework closes with the evaluation of the impact of the regulation and the organisational level responses on the risk and profit situation of the company. In case, the NFCs would adjust their hedging activities in a way that they hedge less with derivatives, they probably would face higher risks in their financial statements, while same level or increased hedging would probably result in higher costs for hedging and consequently fewer profits.

5.3.5. Methodology

So far, most studies in the domain of corporate risk management used a quantitative approach to explain the rationales for hedging and quantitative models based on mathematical formulas to demonstrate the optimal hedging strategy. This made sense, given that those studies mainly tried to demonstrate if and how, hedging makes sense for corporations from an economic point of view and against the background of neoclassical assumptions. However, this study is one of few that focuses uniquely on a different type of phenomena within corporate risk management, namely the impact of regulatory actions and the organizational response to manage from a strategy perspective, and that is using qualitative research due to the complex nature of the phenomena, which includes business, political, and psychological aspects.

Furthermore, this research added to the application of deductive qualitative analysis and to its dissemination into the field of corporate risk management. First, the author created a preliminary concept to guide the research as proposed by the results (Gilgun, 2005, 2010). This concept consisted of the preliminary impact-analysis-model and the preliminary conceptual framework and guided the research process, data collection, data analysis, and interpretation as well as the writing of the results. In addition, guided by another research project that applied deductive qualitative analysis such as Cutlip (2013), the author has systematically analysed and stored the impact of the regulation on the key determinants of corporate hedging activities and the response of the NFCs in relation to the impact and the key determinants.

5.4. Contribution to practice

The practical relevance of understanding how the regulation of OTC derivatives impact corporate hedging activities and how NCFs can manage the impact has been presented in Chapter 2 and confirmed by the interview participants. This dissertation provides following additional insight to management practice:

- (1) This study supports management in gaining a deeper understanding of what determines their corporate hedging activities which constitutes the basis to

systematically analyse the impact of external and internal actions and strategically reply to those actions. The split of the key determinants of corporate hedging activities in those that determine the willingness to hedge with derivatives and those that determine the ability to hedge with derivatives helps to better categorize the impact of external or internal actions.

- (2) The impact-analysis-model provides corporate treasurers and risk management employees with a tool to systematically analyse the impact of external and internal actions on their hedging activities and evaluate the results it in view of the goals of their hedging activities. Such systematic analysis supports management in making swift and informed decisions which might be of relevance particularly in scenarios entailing paucity of time in decision-making. Also, the model can be the basis for internal discussions between the corporate treasurers and management for the set-up of the hedging policy and for any changes in the hedging strategy. Finally, the model can also be used as a basis for discussions with external parties such as regulators or other external parties, when it comes to making changes that can be relevant for NFCs corporate hedging activities. Having the mutual understanding might help in getting a beneficial outcome for the NFCs.
- (3) This dissertation further offers management a concept to categorize the possible responses to the regulation of OTC derivatives. Through using a concept that has been applied in strategic management research, the study extends support to a more strategic approach to the response of risk management employees. That means, that the conceptual framework helps management in developing a strategic oriented analysis and reply of the regulation of the financial derivatives market.

5.5. Research limitations

An important step with regards to each research study is the identification of the limits of the study, which reveals the potential weaknesses of the study (Creswell, 2013). This research study is exposed to certain limitations, which mainly are related to research subject and objectives as well as the research methodology and the nature of the topic. The current study ecosystem presents the following limitations with regards to the research subject and research objectives:

- The research deals only with the regulatory measures applied by the European Union and as such are applicable to Germany. Within those regulatory measures, this research analyses the impact of EMIR and Basel III, as these concern the NFCs the most. Thus, the conclusion with regards to the impact of the regulatory measures and the organisational responses need to be regarded in view of these two EU regulatory measures and may not be applicable to other regions in the world as the intensity of regulatory measures might be different in those regions.
- The research focus is solely on large NFCs. Thus, the conclusions on the impact of the regulatory measures and the organisational response are not applicable to financial corporates, which are subject to more obligations under both regulatory measures, EMIR and Basel III. Furthermore, the focus is on large NFCs and conclusions might need some adjustment when applied to smaller NFCs as they only use a small number of derivatives, are exempt from most obligations.
- Also, the country of the research may present some limitation to the generalizability of findings. This research deals only with NFCs in Germany. Germany is a market with relatively easy access to banks especially for large corporations, such as the interviewed NFCs. This can influence the response of NFCs, so that in markets that are not as overbanked as the German market, the organisational response might be different. Therefore, some conclusions could be limited to the German market. To properly minimize this limitation, one would need to repeat the research with NFCs in other regions, which would be in excess of the time and size of the study. However, the literature review and creation of the initial model and conceptual framework, which are not limited to the German market, and the drawing of conclusions on conceptual level help minimize this topic specific limitation to some extent.
- Furthermore, the research dealt solely with IR and FX derivatives and the conclusions on the impact-analysis-model as well as the organisational response might need adjustment while considering other types of derivatives.
- The research methodology offers a criticism of the generalizability of qualitative research, given the subjective nature of evidence and as it deals with a specific

situation in a specific context (Creswell, 2013). While the primary concern of this study is not generalizability but to understand a phenomenon with all its peculiarities, the generalization of finding or lessons learned is desirable at a conceptual level, i.e. on the level of the impact-analysis-model and conceptualisation of organisational responses. Replicating this research with a more diverse sample or using quantitative research would potentially allow for further generalizability of findings.

5.6. Recommendation for future research

As the literature review reveals, research studies on corporate hedging are focussed on the definition of corporate hedging, the rationales of corporates to hedge and the optimal way of hedging under certain scenarios. But they provide limited insight on the role of regulation within corporate hedging as well as on mechanisms to systematically analyse the impact of regulation or other external/internal changes on corporate hedging activities. The development of the impact-analysis-model provides a new and systematic way to analyse the impact of internal and external factors on corporate hedging activities and evaluate the impact in the required context. Therefore, the proposed model and the proposed definition of corporate hedging activities should facilitate future research in corporate hedging. That can be done, of course, in relation to regulation but also other factors such that can impact the key determinants of the model.

However, as described in the limitation chapter, the initial concept of the model was derived from existing literature on the rationales for corporates to hedge and the optimal way of hedging and subsequently finalised based on a limited sample of large German non-financial corporates. This offers scope for additional research with regards to the applicability of the impact-analysis-model to a more diversified pool of corporates as well as in other than in the context of risk and returns considerations. Further limitations of this study evidence the need for further theoretical and empirical research, before the insight of this study can be developed into a full-grown theory. Within that framework, the recommended directions for further research are:

(1) Expansion of study to other regions:

The country of the research may present some limitation to the generalizability of findings, as this research deals only with NFCs in Germany. Germany is a market with relatively easy access to banks especially for large corporations, such as the interviewed NFCs. This can influence the response of NFCs and correspondingly, the organisational response might be different in markets that are not so overbanked as the German market. Thus, one possible direction for further research in this area that can add to the generalizability of findings is the expansion of the research to other regions. One could, for example, start with other countries in the EU that are in the same regulatory area as this study and subsequently expand to, for example, the US with similar regulations.

(2) Expansion of study to FC and smaller NFCs:

The research focus is solely on large NFCs. Thus, the conclusions on the impact of the regulatory measures and the organisational response are not applicable to financial corporates, which are subject to more obligations under both regulatory measures, i.e., EMIR and Basel III. Furthermore, the focus is on large NFCs and conclusions might need some adjustment when applied to smaller NFCs - as these companies only use a small number of derivatives and are exempt from most obligations. Thus, a possible direction for further research could be the expansion of the research to smaller NFCs, thereby, adding to further generalizability of findings within NFCs. Also, similar research on financial corporates is a possible direction for further research, especially since financial corporates are intensely impacted by EMIR and Basel III.

(3) Expansion of study to other types of derivatives

Another possible direction for further research is the expansion of the study or replication of it with other types of derivatives. This study deals solely with IR and FX derivatives and the conclusions on the impact-analysis-model, albeit, the organisational response might need adjustment when reviewing other types of derivatives such as commodity derivatives. This could lead to different findings on the impact-analysis-model considering the possibility of other factors that determine the willingness and ability to hedge with commodity derivatives and also on the organizational response. However, this

study provisions for the researchers a starting point to replicate the research to other types of derivatives.

(4) Expansion of the study to other types of regulation of derivatives

The fourth recommended expansion of the study is in the direction of the investigation of other types of regulation of financial derivatives, such as MIFID and MAD. The research deals singularly with the analysis of the impact of EMIR and Basel III, as they are those that concerned NFCs most at the time of the study commencement. Thus, the conclusion with regards to the impact of the regulatory measures and the organisational responses need to be regarded in the perspective of these two EU regulatory measures and may not be applicable to regulatory measures. Thus, researchers could investigate the impact of other regulatory measures such as MIFID and MAD based on the research process of this study.

(5) Expansion of the study to other internal and external actions.

Another possible direction for future research is the study of the impact of other internal and external actions on corporate hedging activities. Based on the impact-analysis-model, future researchers can analyse how other internal actions such as management or ownership change and external actions, such as technological change, impact NFCs' hedging activities. The research here deals only with external action in the form of regulatory measures.

5.7. Chapter conclusion

This chapter reflected on the research findings, discussed the results, and deduced implications for theory and management practice. First, the findings were summarized, which evidenced that this study achieved all four research objectives: (1) Creation of the impact-analysis-model, (2) Show how EMIR and Basel III impacted corporate hedging activities based on that impact-analysis-model, (3) Explore NFCs response to the regulation, and (4) Conceptualisation of the response of NFCs to regulation.

Subsequently, the contribution to knowledge for theory and practice was presented. Specifically, this study contributed to theory by (1) Advancing the research on corporate risk management and (2) Narrowing existing research gaps in corporate risk management research through the creation of the impact-analysis-model. Furthermore, (3) this study added to strategic management research by confirming existing theory on organisation response to regulation and (4) Creating an integrated conceptual framework. Finally, (5) the study also contributes to further applicability of deductive qualitative analysis in general besides in the corporate risk management field and strategic management research.

Finally, this chapter presented promising directions for the future research in this area. It shows the requirement to research the applicability of the impact-analysis-model to a more diversified pool of corporates as well as in other than in the context of risk and return considerations. Also, it presented that the study can be expanded and replicated in multiple ways.

Table 42: Research study progression matrix (3)

Research aim	Research Questions	Research objectives	Detailed Research Questions	Methodology	Outcome / Answers
To explore and evaluate the impact of regulatory initiatives on corporate hedging activities of NFCs and corporate response in the context of risk and return considerations	1. How do EMIR and Basel III regulations impact corporate hedging activities of NFCs in Germany in the context of risk and return considerations?	1. To create a model that helps analysing the impact of regulatory initiatives on corporate hedging activities	<p>D1: Is the risk aversion of shareholders' and managers' a key determinant of the willingness of NFCs to do corporate hedging and subsequently of the impact-analysis-model?</p> <p>D2: Is the trust in the counterparties and the derivatives market a key determinant of the willingness of NFCs to do corporate hedging and subsequently of the impact-analysis-model?</p> <p>D3: Are cost considerations a key determinant of the willingness of NFCs to do corporate hedging and subsequently of the impact-analysis-model?</p> <p>D4: Are there any other factors that are important for the willingness of NFCs to do corporate hedging and can be considered key determinants?</p> <p>D5: Are the systems and processes in relation to corporate hedging a key determinant of the ability of NFCs to conduct corporate hedging and subsequently of the impact-analysis-model?</p> <p>D6: Is the knowhow about corporate hedging a key determinant of the ability of NFCs to conduct corporate hedging and subsequently of the impact-analysis-model?</p> <p>D7: Is the situation on the derivatives market a key determinant of the ability of NFCs to conduct corporate hedging and subsequently of the impact-analysis-model?</p> <p>D8: Are there any other factors that are important for the ability of NFCs to do corporate hedging and can be considered key determinants?</p>	Semi structured interviews supported by archival records	<p>A1: Yes, risk aversion is a key determinant of the willingness and impact-analysis-model</p> <p>A2: Yes, trust is a key determinant of the willingness and impact-analysis-model.</p> <p>A3: Yes, costs are a key determinant of the willingness and impact-analysis-model</p> <p>A4: Yes, accounting is key determinant of the willingness and impact-analysis-model</p> <p>A5: Yes, systems and processes are a key determinant of the ability and impact-analysis-model</p> <p>A6: Yes, knowhow is a key determinant of the ability and impact-analysis-model.</p> <p>A7: Yes, derivatives market situation is a key determinant of the ability and impact-analysis-model.</p> <p>A8: No, no other factors that are important for the ability and impact-analysis-model</p>

		2. To analyse and evaluate the impact of EMIR and Basel III in the context of risk and return considerations of NFCs.	D9. Which of the key determinants of the impact-analysis-model are impacted by EMIR and what is the consequence for risk and returns of NFCs? D10. Which of the above-mentioned key determinants are impacted by Basel III and what is the consequence for risk and return considerations?	Semi structured interviews supported by archival records	A9: EMIR impacted the determinants, Costs, Systems & Processes and Knowhow. This had negative conseq for returns. A10: Basel III impacted the determinants Costs and Derivatives Market. This had negative conseq. for returns.
	2. How do NFCs response to manage the regulatory impact in the context of risk and return considerations?	3. To analyse and evaluate NFC's response in the context of risk and return considerations	D11: What measures do NFCs take to manage the impact of EMIR and Basel III regulations? D12: What is the consequence of the above-mentioned responses for risk and returns of NFCs?	Semi structured interviews	A11: Update of systems and processes, hiring consultants, increase knowhow A12: Increase of costs and efforts and subsequently reduction of returns.
		4. To conceptualise NFCs' response to regulation.	D13: Can the response of NFCs be conceptualised based on the conceptual framework of Cook et al. and can the theory of the level of organisational response to regulation be applied?		A13: Yes, the responses can be conceptualised as managerial level responses and the theory is confirmed.

6. References

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Appendix 1: Global OTC derivatives market June 2018

In billions of USD

	Notional amounts outstanding				Gross market value			
	H2 2016	H1 2017	H2 2017	H1 2018	H2 2016	H1 2017	H2 2017	H1 2018
All contracts	482,421	542,439	531,911	594,833	14,948	12,683	10,956	10,326
Foreign exchange contracts	78,780	88,429	87,117	95,798	3,324	2,626	2,293	2,620
By instrument								
Outright forwards and fx swaps	44,226	51,754	50,847	56,416	1,515	1,259	1,111	1,249
Currency swaps	22,971	24,532	25,535	26,012	1,510	1,160	989	1,155
Options	11,533	12,088	10,679	13,307	299	208	192	216
Other products	50	55	56	64	...	...	...	...
By counterparty								
Reporting dealers	33,027	36,521	36,128	40,609	1,426	1,112	936	1,146
Other financial institutions	35,290	40,258	39,084	43,308	1,304	1,036	918	1,042
Central counterparties	1,754	2,119	2,100	2,907	70	68	65	71
Non-financial customers	10,413	11,594	11,849	11,817	594	479	439	431
By maturity								
Up to one year	60,146	69,461	68,083	76,145	...	...	...	...
Between one and five years	12,997	13,346	13,474	13,879	...	...	...	...
Over five years	5,587	5,566	5,504	5,709	...	...	...	...
By currency								
USD	70,550	77,043	74,756	84,448	2,947	2,299	1,974	2,336
EUR	24,334	27,826	28,280	31,368	871	929	782	825
JPY	14,146	14,904	14,838	15,629	714	405	300	363
GBP	9,080	11,070	12,257	11,719	367	346	305	357
CHF	3,541	4,120	4,257	4,196	112	113	91	94
CAD	3,350	4,068	4,088	4,484	111	140	107	117
SEK	1,812	2,038	2,268	2,131	46	55	47	59
Other currencies	30,747	35,788	33,490	37,621	1,479	964	979	1,089
Interest rate contracts	385,513	435,205	426,648	481,085	10,636	9,045	7,579	6,644
By instrument								
FRAs	63,183	75,414	68,334	84,131	243	129	112	107
Swaps	289,103	321,812	318,870	349,761	9,444	8,131	6,747	5,914
Options	32,823	37,641	39,112	46,833	949	786	719	623
Other products	404	338	332	361	...	...	...	...
By counterparty								
Reporting dealers	43,556	42,682	40,720	40,116	2,497	2,122	1,963	1,704
Other financial institutions	329,892	379,504	371,868	426,168	7,450	6,290	5,002	4,326
Central counterparties	287,219	329,766	320,218	366,665	5,029	4,388	3,217	2,702
Non-financial customers	11,660	12,681	13,729	14,441	688	633	614	614
By maturity								
Up to one year	165,888	199,179	191,445	231,284	...	...	...	...
Between one and five years	128,978	141,852	140,035	155,344	...	...	...	...
Over five years	90,243	93,835	94,836	94,097	...	...	...	...
By currency								
USD	143,290	159,034	156,506	192,510	2,356	1,850	1,434	1,326
EUR	105,594	126,553	121,890	129,417	4,815	4,155	3,561	3,140
JPY	41,800	40,975	38,772	37,215	753	630	491	443
GBP	34,033	36,684	37,570	44,522	1,701	1,490	1,292	1,067
CHF	4,168	4,299	4,107	4,398	102	84	62	52
CAD	8,471	9,849	10,944	12,494	129	128	135	104
SEK	4,652	6,156	5,985	6,052	96	87	65	60
Other currencies	43,506	51,655	50,874	54,478	683	622	539	452
Equity-linked contracts	6,253	6,964	6,569	7,071	477	524	575	608
By instrument								
Forwards and swaps	2,574	2,903	3,210	3,299	160	184	197	228
Options	3,678	4,061	3,360	3,772	317	340	378	380
By counterparty								
Reporting dealers	2,120	2,297	1,685	1,770	147	160	163	153
Other financial institutions	3,489	3,991	4,161	4,498	255	287	321	337
Central counterparties	57	70	13	20	1	3	0	0
Non-financial customers	644	676	723	803	76	77	91	117
By maturity								
Up to one year	4,016	4,555	4,087	4,435	...	...	...	...
Between one and five years	1,922	2,086	2,121	2,296	...	...	...	...
Over five years	315	323	361	340	...	...	...	...
By market								
US equities	2,782	2,767	2,823	3,027	198	217	239	260
European equities	2,082	2,668	2,227	2,317	134	149	159	170
Japanese equities	251	305	309	309	28	28	33	36
Other Asian equities	255	297	333	366	18	19	20	22
Latin American equities	221	199	244	284	14	11	12	14
Other equities	663	727	634	768	85	99	112	106

Appendix 2: Overview of literature on regulatory impact on corporate hedging

Search term	Library (title and abstracts)	Electronic database (title and abstract)	Internet (title)	Total	Relevant after review
(hedg*) AND (regulat* OR Basel OR EMIR OR European market infrastructure regulation)	2	276	58	336	0

Appendix 3: Letter of Introduction

LETTER OF INTRODUCTION

Date

Dear Sir or Madam

This letter is to introduce Mr Henok Kifle who is a PhD student in the Faculty of Business, Education and Professional Studies at the University of Gloucestershire.

He is undertaking research leading to the production of a thesis or other publications on the subject of “How the regulation of over-the-counter financial derivatives impacts non-financial-corporates hedging activities and how this is managed by non-financial corporates?” He would like to invite you to assist in this project by granting an interview and providing supporting documents which cover certain aspects of this topic. Be assured that any information provided will be treated in the strictest confidence and none of the participants will be individually identifiable in the resulting thesis, report or other publications. You are, of course, entirely free to discontinue your participation at any time or to decline to answer particular questions.

Since he intends to make a tape recording of the interview, he will seek your consent, on the attached form, to record the interview, to use the recording or a transcription in preparing the thesis, report or other publications, on condition that your name or identity is not revealed, and that the recording will not be made available to any other person.

Any enquiries you may have concerning this project should be directed to me or Mr. Kifle at the addresses given above or by telephone.

Thank you for your attention and assistance.

Yours sincerely

Prof Hans Ruediger Kaufmann, PhD

This research project will be conducted under the guidelines of the University of Gloucestershire's Handbook of Research Ethics which has been approved by the University Research Degrees Committee. Please feel free to contact me for more information regarding ethical guidelines of the University.

Appendix 4: Informed Consent

INFORMED CONSENT

I, the undersigned, confirm that (please tick box as appropriate):

1.	I have read and understood the information about the project, as provided in the Letter of Introduction dated 26 October 2018.	<input type="checkbox"/>
2.	I have been given the opportunity to ask questions about the project and my participation.	<input type="checkbox"/>
3.	I voluntarily agree to participate in the project.	<input type="checkbox"/>
4.	I understand I can withdraw at any time without giving reasons and that I will not be penalised for withdrawing nor will I be questioned on why I have withdrawn.	<input type="checkbox"/>
5.	The procedures regarding confidentiality have been clearly explained (e.g. use of names, pseudonyms, anonymisation of data, etc.) to me.	<input type="checkbox"/>
6.	The use of the data in research, publications, sharing and archiving has been explained to me.	<input type="checkbox"/>
7.	I understand that the interview will be tape recorded and herewith give my consent to tape record the interview.	<input type="checkbox"/>
8.	I understand that other researchers will have access to this data only if they agree to preserve the confidentiality of the data and if they agree to the terms I have specified in this form.	<input type="checkbox"/>
9.	I, along with the Researcher, agree to sign and date this informed consent form.	<input type="checkbox"/>

Participant:

Name of Participant Signature Date

Researcher:

Name of Researcher Signature Date

Appendix 5: Interview Guideline Questions

Interview Guideline Questions

Theme 1: Introduction of participant and background of derivatives usage

1. How many people work in your department and what are the tasks and responsibilities?
2. Does your company have a hedging policy in place and what does it aim on with regards to FX and IR risk hedging?
3. How many and which derivatives instruments do you use to hedge interest rate and currency risks and why are you using those instruments?
4. What hedging strategy in terms of ratio, instrument and tenor do you currently use?
5. Who are your main counterparties and why?
6. What systems do you use for hedging purposes and how are those systems integrated with other systems in your company?

Theme 2: Identification of key factors of Corporate Hedging Activities for Impact-analysis-model

7. How is your shareholders' and your managements' stance towards risk stemming from IR and FX changes?
8. What role does this play in relation to your company's willingness to hedge with derivatives and how is this visible in your policy or hedging process?
9. Given that you are hedging with derivatives, how much trust do you have in the market for derivatives and your counterparties?
10. What role does this play in relation to your company's willingness to hedge with derivatives and is this visible in your policy or hedging process?
11. What costs are involved for you when conducting hedging transactions and who is covering those costs?
12. How relevant are the costs with regards to your willingness to conduct hedging via derivatives and how is this covered in your policy or hedging process?
13. What systems do you use for hedging purposes and what role do the systems and processes play for your company's ability to hedge via derivatives and with certain instruments?
14. What experience do the persons responsible for FX and interest rate risk hedging have in that area and how relevant is this in relation to your ability to hedge with certain derivatives instruments?
15. What does your company think about the situation of the derivatives market in light of the intensified regulation and does this influence your company's ability to hedge with certain instruments?
16. What other factors are relevant for your company's willingness or ability to conduct corporate hedging in relation to IR and FX risk?

Theme 3: Impact of EMIR and Basel III on Corporate Hedging Activities

17. Has the behavior towards risk of your shareholders and managers been impacted by the implementation of EMIR and Basel III and if yes, how?
18. In view of the trust into the derivatives market, how has this been impacted with the implementation of EMIR and Basel III?
19. How have the costs related to corporate hedging been impacted by the regulatory actions and did this have impact on your willingness to use derivatives?
20. What changes to your systems and processes have you done in view of the regulations and has this overall impacted your ability to conduct corporate hedging with derivatives?
21. How is the intensified regulation changing the required expertise of employees and how do you deal with that impact?
22. What changes did you experience with regards to the derivatives market (availability of required instruments, tenor etc.) considering the intensified regulation of derivatives?

Theme 4: Corporate response to EMIR and Basel III

23. How have you experienced the implementation of EMIR and Basel III at all?
24. How would you describe the process that your company underwent to comply with EMIR?
25. What changes to former processes have you taken in order to implement EMIR, i.e. to comply with the reporting and reconciliation requirements?
26. How have you responded to the impact of EMIR and Basel III on the factors that determine your willingness and ability to do corporate hedging?
27. What is the consequence of that response for risk and return considerations?
28. What other measures have you taken to balance out the above-mentioned consequences on risk considerations?

Appendix 6: Participant Summaries

PARTICIPANT SUMMARIES

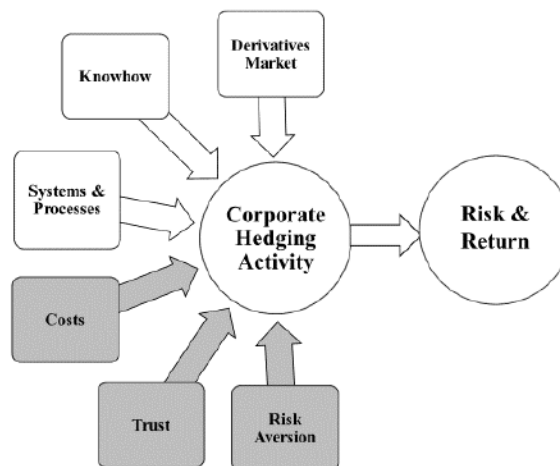
Summary of results: NFC1

First, thank you so much for taking the time to review the summary of the interview findings. I will first provide a brief explanation of the study objectives, so that you will be able to accurately determine whether your interview was understood and analyzed correctly within the framework of the study objectives.

Purpose:

The aim of this research project is to analyze the impact of the implementation of EMIR and the reform of Basel II to Basel III on the corporate hedging activities of non-financial corporates in Germany. To do this in a systematic way, this research project aimed to create a model, called the impact-analysis-model. Furthermore, this research project explored the response of non-financial corporates in terms of adjustment of processes and strategy and proposes a conceptualization of responses. Your interview has in an initial step been used to create the impact-analysis-model and analyze the impact of EMIR and Basel III. The model is made up of 7 key determinants that can influence your corporate hedging activities, defined here as the willingness and ability to hedge with financial derivatives. The idea is that based on the impact of the regulation on these seven key determinants (risk aversion, trust, costs, accounting, systems & processes, knowhow, derivatives market) one can systematically analyze the impact on the willingness and ability to do hedge with financial derivatives. The impact is then be evaluated in the context of risk and return considerations. In the second step the interview is used to explore your response, in terms of internal adjustments and external directed response, to the regulatory changes. The responses have then been conceptualized using an existing theory on organizational response to regulation. That theory divides the response in three categories, namely institutional level response (e.g. lawsuits, involvement in regulatory agencies), managerial level response (e.g. changes in processes, planning, budget, hiring of consultants) and technical level response (e.g. changes in hedging strategy, instruments used, tenors hedged).

Impact-analysis-model



What are you supposed to do?

This summary of the research is basically a way to check of my interpretation of your interview. I will explain my understanding of the findings with regards to your specific interview and would be grateful when you could provide me feedback if my understanding is correct. This feedback process provides me to check my understanding and it gives you the opportunity to correct any wrong interpretation or understanding. Your feedback is a critical element in this study; thus, I appreciate that you read the following explanation and give it some thought. I will contact you to get a brief phone call and hear your feedback.

Research Objective 1: Create the impact-analysis-model

In the following table, I will explain each of the seven key determinants of the impact-analysis-model. This definition was used when analyzing your interview data. After that, I will provide examples of your statements showing your opinion of this determinant as a factor influencing corporate hedging activities and my conclusion out of it. Please look for any mistakes in my interpretation and add anything that you think is of additional help/value.

Explanation of Key Determinant	Your Interview Findings
Risk aversion: The theories on rationales for corporates to hedge suggest that the reason for hedging is maximisation of profits and subsequently firm value. This is done through elimination of volatility of cash flows and reduction of financial and tax costs. This suggests that shareholders' and managers' risk aversion (elimination of volatility) is the starting point of any hedging decision and thus a key element of the willingness to hedge.	Owners' and managements stance towards risk is the fundamental reason to hedge. Given that the owners and management do not want any risk from foreign exchange and interest rate movements, stance towards risk is very conservative. Strict rules set out how to hedge and which instruments to use. Overall, this determinant seems to be the most important of willingness to hedge. <ul style="list-style-type: none">- Risk calculation - no own opinion/forecasting.- Hedge ratio: 100% of existing exposure and significant portion of planned exposure.- Instruments: plain vanilla only swaps and forwards. Tenor: all tenors are covered fully for existing exposure and significantly for planned exposure.
Trust: Given that NFCs are replying to volatility of cash flows by hedging through derivatives, there must be a certain level of trust, in terms of feeling more secure, by the NFC into the derivatives market and the counterparty that is trading with them. Otherwise, NFCs would not feel more secure after the hedging with derivatives. Thus, it was assumed in the initial impact-analysis-model that the degree of trust that NFCs have in the derivatives market and the counterparty that is trading with them also influences their willingness to hedge.	Trust is an important factor for the willingness to hedge. There is a high level of trust in the counterparties as hedging is only done with core banks with a prime credit rating. This determinant seems to be less relevant compared to risk aversion but also important for the willingness to hedge with derivatives. CDS is not used for monitoring but counterparties need to have prime credit rating of A- or better.
Costs: The theories on the rationales for corporates to hedge show that firms aim to reduce or control costs (financial costs and/or tax costs) through hedging. Thereby they aim to increase firm value. Subsequently, when the reduction in costs through hedging does not lead to increase of profits, for example due to higher transaction costs, this rationale	Cost considerations are an important factor for willingness to hedge with derivatives. The company has rules to take the best offer from the banks. However, the costs of hedging have been significantly reduced in the last years, due to higher level of transparency and the intense competition between banks. Especially, since implementation of

for hedging would be meaningless. Therefore, it has been assumed that costs considerations, such as the premium that need to be paid for the hedge and the costs to accomplish the transaction as well as the fees of the banks, also impact the willingness of NFCs to hedge through derivatives.	
Accounting: The accounting treatment of the hedge is of importance for NFC, given that they want to avoid unnecessary volatility of financial statements. Hedge accounting rules allow the reduction of volatility in financial figures through aligning the value movements of the hedged item with the hedging instrument.	
Systems and processes: An important factor determining the ability of NFCs to hedge is the systems and processes of NFCs. The companies need to have the appropriate systems and processes in place to conduct and accommodate the derivatives trades. This includes the technological means to connect with the trade counterparties and accomplish the trade as well as to depict the trades in their accounting and booking systems. Also, appropriate processes, including guidelines, are required to handle the trade, the booking and monitoring properly. This includes the separation of front-office and back-office within the risk management department, with the first doing the trade and the latter booking and monitoring it.	
Know-how: The theories on the optimal hedging strategy suggest that the expertise of the employees, that do the hedging, propose the hedging policy, and decide on hedging policy are of importance for the corporate hedging activities. At all stages of the corporate hedging transaction, that is from calculating the risk exposure, to determining the appropriate hedge ratio and choosing the right instrument, the know-how of the employees play a major role. Therefore, it has been assumed in the initial impact-analysis-model that the know-how of the employees and management with regards to corporate hedging is influencing their ability to do corporate hedging.	
Derivatives Market: This determinant is related to the availability of the required instruments and the required tenors. This is of course dependent on the derivatives market's situation because when the right instruments and tenors are not available for the NFCs, it would negatively influence their ability to hedge efficiently. Thus, also the situation on the derivatives market, be it directly the market or via the banks, was assumed to influence the ability of NFCs to conduct corporate hedging.	

Research Objective 2: Answer the question on how EMIR and Basel III impact corporate hedging activities in context of risk and return considerations.

In this section I will present a summary of my understanding of the impact of EMIR and Basel III on your corporate hedging activities based on your interview. Also, I will present my understanding of the consequence of the impact for your risk and return considerations. Please look for any mistakes in my interpretation and any other impact on your corporate hedging activities that you feel might not be captured by the seven determinants.

Regulation	Summary of your comments on impact on each determinant	My interpretation of your comments and consequence for risk and return considerations
EMIR / Basel III	<p>Risk Version: Both regulations had no impact on the way of risk is calculation and evaluation, hedge ratio, instruments and tenors used.</p> <p>Trust: No changes to the counterparties you hedge with and the conditions for choosing those counterparties (e.g. rating, CDS, relationship).</p> <p>Costs: The costs of communication with banks are not impacted. The prices of the transactions have increased due to Basel III since banks price in XVA but not due to EMIR. The costs of monitoring and reporting have increased due to EMIR but not Basel III.</p> <p>Accounting: The applicability of hedge accounting and the hedge effectiveness have not been impacted by both regulations.</p> <p>Systems and Processes: EMIR had impact on your systems and processes, as system upgrades and new features were required, and processes/workflows have been adjusted to include the regulatory reporting requirements. Furthermore, EMIR was catalysator for further automatization and implementation of 360T. Basel III had no impact on systems and processes.</p> <p>Knowhow: EMIR has impacted the required knowhow of your middle and back office employees in terms of reporting and monitoring the trade while it is less relevant for the activities of front-office employees. Employees attended some conferences and were supported by consultants. Basel III had no impact.</p> <p>Derivatives Market: EMIR had no impact on the instruments used and tenors required. Basel III had impact on the market as it has been noticed that banks have less interest for long term derivatives.</p>	<p>With regards to the factors that influence your willingness to hedge with derivatives, only the determinant Costs has been impacted by EMIR and Basel III. The costs increases were moderate and given that the general costs of hedging decreased in recent years, this does not change the willingness to hedge with derivatives</p> <p>With regards to the determinants that influence your ability to hedge with derivatives the systems and processes and the required knowhow have been impacted by EMIR. However, the impact was moderate and manageable without any significant problems Also, the determinant Derivatives Market has been impacted by Basel III and is leading to less offers for long-term derivatives.</p> <p>Overall, EMIR and Basel III are leading to higher costs for hedging. These costs are not accompanied by profits, so that the impact on the returns is negative, while the impact on risk is neutral, as there is no change of risk hedging activities.</p>

Research Objective 3: Answer the question on how NFCs responded to EMIR and Basel III. In this section I will present a summary of my understanding of your comments on how you responded to the impact that EMIR and Basel III had on the above- mentioned determinants. Please look for any mistakes in my interpretation and any other response that you feel might not be captured by my understanding.

Regulation	Your interview comments	My understanding
Costs	EMIR - No response. Basel III - increase competition between banks to get better quotes	Impact of EMIR has been accepted as they are moderate. Impact of Basel III also accepted but the company tries to limit this by increasing competition between banks and tying hedge business to other fee businesses.
Systems and Processes	New systems for trading and reconciliation and updated processes for confirmations, reporting and reconciliation	
Knowhow	Conferences, consultants, learning by doing	
Derivatives Market	Increase competition, optimisation of bank strategy	

Thank you for taking the time to read through the description of your interview interpretation and results. I look forward to receiving your feedback. Thank you again for your time and thoughtfulness.

PARTICIPANT SUMMARIES

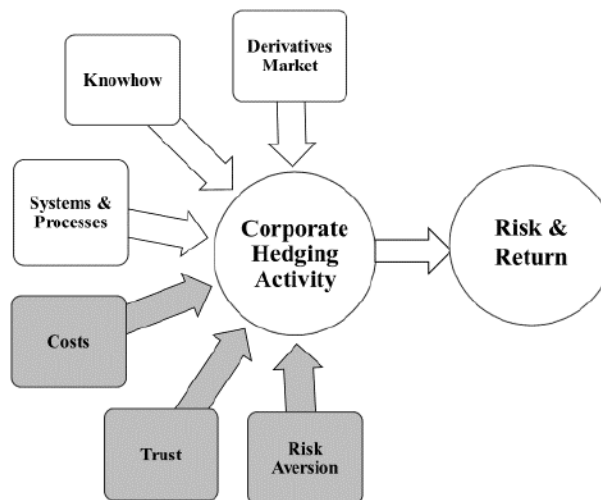
Summary of results: NFC2

First, thank you so much for taking the time to review the summary of the interview findings. I will first provide a brief explanation of the study objectives, so that you will be able to accurately determine whether your interview was understood and analyzed correctly within the framework of the study objectives.

Purpose:

The aim of this research project is to analyze the impact of the implementation of EMIR and the reform of Basel II to Basel III on the corporate hedging activities of non-financial corporates in Germany. To do this in a systematic way, this research project aimed to create a model, called the impact-analysis-model. Furthermore, this research project explored the response of non-financial corporates in terms of adjustment of processes and strategy and proposes a conceptualization of responses. Your interview has in an initial step been used to create the impact-analysis-model and analyze the impact of EMIR and Basel III. The model is made up of 7 key determinants that can influence your corporate hedging activities, defined here as the willingness and ability to hedge with financial derivatives. The idea is that based on the impact of the regulation on these seven key determinants (risk aversion, trust, costs, accounting, systems & processes, knowhow, derivatives market) one can systematically analyze the impact on the willingness and ability to do hedge with financial derivatives. The impact is then be evaluated in the context of risk and return considerations. In the second step the interview is used to explore your response, in terms of internal adjustments and external directed response, to the regulatory changes. The responses have then been conceptualized using an existing theory on organizational response to regulation. That theory divides the response in three categories, namely institutional level response (e.g. lawsuits, involvement in regulatory agencies), managerial level response (e.g. changes in processes, planning, budget, hiring of consultants) and technical level response (e.g. changes in hedging strategy, instruments used, tenors hedged).

Impact-analysis-model



What are you supposed to do?

This summary of the research is basically a way to check of my interpretation of your interview. I will explain my understanding of the findings with regards to your specific interview and would be grateful when you could provide me feedback if my understanding is correct. This feedback process provides me to check my understanding and it gives you the opportunity to correct any wrong interpretation or understanding. Your feedback is a critical element in this study; thus, I appreciate that you read the following explanation and give it some thought. I will contact you to get a brief phone call and hear your feedback.

Research Objective 1: Create the impact-analysis-model

In the following table, I will explain each of the seven key determinants of the impact-analysis-model. This definition was used when analyzing your interview data. After that, I will provide examples of your statements showing your opinion of this determinant as a factor influencing corporate hedging activities and my conclusion out of it. Please look for any mistakes in my interpretation and add anything that you think is of additional help/value.

Explanation of Key Determinant	Your Interview Findings
Risk aversion: The theories on rationales for corporates to hedge suggest that the reason for hedging is maximisation of profits and subsequently firm value. This is done through elimination of volatility of cash flows and reduction of financial and tax costs. This suggests that shareholders' and managers' risk aversion (elimination of volatility) is the starting point of any hedging decision and thus a key element of the willingness to hedge.	Owners' and managements conservative stance towards risk is one of the main reasons to hedge and main criteria when deciding on a hedging strategy. Clear and strict guidelines with regards to hedging instruments, hedge horizon and counterparties in place, no speculation is allowed. Overall, this determinant is confirmed to be important for willingness to hedge. Risk calculation - own planning system /no speculation. Hedge ratio: 100% of existing and around 70% of planned exposure. Instruments: plain vanilla only swaps, forwards, and options. Tenor: all tenors are covered fully for existing exposure and significantly for planned exposure.
Trust: Given that NFCs are replying to volatility of cash flows by hedging through derivatives, there must be a certain level of trust, in terms of feeling more secure, by the NFC into the derivatives market and the counterparty that is trading with them. Otherwise, NFCs would not feel more secure after the hedging with derivatives. Thus, it was assumed in the initial impact-analysis-model that the degree of trust that NFCs have in the derivatives market and the counterparty that is trading with them also influences their willingness to hedge.	Trust is an important factor for the willingness to hedge. Hedging only with core banks which are known very well from other financing contracts and with a good investment grade credit rating of at least A-. The company has counterparty limits for the banks that are monitored regularly in connection with the rating and the financial situation of the bank as well as the CDS. Trust in banks is given, however limited by the rating and CDS criteria. In case a bank ceases to be A- then the company would avoid doing trades with that bank.
Costs: The theories on the rationales for corporates to hedge show that firms aim to reduce or control costs (financial costs and/or tax costs) through hedging. Thereby they aim to increase firm value. Subsequently, when the reduction in costs through	Cost considerations are from an economic point of view an important factor, thus the company tries to use natural hedging considerations a lot and tries to keep costs low. The costs for the transaction including the margin of the banks are also moderate for the level

hedging does not lead to increase of profits, for example due to higher transaction costs, this rationale for hedging would be meaningless. Therefore, it has been assumed that costs considerations, such as the premium that need to be paid for the hedge and the costs to accomplish the transaction as well as the fees of the banks, also impact the willingness of NFCs to hedge through derivatives.	of hedging, so that the costs often do not play such an important role in the decision to hedge but when deciding with whom to hedge. The implementation of electronic platforms leads to significant reduction of costs of hedging due to higher transparency and competition between banks. Overall, the determinant is confirmed as a key determinant for the willingness to hedge with derivatives.
Accounting: The accounting treatment of the hedge is of importance for NFC, given that they want to avoid unnecessary volatility of financial statements. Hedge accounting rules allow the reduction of volatility in financial figures through aligning the value movements of the hedged item with the hedging instrument.	This factor is not relevant for the company as the company does not apply hedge accounting. Ratios, such as KPIs are not relevant and the company only focusses on the operational business. Furthermore, from the company's point of view, the advantages of less volatility in the figures do not justify the various burdensome and costly requirements of hedge accounting such as designation, documentation, and measurement of effectiveness.
Systems and processes: An important factor determining the ability of NFCs to hedge is the systems and processes of NFCs. The companies need to have the appropriate systems and processes in place to conduct and accommodate the derivatives trades. This includes the technological means to connect with the trade counterparties and accomplish the trade as well as to depict the trades in their accounting and booking systems. Also, appropriate processes, including guidelines, are required to handle the trade, the booking and monitoring properly. This includes the separation of front-office and back-office within the risk management department, with the first doing the trade and the latter booking and monitoring it.	Systems and processes are of core importance for the ability to hedge. The company has fully automated processes that are based on the connectedness of the IT systems. All relevant systems, from trading to booking and confirmations are connected, and all is done with few hours. It has been confirmed that efficient systems and processes are key determinant for the ability to conduct smooth hedging, otherwise an efficient hedging and risk monitoring would not be possible and not the timely reporting in line with the regulatory requirements.
Know-how: The theories on the optimal hedging strategy suggest that the expertise of the employees, that do the hedging, propose the hedging policy, and decide on hedging policy are of importance for the corporate hedging activities. At all stages of the corporate hedging transaction, that is from calculating the risk exposure, to determining the appropriate hedge ratio and choosing the right instrument, the know-how of the employees play a major role. Therefore, it has been assumed in the initial impact-analysis-model that the know-how of the employees and management with regards to corporate hedging is influencing their ability to do corporate hedging.	The know-how of employees is very important in the daily work as they are looking on the risk exposure and decide on how to hedge it in line with the policy. Furthermore, they propose the adjustments to the hedging policy or also adequate instruments that are outside the policy. Thus, the know-how of employees is confirmed as a key determinant for the ability to hedge with derivatives.
Derivatives Market: This determinant is related to the availability of the required instruments and the required tenors. This is of course dependent on the derivatives market's situation because when the right instruments and tenors are not available for the NFCs, it would negatively influence their ability to hedge efficiently. Thus, also the situation on the derivatives market, be it directly the market or via the banks, was assumed to influence the ability of NFCs to conduct corporate hedging.	The situation on the derivatives markets is an important determinant and as such relevant for the ability to hedge with derivatives. In the daily decision making it is considered as given, as the company never experienced a shortage of availability of the required derivative instruments. The company experienced a decline of offer for long term interest rate derivatives in the past and higher prices for derivatives, but not that the market was not available at all.

Research Objective 2: Answer the question on how EMIR and Basel III impact corporate hedging activities in context of risk and return considerations.

In this section I will present a summary of my understanding of the impact of EMIR and Basel III on your corporate hedging activities based on your interview. Also, I will present my understanding of the consequence of the impact for your risk and return considerations. Please look for any mistakes in my interpretation and any other impact on your corporate hedging activities that you feel might not be captured by the seven determinants.

Regulation	Summary of your comments on impact on each determinant	My interpretation of your comments and consequence for risk and return considerations
EMIR / Basel III	<p>Risk Version: Both regulations had no impact on the way risk is calculated and evaluated, hedge ratio, instruments and tenors used.</p> <p>Trust: No changes to the counterparties you hedge with and the conditions for choosing those counterparties (e.g. rating, CDS, relationship).</p> <p>Costs: The costs for communication with banks have not been impacted. The prices of the transactions have increased due to Basel III, since banks price in XVA but not due to EMIR. The costs of monitoring and reporting have increased due to EMIR but not Basel III.</p> <p>Accounting: The applicability of hedge accounting is not relevant for your company.</p> <p>Systems and Processes: EMIR had impact on your systems and processes, as system upgrades and new features were required, and processes/workflows have been adjusted to include the regulatory reporting requirements. Basel III had no impact on systems and processes.</p> <p>Knowhow: EMIR has impacted the required knowhow of your middle and back office employees in terms of reporting and monitoring the trade while it is less relevant for the activities of front-office employees. Employees attended some conferences and were supported by consultants. Basel III had no impact.</p> <p>Derivatives Market: EMIR had no impact on the instruments used and tenors required. Basel III had impact on the market as it has been noticed, that banks have less interest for long term derivatives.</p>	<p>With regards to the factors that influence your willingness to hedge with derivatives, only the determinant Costs has been impacted by EMIR and Basel III. The costs increases were moderate and given that the general costs of hedging decreased in recent years, this does not change the willingness to hedge with derivatives</p> <p>With regards to the determinants that influence your ability to hedge with derivatives the systems and processes and the required knowhow have been impacted by EMIR. However, the impact was moderate and manageable without any significant problems Also, the determinant Derivatives Market has been impacted by Basel III and is leading to less offers for long-term derivatives.</p> <p>Overall, EMIR and Basel III are leading to higher costs for hedging. These costs are not accompanied by profits, so that the impact on the returns is negative, while the impact on risk is neutral, as there is no change of risk hedging activities.</p>

Research Objective 3: Answer the question on how NFCs responded to EMIR and Basel III. In this section I will present a summary of my understanding of your comments on how you responded to the impact that EMIR and Basel III had on the above- mentioned determinants. Please look for any mistakes in my interpretation and any other response that you feel might not be captured by my understanding.

Regulation	Your interview comments	My understanding
Costs	EMIR – No response. Basel III - Optimisation of bank strategy.	Impact of EMIR has been accepted as they are moderate. Impact of Basel III also accepted but the company tries to limit this by increasing competition between banks and tying hedge business to other fee businesses.
Systems and Processes	Updated systems for reconciliation and process for reporting and reconciliation	
Knowhow	Conferences, consultants, learning by doing	
Derivatives Market	Increase competition, optimisation of bank strategy	

Thank you for taking the time to read through the description of your interview interpretation and results. I look forward to receiving your feedback. Thank you again for your time and thoughtfulness.

PARTICIPANT SUMMARIES

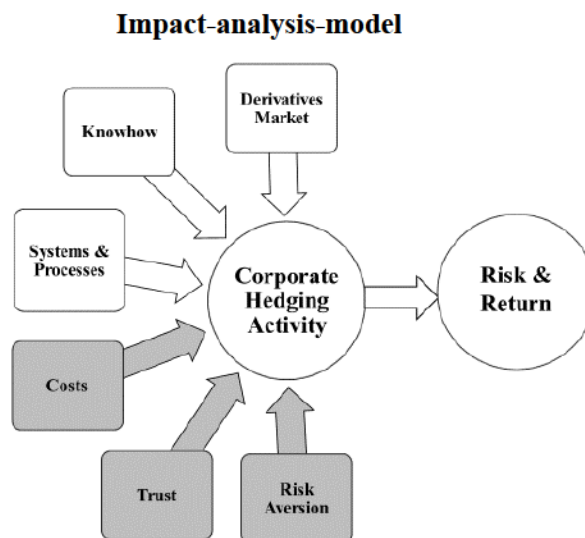
Summary of results: NFC3

First, thank you so much for taking the time to review the summary of the interview findings. I will first provide a brief explanation of the study objectives, so that you will be able to accurately determine whether your interview was understood and analyzed correctly within the framework of the study objectives.

Purpose:

The aim of this research project is to analyze the impact of the implementation of EMIR and the reform of Basel II to Basel III on the corporate hedging activities of non-financial corporates in Germany. To do this in a systematic way, this research project aimed to create a model, called the impact-analysis-model. Furthermore, this research project explored the response of non-financial corporates in terms of adjustment of processes and strategy and proposes a conceptualization of responses.

Your interview has in an initial step been used to create the impact-analysis-model and analyze the impact of EMIR and Basel III. The model is made up of 7 key determinants that can influence your corporate hedging activities, defined here as the willingness and ability to hedge with financial derivatives. The idea is that based on the impact of the regulation on these seven key determinants (risk aversion, trust, costs, accounting, systems & processes, knowhow, derivatives market) one can systematically analyze the impact on the willingness and ability to do hedge with financial derivatives. The impact is then be evaluated in the context of risk and return considerations. In the second step the interview is used to explore your response, in terms of internal adjustments and external directed response, to the regulatory changes. The responses have then been conceptualized using an existing theory on organizational response to regulation. That theory divides the response in three categories, namely institutional level response (e.g. lawsuits, involvement in regulatory agencies), managerial level response (e.g. changes in processes, planning, budget, hiring of consultants) and technical level response (e.g. changes in hedging strategy, instruments used, tenors hedged).



What are you supposed to do?

This summary of the research is basically a way to check of my interpretation of your interview. I will explain my understanding of the findings with regards to your specific interview and would be grateful when you could provide me feedback if my understanding is correct. This feedback process provides me to check my understanding and it gives you the opportunity to correct any wrong interpretation or understanding. Your feedback is a critical element in this study; thus, I appreciate that you read the following explanation and give it some thought. I will contact you to get a brief phone call and hear your feedback.

Research Objective 1: Create the impact-analysis-model

In the following table, I will explain each of the seven key determinants of the impact-analysis-model. This definition was used when analyzing your interview data. After that, I will provide examples of your statements showing your opinion of this determinant as a factor influencing corporate hedging activities and my conclusion out of it. Please look for any mistakes in my interpretation and add anything that you think is of additional help/value.

Explanation of Key Determinant	Your Interview Findings
Risk aversion: The theories on rationales for corporates to hedge suggest that the reason for hedging is maximisation of profits and subsequently firm value. This is done through elimination of volatility of cash flows and reduction of financial and tax costs. This suggests that shareholders' and managers' risk aversion (elimination of volatility) is the starting point of any hedging decision and thus a key element of the willingness to hedge.	The company's stance towards risk is the main reason to hedge and is regarded as very conservative. The guidelines prescribe not to have any interest rate risk and limit foreign exchange risk to maximum 25% of the risk exposure Overall, this determinant is confirmed to be a key determinant of willingness to hedge. Risk calculation – no own opinion but forecasting. Hedge ratio: 100% of all interest rate risk and 75% of all foreign exchange risk. Instruments: plain vanilla only swaps and forwards. Tenor: all tenors are covered fully for existing exposure and significantly for planned exposure.
Trust: Given that NFCs are replying to volatility of cash flows by hedging through derivatives, there must be a certain level of trust, in terms of feeling more secure, by the NFC into the derivatives market and the counterparty that is trading with them. Otherwise, NFCs would not feel more secure after the hedging with derivatives. Thus, it was assumed in the initial impact-analysis-model that the degree of trust that NFCs have in the derivatives market and the counterparty that is trading with them also influences their willingness to hedge.	Trust is an important factor for the willingness to hedge. Hedging is only with core banks which are known very well from other financing contracts and with a good investment grade credit rating of at least BBB-. The company has counterparty limits for the banks that are monitored regularly in connection with the rating and the financial situation of the bank. There is a high degree of trust in the banks and in case of any rating issues of a bank, i.e. being sub investment grade, then the company would not terminate all trades but discuss with the bank the way forward.
Costs: The theories on the rationales for corporates to hedge show that firms aim to reduce or control costs (financial costs and/or tax costs) through hedging. Thereby they aim to increase firm value. Subsequently, when the reduction in costs through hedging does not lead to increase of profits, for example due to higher transaction costs, this rationale for hedging would be meaningless. Therefore, it has been assumed that costs considerations, such as the	Cost considerations are generally an important factor for willingness to hedge with derivatives. However, the costs of hedging have been significantly reduced in the last years, due to higher level of transparency and the intense competition between banks. Especially, since implementation of electronic platforms, costs of hedging decreased significantly. Thus, the determinant is confirmed as a key determinant for the willingness to hedge

premium that need to be paid for the hedge and the costs to accomplish the transaction as well as the fees of the banks, also impact the willingness of NFCs to hedge through derivatives.	with derivatives but currently less relevant in the daily hedging decision due to the low level of costs of hedging.
Accounting: The accounting treatment of the hedge is of importance for NFC, given that they want to avoid unnecessary volatility of financial statements. Hedge accounting rules allow the reduction of volatility in financial figures through aligning the value movements of the hedged item with the hedging instrument.	The company applies hedge accounting and sees it as an important factor for the willingness of the company to hedge with derivatives. This is a factor that can influence willingness to hedge with certain instruments and tenors as the company aims to reduce volatility in the profit and loss statement. The company aims to make all deals compliant to hedge accounting, but it nevertheless was confirmed that the company would not refrain from a trade if it makes economically sense and is not considered compliant with hedge accounting rules.
Systems and processes: An important factor determining the ability of NFCs to hedge is the systems and processes of NFCs. The companies need to have the appropriate systems and processes in place to conduct and accommodate the derivatives trades. This includes the technological means to connect with the trade counterparties and accomplish the trade as well as to depict the trades in their accounting and booking systems. Also, appropriate processes, including guidelines, are required to handle the trade, the booking and monitoring properly. This includes the separation of front-office and back-office within the risk management department, with the first doing the trade and the latter booking and monitoring it.	Systems and processes are of core importance for the ability to hedge. It has been confirmed that the without the right systems and processes, the company could not hedge the way it is doing now. This is relevant in each step of the hedging process as the company has fully automated processes. All relevant systems, from trading to booking and confirmations are connected. Overall, it has been confirmed that efficient systems and processes are key determinant for the ability to conduct smooth hedging, otherwise an efficient hedging and risk monitoring would not be possible and not the timely reporting in line with the regulatory requirements.
Know-how: The theories on the optimal hedging strategy suggest that the expertise of the employees, that do the hedging, propose the hedging policy, and decide on hedging policy are of importance for the corporate hedging activities. At all stages of the corporate hedging transaction, that is from calculating the risk exposure, to determining the appropriate hedge ratio and choosing the right instrument, the know-how of the employees play a major role. Therefore, it has been assumed in the initial impact-analysis-model that the know-how of the employees and management with regards to corporate hedging is influencing their ability to do corporate hedging.	The know-how of employees is very important in the daily work as they are looking on the risk exposure and decide on how to hedge it in line with the policy. Especially for the 25% that are not prescribed to be hedged immediately, the knowhow of the employees is required. Furthermore, they propose the adjustments to the hedging policy or also adequate instruments that are outside the policy. Thus, the know-how of employees is confirmed as a key role for the ability to hedge with derivatives.
Derivatives Market: This determinant is related to the availability of the required instruments and the required tenors. This is of course dependent on the derivatives market's situation because when the right instruments and tenors are not available for the NFCs, it would negatively influence their ability to hedge efficiently. Thus, also the situation on the derivatives market, be it directly the market or via the banks, was assumed to influence the ability of NFCs to conduct corporate hedging.	The situation on the derivatives markets is an important determinant and as such relevant for the ability to hedge with derivatives. In the daily decision making it is considered as given, as the company never experienced a shortage of availability of the required derivative instruments and tenors. The company does not have any long-term derivatives outstanding and did not experienced a shortage of those. Nevertheless, the company heard from other corporate treasurers and their core banks that that prices for long term interest rate and currency derivatives are high and less offered by banks.

Research Objective 2: Answer the question on how EMIR and Basel III impact corporate hedging activities in context of risk and return considerations.

In this section I will present a summary of my understanding of the impact of EMIR and Basel III on your corporate hedging activities based on your interview. Also, I will present my understanding of the consequence of the impact for your risk and return considerations. Please look for any mistakes in my interpretation and any other impact on your corporate hedging activities that you feel might not be captured by the seven determinants.

Regulation	Summary of your comments on impact on each determinant	My interpretation of your comments and consequence for risk and return considerations
EMIR / Basel III	<p>Risk Version: Both regulations had no impact on the way risk is calculated and evaluated, hedge ratio, instruments and tenors used.</p> <p>Trust: No changes to the counterparties you hedge with and the conditions for choosing those counterparties (e.g. rating, relationship).</p> <p>Costs: The costs for communication with banks have not been impacted. The prices of the transactions have increased due to Basel III since banks price in XVA but not due to EMIR. The costs of monitoring and reporting have increased due to EMIR but not Basel III.</p> <p>Accounting: The applicability of hedge accounting and the hedge effectiveness have not been impacted by both regulations.</p> <p>Systems and Processes: EMIR had impact on your systems and processes, as system upgrades and new features were required, and processes/workflows have been adjusted to include the regulatory reporting requirements. Basel III had no impact on systems and processes.</p> <p>Knowhow: EMIR has impacted the required knowhow of your middle and back office employees in terms of reporting and monitoring the trade while it is less relevant for the activities of front-office employees. Employees attended some conferences and were supported by consultants. Basel III had no impact.</p> <p>Derivatives Market: EMIR had no impact on the instruments used and tenors required. Basel III had impact on the market as it has been noticed that banks have less interest for long term derivatives.</p>	<p>With regards to the factors that influence your willingness to hedge with derivatives, only the determinant Costs has been impacted by EMIR and Basel III. The costs increases were moderate and given that the general costs of hedging decreased in recent years, this does not change the willingness to hedge with derivatives</p> <p>With regards to the determinants that influence your ability to hedge with derivatives the systems and processes and the required knowhow have been impacted by EMIR. However, the impact was moderate and manageable without any significant problems Also, the determinant Derivatives Market has been impacted by Basel III and is leading to less offers for long-term derivatives.</p> <p>Overall, EMIR and Basel III are leading to higher costs for hedging. These costs are not accompanied by profits, so that the impact on the returns is negative, while the impact on risk is neutral, as there is no change of risk hedging activities.</p>

Research Objective 3: Answer the question on how NFCs responded to EMIR and Basel III. In this section I will present a summary of my understanding of your comments on how you responded to the impact that EMIR and Basel III had on the above- mentioned determinants. Please look for any mistakes in my interpretation and any other response that you feel might not be captured by my understanding.

Regulation	Your interview comments	My understanding
Costs	EMIR – No response. Basel III – No specific response.	Impact of EMIR has been accepted as they are moderate. Impact of Basel III also accepted but the company tries to limit this by increasing competition between banks and tying hedge business to other fee businesses.
Systems and Processes	Updated systems for reconciliation and process for reporting and reconciliation	
Knowhow	Learning by doing	
Derivatives Market	No specific response	

Thank you for taking the time to read through the description of your interview interpretation and results. I look forward to receiving your feedback. Thank you again for your time and thoughtfulness.

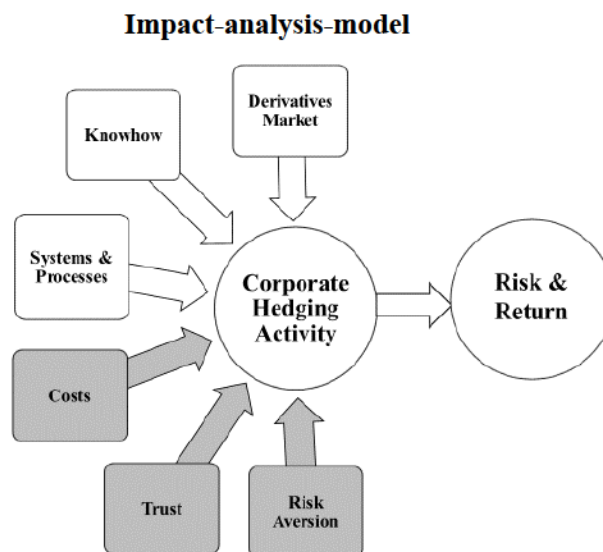
PARTICIPANT SUMMARIES

Summary of results: NFC4

First, thank you so much for taking the time to review the summary of the interview findings. I will first provide a brief explanation of the study objectives, so that you will be able to accurately determine whether your interview was understood and analyzed correctly within the framework of the study objectives.

Purpose:

The aim of this research project is to analyze the impact of the implementation of EMIR and the reform of Basel II to Basel III on the corporate hedging activities of non-financial corporates in Germany. To do this in a systematic way, this research project aimed to create a model, called the impact-analysis-model. Furthermore, this research project explored the response of non-financial corporates in terms of adjustment of processes and strategy and proposes a conceptualization of responses. Your interview has in an initial step been used to create the impact-analysis-model and analyze the impact of EMIR and Basel III. The model is made up of 7 key determinants that can influence your corporate hedging activities, defined here as the willingness and ability to hedge with financial derivatives. The idea is that based on the impact of the regulation on these seven key determinants (risk aversion, trust, costs, accounting, systems & processes, knowhow, derivatives market) one can systematically analyze the impact on the willingness and ability to do hedge with financial derivatives. The impact is then be evaluated in the context of risk and return considerations. In the second step the interview is used to explore your response, in terms of internal adjustments and external directed response, to the regulatory changes. The responses have then been conceptualized using an existing theory on organizational response to regulation. That theory divides the response in three categories, namely institutional level response (e.g. lawsuits, involvement in regulatory agencies), managerial level response (e.g. changes in processes, planning, budget, hiring of consultants) and technical level response (e.g. changes in hedging strategy, instruments used, tenors hedged).



What are you supposed to do?

This summary of the research is basically a way to check of my interpretation of your interview. I will explain my understanding of the findings with regards to your specific interview and would be grateful when you could provide me feedback if my understanding is correct. This feedback process provides me to check my understanding and it gives you the opportunity to correct any wrong interpretation or understanding. Your feedback is a critical element in this study; thus, I appreciate that you read the following explanation and give it some thought. I will contact you to get a brief phone call and hear your feedback.

Research Objective 1: Create the impact-analysis-model

In the following table, I will explain each of the seven key determinants of the impact-analysis-model. This definition was used when analyzing your interview data. After that, I will provide examples of your statements showing your opinion of this determinant as a factor influencing corporate hedging activities and my conclusion out of it. Please look for any mistakes in my interpretation and add anything that you think is of additional help/value.

Explanation of Key Determinant	Your Interview Findings
Risk aversion: The theories on rationales for corporates to hedge suggest that the reason for hedging is maximisation of profits and subsequently firm value. This is done through elimination of volatility of cash flows and reduction of financial and tax costs. This suggests that shareholders' and managers' risk aversion (elimination of volatility) is the starting point of any hedging decision and thus a key element of the willingness to hedge.	Owners' and managements wish to avoid any risk from foreign exchange changes and interest rate changes are the most important reason to hedge. The company has strict rules in place giving guidance on how to hedge and which instruments to use. Overall, this determinant seems to be the most important of willingness to hedge. Risk calculation - own opinion is included in risk calculation/no speculation. Hedge ratio: Mostly 100% of existing exposure, minimum 75% of existing and planned exposure. Instruments: plain vanilla only forwards, swaps and occasionally options. Tenor: all tenors are covered fully for existing exposure and significantly for planned exposure.
Trust: Given that NFCs are replying to volatility of cash flows by hedging through derivatives, there must be a certain level of trust, in terms of feeling more secure, by the NFC into the derivatives market and the counterparty that is trading with them. Otherwise, NFCs would not feel more secure after the hedging with derivatives. Thus, it was assumed in the initial impact-analysis-model that the degree of trust that NFCs have in the derivatives market and the counterparty that is trading with them also influences their willingness to hedge.	Trust is an important factor for the willingness to hedge and as such confirmed to be a key determinant. There is a high level of trust in the counterparties as hedging is only done with core banks with an investment grade credit rating. There are counterparty credit limits for each bank which are monitored and controlled by the Head Office of the company. CDS is not used for monitoring but counterparty exposure limits and a minimum rating of BBB- provide a control mechanism.
Costs: The theories on the rationales for corporates to hedge show that firms aim to reduce or control costs (financial costs and/or tax costs) through hedging. Thereby they aim to increase firm value. Subsequently, when the reduction in costs through hedging does not lead to increase of profits, for example due to higher transaction costs, this rationale for hedging would be meaningless. Therefore, it has	Cost considerations are an important factor for willingness to hedge with derivatives. The company has rules to take one of the best offers from the banks and this need to be documented. However, the costs of hedging are low given the usage of only plain vanilla and short-term derivatives. Also, costs have significantly reduced in the last years, due to higher level of transparency and the intense competition

<p>been assumed that costs considerations, such as the premium that need to be paid for the hedge and the costs to accomplish the transaction as well as the fees of the banks, also impact the willingness of NFCs to hedge through derivatives.</p>	<p>between banks. Especially, since implementation of electronic platforms, costs of hedging decreased significantly. Thus, the determinant is confirmed as a key determinant for the willingness to hedge with derivatives but less relevant in the actual hedge decision due to the low level of the costs of hedging.</p>
<p>Accounting: The accounting treatment of the hedge is of importance for NFC, given that they want to avoid unnecessary volatility of financial statements. Hedge accounting rules allow the reduction of volatility in financial figures through aligning the value movements of the hedged item with the hedging instrument.</p>	<p>The company applies hedge accounting and sees it as a very important factor for the willingness of the company to hedge with derivatives. For the company it is important that the P&L is not influenced by currency and interest rate volatility, as earnings per share is one of the most important KPIs for the company. Thus, this factor that can influence willingness to hedge with certain instruments and tenors. The company aims to make all deals compliant to hedge accounting and seldom have deals that are flagged as not compliant with hedge accounting rules.</p>
<p>Systems and processes: An important factor determining the ability of NFCs to hedge is the systems and processes of NFCs. The companies need to have the appropriate systems and processes in place to conduct and accommodate the derivatives trades. This includes the technological means to connect with the trade counterparties and accomplish the trade as well as to depict the trades in their accounting and booking systems. Also, appropriate processes, incl. guidelines, are required to handle the trade, the booking and monitoring properly. This includes the separation of front-office and back-office within the risk management department, with the first doing the trade and the latter booking and monitoring it.</p>	<p>Systems and processes are the most important factor when it comes to the ability to hedge properly. The company has fully automated processes that are based on the connectedness of the IT systems. All relevant systems, from trading to booking and confirmations are connected, and all is done with few hours. It has been confirmed that efficient systems and processes are key determinant for the ability to conduct smooth hedging, otherwise an efficient hedging and risk monitoring would not be possible and not the timely reporting in line with the regulatory requirements.</p>
<p>Know-how: The theories on the optimal hedging strategy suggest that the expertise of the employees, that do the hedging, propose the hedging policy, and decide on hedging policy are of importance for the corporate hedging activities. At all stages of the corporate hedging transaction, that is from calculating the risk exposure, to determining the appropriate hedge ratio and choosing the right instrument, the know-how of the employees play a major role. Therefore, it has been assumed in the initial impact-analysis-model that the know-how of the employees and management with regards to corporate hedging is influencing their ability to do corporate hedging.</p>	<p>The company has very experienced employees in the treasury department as they are the core competency centre for the European activities of the Group. The know-how of employees is very important in the daily work as they are looking on the risk exposure and decide on how to hedge it in line with the policy. Furthermore, they propose adjustments to the hedging policy to Group Treasury. Overall, the know-how of employees is confirmed as a key determinant for the ability to hedge with derivatives.</p>
<p>Derivatives Market: This determinant is related to the availability of the required instruments and the required tenors. This is of course dependent on the derivatives market's situation because when the right instruments and tenors are not available for the NFCs, it would negatively influence their ability to hedge efficiently. Thus, also the situation on the derivatives market, be it directly the market or via the banks, was assumed to influence the ability of NFCs to conduct corporate hedging.</p>	<p>The situation on the derivatives markets is a key determinant for the ability to hedge with derivatives. In the daily decision making it is considered as given, as the company never experienced a situation in the past where market was not available at all. This might be connected to the fact that the company mainly uses plain vanilla instruments, short term tenors and standard currencies. Thus, given that the company cannot hedge with the required instruments when the instruments are not available, the market situation is relevant for the ability to hedge efficiently with derivatives.</p>

Research Objective 2: Answer the question on how EMIR and Basel III impacted corporate hedging activities in context of risk and return considerations.

In this section I will present a summary of my understanding of the impact of EMIR and Basel III on your corporate hedging activities based on your interview. Also, I will present my understanding of the consequence of the impact for your risk and return considerations. Please look for any mistakes in my interpretation and any other impact on your corporate hedging activities that you feel might not be captured by the seven determinants.

Regulation	Summary of your comments on impact on each determinant	My interpretation of your comments and consequence for risk and return considerations
EMIR / Basel III	<p>Risk Version: Both regulations had no impact on the way risk is calculated and evaluated, hedge ratio, instruments and tenors used.</p> <p>Trust: No changes to the counterparties you hedge with and the conditions for choosing those counterparties (e.g. rating, relationship).</p> <p>Costs: The costs for communication with banks have not been impacted. The prices of the transactions have increased due to Basel III since banks price in XVA but not due to EMIR. The costs of monitoring and reporting have increased due to EMIR but not Basel III.</p> <p>Accounting: The applicability of hedge accounting and the hedge effectiveness have not been impacted by both regulations.</p> <p>Systems and Processes: EMIR had impact on your systems and processes, as system upgrades and new features were required, and processes/workflows have been adjusted to include the regulatory reporting requirements. Basel III had no impact on systems and processes.</p> <p>Knowhow: EMIR has impacted the required knowhow of your middle and back office employees in terms of reporting and monitoring the trade while it is less relevant for the activities of front-office employees. Employees attended some conferences and were supported by consultants. Basel III had no impact.</p> <p>Derivatives Market: EMIR had no impact on the instruments used and tenors required. Basel III had impact on the market as it has been noticed that banks have less interest for long term derivatives.</p>	<p>With regards to the factors that influence your willingness to hedge with derivatives, only the determinant Costs has been impacted by EMIR and Basel III. The costs increases were moderate and given that the general costs of hedging decreased in recent years, this does not change the willingness to hedge with derivatives</p> <p>With regards to the determinants that influence your ability to hedge with derivatives the systems and processes and the required knowhow have been impacted by EMIR. However, the impact was moderate and manageable without any significant problems Also, the determinant Derivatives Market has been impacted by Basel III and is leading to less offers for long-term derivatives.</p> <p>Overall, EMIR and Basel III are leading to higher costs for hedging. These costs are not accompanied by profits, so that the impact on the returns is negative, while the impact on risk is neutral, as there is no change of risk hedging activities.</p>

Research Objective 3: Answer the question on how NFCs responded to EMIR and Basel III. In this section I will present a summary of my understanding of your comments on how you responded to the impact that EMIR and Basel III had on the above- mentioned determinants. Please look for any mistakes in my interpretation and any other response that you feel might not be captured by my understanding.

Regulation	Your interview comments	My understanding
Costs	EMIR - Reporting outsourced Basel III – No specific response	Impact of EMIR has been accepted as they are moderate in terms of costs and mainly covered by systems. Impact of Basel III also accepted but are also limited since the XVA that banks price in for short term trades are very low.
Systems and Processes	Update systems for reconciliation and processes for confirmations	
Knowhow	Conferences, learning by doing	
Derivatives Market	No specific response	

Thank you for taking the time to read through the description of your interview interpretation and results. I look forward to receiving your feedback. Thank you again for your time and thoughtfulness.

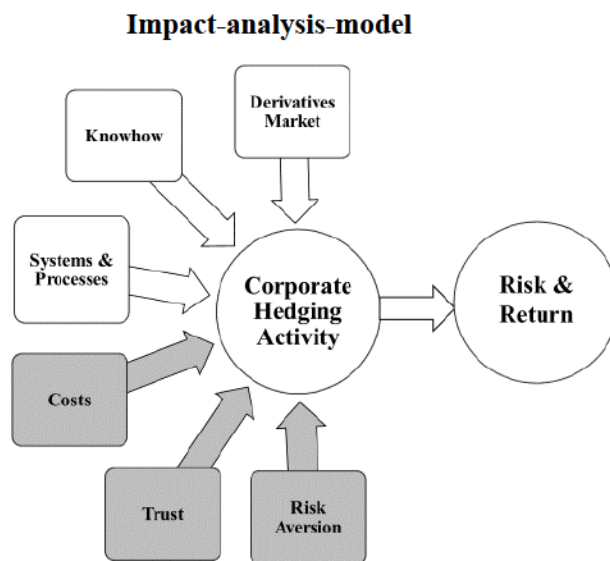
PARTICIPANT SUMMARIES

Summary of results: NFC5

First, thank you so much for taking the time to review the summary of the interview findings. I will first provide a brief explanation of the study objectives, so that you will be able to accurately determine whether your interview was understood and analyzed correctly within the framework of the study objectives.

Purpose:

The aim of this research project is to analyze the impact of the implementation of EMIR and the reform of Basel II to Basel III on the corporate hedging activities of non-financial corporates in Germany. To do this in a systematic way, this research project aimed to create a model, called the impact-analysis-model. Furthermore, this research project explored the response of non-financial corporates in terms of adjustment of processes and strategy and proposes a conceptualization of responses. Your interview has in an initial step been used to create the impact-analysis-model and analyze the impact of EMIR and Basel III. The model is made up of 7 key determinants that can influence your corporate hedging activities, defined here as the willingness and ability to hedge with financial derivatives. The idea is that based on the impact of the regulation on these seven key determinants (risk aversion, trust, costs, accounting, systems & processes, knowhow, derivatives market) one can systematically analyze the impact on the willingness and ability to do hedge with financial derivatives. The impact is then be evaluated in the context of risk and return considerations. In the second step the interview is used to explore your response, in terms of internal adjustments and external directed response, to the regulatory changes. The responses have then been conceptualized using an existing theory on organizational response to regulation. That theory divides the response in three categories, namely institutional level response (e.g. lawsuits, involvement in regulatory agencies), managerial level response (e.g. changes in processes, planning, budget, hiring of consultants) and technical level response (e.g. changes in hedging strategy, instruments used, tenors hedged).



What are you supposed to do?

This summary of the research is basically a way to check of my interpretation of your interview. I will explain my understanding of the findings with regards to your specific interview and would be grateful when you could provide me feedback if my understanding is correct. This feedback process provides me to check my understanding and it gives you the opportunity to correct any wrong interpretation or understanding. Your feedback is a critical element in this study; thus, I appreciate that you read the following explanation and give it some thought. I will contact you to get a brief phone call and hear your feedback.

Research Objective 1: Create the impact-analysis-model

In the following table, I will explain each of the seven key determinants of the impact-analysis-model. This definition was used when analyzing your interview data. After that, I will provide examples of your statements showing your opinion of this determinant as a factor influencing corporate hedging activities and my conclusion out of it. Please look for any mistakes in my interpretation and add anything that you think is of additional help/value.

Explanation of Key Determinant	Your Interview Findings
Risk aversion: The theories on rationales for corporates to hedge suggest that the reason for hedging is maximisation of profits and subsequently firm value. This is done through elimination of volatility of cash flows and reduction of financial and tax costs. This suggests that shareholders' and managers' risk aversion (elimination of volatility) is the starting point of any hedging decision and thus a key element of the willingness to hedge.	Shareholders' and managements' stance towards risk is the main reason to hedge and is regarded as very conservative. The guidelines prescribe not to have any interest rate risk and limit foreign exchange risk to maximum 25% of the risk exposure Overall, this determinant is confirmed to be a key determinant of willingness to hedge. Risk calculation – limited room for own forecasting. Hedge ratio: 100% of all interest rate risk and 75% of all foreign exchange risk. Instruments: plain vanilla only swaps, forwards and occasionally options. Tenor: all tenors are covered fully for existing exposure and significantly for planned exposure.
Trust: Given that NFCs are replying to volatility of cash flows by hedging through derivatives, there must be a certain level of trust, in terms of feeling more secure, by the NFC into the derivatives market and the counterparty that is trading with them. Otherwise, NFCs would not feel more secure after the hedging with derivatives. Thus, it was assumed in the initial impact-analysis-model that the degree of trust that NFCs have in the derivatives market and the counterparty that is trading with them also influences their willingness to hedge.	Trust is an important factor for the willingness to hedge. Hedging is only with core banks which are known very well from other financing contracts and with a good investment grade credit rating of at least BBB-. The company has counterparty limits for the banks that are monitored regularly in connection with the rating and the financial situation of the bank as well as the development of the CDS. There is a good level of trust in the banks and in case of any rating issues of a bank, i.e. being sub investment grade, then the company would not terminate all trades but discuss with the bank the way forward.
Costs: The theories on the rationales for corporates to hedge show that firms aim to reduce or control costs (financial costs and/or tax costs) through hedging. Thereby they aim to increase firm value. Subsequently, when the reduction in costs through hedging does not lead to increase of profits, for example due to higher transaction costs, this rationale for hedging would be meaningless. Therefore, it has	Cost considerations are an important factor for willingness to hedge with derivatives. The company has rules to take one of the best offers from banks and has to document this for evidence purposes. However, the costs of hedging have been significantly reduced in the last years, due to higher level of transparency and the intense competition between banks. Especially, since implementation of electronic

<p>been assumed that costs considerations, such as the premium that need to be paid for the hedge and the costs to accomplish the transaction as well as the fees of the banks, also impact the willingness of NFCs to hedge through derivatives.</p>	<p>platforms to hedge with banks, costs of hedging decreased significantly. Around 90% of trades is now done via electronic platforms. Thus, the determinant is confirmed as a key determinant for the willingness to hedge with derivatives but currently less relevant in the decision-making process due to the low level of costs for hedging.</p>
<p>Accounting: The accounting treatment of the hedge is of importance for NFC, given that they want to avoid unnecessary volatility of financial statements. Hedge accounting rules allow the reduction of volatility in financial figures through aligning the value movements of the hedged item with the hedging instrument.</p>	<p>The company applies hedge accounting and sees it as an important factor for the willingness of the company to hedge with derivatives. This is a factor that can influence willingness to hedge with certain instruments and tenors as the company aims to reduce volatility in the profit and loss statement. The company aims to make as many deals as possible compliant to hedge accounting, but it nevertheless will not refrain from a hedging trade if it makes economically sense and is not considered compliant with hedge accounting rules.</p>
<p>Systems and processes: An important factor determining the ability of NFCs to hedge is the systems and processes of NFCs. The companies need to have the appropriate systems and processes in place to conduct and accommodate the derivatives trades. This includes the technological means to connect with the trade counterparties and accomplish the trade as well as to depict the trades in their accounting and booking systems. Also, appropriate processes, including guidelines, are required to handle the trade, the booking and monitoring properly. This includes the separation of front-office and back-office within the risk management department, with the first doing the trade and the latter booking and monitoring it.</p>	<p>Systems and processes are of core importance for the ability to hedge. The company has fully automated processes that are based on the connectedness of the IT systems. All relevant systems, from trading to booking and confirmations are connected, and all is done with few hours. It has been confirmed that efficient systems and processes are key determinant for the ability to conduct smooth hedging, otherwise an efficient hedging and risk monitoring would not be possible and not the timely reporting in line with the regulatory requirements.</p>
<p>Know-how: The theories on the optimal hedging strategy suggest that the expertise of the employees, that do the hedging, propose the hedging policy and decide on hedging policy are of importance for the corporate hedging activities. At all stages of the corporate hedging transaction, that is from calculating the risk exposure, to determining the appropriate hedge ratio and choosing the right instrument, the know-how of the employees play a major role. Therefore, it has been assumed in the initial impact-analysis-model that the know-how of the employees and management with regards to corporate hedging is influencing their ability to do corporate hedging.</p>	<p>The know-how of employees is confirmed as a key determinant for the ability to hedge with derivatives. The company has very experienced employees whose expertise is not only required in the daily business, but also for advising management and monitoring existing risk. It has been mentioned that for the workflow and standard business processes are more and more standardised and expertise is becoming less relevant. But not for businesses that are a bit out of the ordinary. Furthermore, they propose the adjustments to the hedging policy or also adequate instruments that are outside the policy.</p>
<p>Derivatives Market: This determinant is related to the availability of the required instruments and the required tenors. This is of course dependent on the derivatives market's situation because when the right instruments and tenors are not available for the NFCs, it would negatively influence their ability to hedge efficiently. Thus, also the situation on the derivatives market, be it directly the market or via the banks, was assumed to influence the ability of NFCs to conduct corporate hedging.</p>	<p>The situation on the derivatives markets is an important determinant and as such relevant for the ability to hedge with derivatives. In the daily decision making it is considered as given for the standard instruments and tenors. Nevertheless, the company experienced a few times a shortage of availability of the required derivative instruments due to regulatory issues and a decline of offers from banks for long term interest rate derivatives, both resulting in higher costs for the company.</p>

Research Objective 2: Answer the question on how EMIR and Basel III impact corporate hedging activities in context of risk and return considerations.

In this section I will present a summary of my understanding of the impact of EMIR and Basel III on your corporate hedging activities based on your interview. Also, I will present my understanding of the consequence of the impact for your risk and return considerations. Please look for any mistakes in my interpretation and any other impact on your corporate hedging activities that you feel might not be captured by the seven determinants.

Regulation	Summary of your comments on impact on each determinant	My interpretation of your comments and consequence for risk and return considerations
EMIR / Basel III	<p>Risk Version: Both regulations had no impact on the way risk is calculated and evaluated, hedge ratio, instruments and tenors used.</p> <p>Trust: No changes to the counterparties you hedge with and the conditions for choosing those counterparties (e.g. rating, relationship).</p> <p>Costs: The costs for communication with banks have not been impacted. The prices of the transactions have increased due to Basel III since banks price in XVA but not due to EMIR. The costs of monitoring and reporting have increased due to EMIR but not Basel III.</p> <p>Accounting: The applicability of hedge accounting and the hedge effectiveness have not been impacted by both regulations.</p> <p>Systems and Processes: EMIR had impact on your systems and processes, as system upgrades and new features were required, and processes/workflows have been adjusted to include the regulatory reporting requirements. Basel III had no impact on systems and processes.</p> <p>Knowhow: EMIR has impacted the required knowhow of your middle and back office employees in terms of reporting and monitoring the trade while it is less relevant for the activities of front-office employees. Employees attended some conferences and were supported by consultants. Basel III had no impact.</p> <p>Derivatives Market: EMIR had no impact on the instruments used and tenors required. Basel III had impact on the market as it has been noticed that banks have less interest for long term derivatives.</p>	<p>With regards to the factors that influence your willingness to hedge with derivatives, only the determinant Costs has been impacted by EMIR and Basel III. The costs increases were moderate and given that the general costs of hedging decreased in recent years, this does not change the willingness to hedge with derivatives</p> <p>With regards to the determinants that influence your ability to hedge with derivatives the systems and processes and the required knowhow have been impacted by EMIR. However, the impact was moderate and manageable without any significant problems Also, the determinant Derivatives Market has been impacted by Basel III and is leading to less offers for long-term derivatives.</p> <p>Overall, EMIR and Basel III are leading to higher costs for hedging. These costs are not accompanied by profits, so that the impact on the returns is negative, while the impact on risk is neutral, as there is no change of risk hedging activities.</p>

Research Objective 3: Answer the question on how NFCs responded to EMIR and Basel III. In this section I will present a summary of my understanding of your comments on how you responded to the impact that EMIR and Basel III had on the above- mentioned determinants. Please look for any mistakes in my interpretation and any other response that you feel might not be captured by my understanding.

Regulation	Your interview comments	My understanding
Costs	EMIR – No response. Basel III – Increase competition between banks.	Impact of EMIR has been accepted as they are moderate. Impact of Basel III also accepted but the company tries to limit this by increasing competition between banks and tying hedge business to other fee businesses (banks fee income and exposure the company is regularly monitored.
Systems and Processes	Updated systems for reconciliation and process for reporting and reconciliation	
Knowhow	Conferences, consultants learning by doing	
Derivatives Market	Increase competition, optimisation of bank strategy	

Thank you for taking the time to read through the description of your interview interpretation and results. I look forward to receiving your feedback. Thank you again for your time and thoughtfulness.

PARTICIPANT SUMMARIES

Summary of results: NFC6

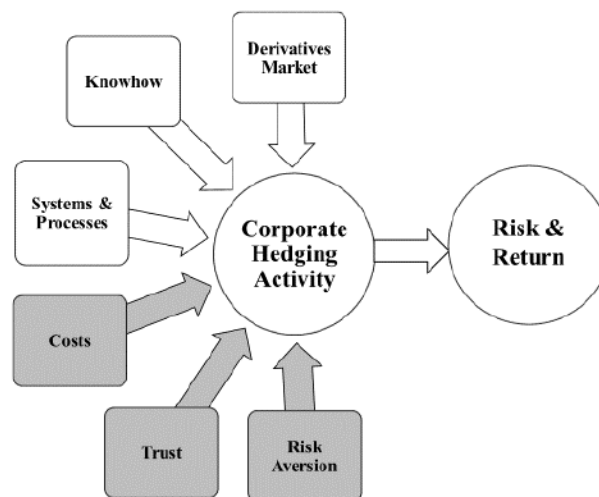
First, thank you so much for taking the time to review the summary of the interview findings. I will first provide a brief explanation of the study objectives, so that you will be able to accurately determine whether your interview was understood and analyzed correctly within the framework of the study objectives.

Purpose:

The aim of this research project is to analyze the impact of the implementation of EMIR and the reform of Basel II to Basel III on the corporate hedging activities of non-financial corporates in Germany. To do this in a systematic way, this research project aimed to create a model, called the impact-analysis-model. Furthermore, this research project explored the response of non-financial corporates in terms of adjustment of processes and strategy and proposes a conceptualization of responses.

Your interview has in an initial step been used to create the impact-analysis-model and analyze the impact of EMIR and Basel III. The model is made up of 7 key determinants that can influence your corporate hedging activities, defined here as the willingness and ability to hedge with financial derivatives. The idea is that based on the impact of the regulation on these seven key determinants (risk aversion, trust, costs, accounting, systems & processes, knowhow, derivatives market) one can systematically analyze the impact on the willingness and ability to do hedge with financial derivatives. The impact is then be evaluated in the context of risk and return considerations. In the second step the interview is used to explore your response, in terms of internal adjustments and external directed response, to the regulatory changes. The responses have then been conceptualized using an existing theory on organizational response to regulation. That theory divides the response in three categories, namely institutional level response (e.g. lawsuits, involvement in regulatory agencies), managerial level response (e.g. changes in processes, planning, budget, hiring of consultants) and technical level response (e.g. changes in hedging strategy, instruments used, tenors hedged).

Impact-analysis-model



What are you supposed to do?

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Research Objective 1: Create the impact-analysis-model

In the following table, I will explain each of the seven key determinants of the impact-analysis-model. This definition was used when analyzing your interview data. After that, I will provide examples of your statements showing your opinion of this determinant as a factor influencing corporate hedging activities and my conclusion out of it. Please look for any mistakes in my interpretation and add anything that you think is of additional help/value.

Explanation of Key Determinant	Your Interview Findings
Risk aversion: The theories on rationales for corporates to hedge suggest that the reason for hedging is maximisation of profits and subsequently firm value. This is done through elimination of volatility of cash flows and reduction of financial and tax costs. This suggests that shareholders' and managers' risk aversion (elimination of volatility) is the starting point of any hedging decision and thus a key element of the willingness to hedge.	Owners' and managements risk aversion is the fundamental reason to hedge. Given that the owners and management do not want any risk from foreign exchange and interest rate movements, stance towards risk is very conservative. Strict rules set out how to hedge and which instruments to use. Overall, this determinant is confirmed to be a key determinant for the willingness to hedge. Risk calculation - no opinion on market development/forecasting of exposure based on experience. Hedge ratio: 100% of existing exposure and 60% of planned exposure for a hedge horizon of 12 months. Instruments: plain vanilla only swaps and forwards. Tenor: all tenors are covered fully for existing exposure and significantly for planned exposure.
Trust: Given that NFCs are replying to volatility of cash flows by hedging through derivatives, there must be a certain level of trust, in terms of feeling more secure, by the NFC into the derivatives market and the counterparty that is trading with them. Otherwise, NFCs would not feel more secure after the hedging with derivatives. Thus, it was assumed in the initial impact-analysis-model that the degree of trust that NFCs have in the derivatives market and the counterparty that is trading with them also influences their willingness to hedge.	Trust is an important factor for the willingness to hedge and as such confirmed to be a key determinant. There is a high level of trust in the counterparties as hedging is only done with core banks with a very good credit rating. This determinant is controlled through the minimum credit rating that is required from banks and the fact that hedging is only done with core relationship banks. CDS is not used for monitoring purposes but counterparties need to have credit rating of A- or better.
Costs: The theories on the rationales for corporates to hedge show that firms aim to reduce or control costs (financial costs and/or tax costs) through hedging. Thereby they aim to increase firm value. Subsequently, when the reduction in costs through hedging does not lead to increase of profits, for	Cost considerations are an important factor for willingness to hedge with derivatives. The company has rules to take the best offer from the banks with no exceptions. However, the costs of hedging have been significantly reduced in the last years, due to higher level of transparency and the intense competition

<p>example due to higher transaction costs, this rationale for hedging would be meaningless. Therefore, it has been assumed that costs considerations, such as the premium that need to be paid for the hedge and the costs to accomplish the transaction as well as the fees of the banks, also impact the willingness of NFCs to hedge through derivatives.</p>	<p>between banks. Especially, since implementation of electronic platforms, costs of hedging decreased significantly. The company uses electronic platforms for more than 90% of their hedging trades. Thus, the determinant is confirmed as a key determinant for the willingness to hedge with derivatives but currently less relevant due to the reduced costs of hedging.</p>
<p>Accounting: The accounting treatment of the hedge is of importance for NFC, given that they want to avoid unnecessary volatility of financial statements. Hedge accounting rules allow the reduction of volatility in financial figures through aligning the value movements of the hedged item with the hedging instrument.</p>	<p>The company applies hedge accounting and sees it as an important factor for the willingness to hedge with derivatives. Hedge accounting applicability is also a reason to remain with plain vanilla derivatives and simple strategies. The company aims to make as many deals as possible compliant to hedge accounting, but it nevertheless would not refrain from a hedging trade if it makes economically sense and is not considered compliant with hedge accounting rules.</p>
<p>Systems and processes: An important factor determining the ability of NFCs to hedge is the systems and processes of NFCs. The companies need to have the appropriate systems and processes in place to conduct and accommodate the derivatives trades. This includes the technological means to connect with the trade counterparties and accomplish the trade as well as to depict the trades in their accounting and booking systems. Also, appropriate processes, including guidelines, are required to handle the trade, the booking and monitoring properly. This includes the separation of front-office and back-office within the risk management department, with the first doing the trade and the latter booking and monitoring it.</p>	<p>Systems and processes are of core importance for the ability to hedge. Processes are not fully automated as the confirmation process is still done manually. The rest from trading to booking is automated. It has been confirmed that efficient systems and processes are key determinant for the ability to conduct smooth hedging, otherwise an efficient hedging and risk monitoring would not be possible and not the timely reporting in line with the regulatory requirements. The company is now in good progress also to automatize the confirmation process.</p>
<p>Know-how: The theories on the optimal hedging strategy suggest that the expertise of the employees, that do the hedging, propose the hedging policy, and decide on hedging policy are of importance for the corporate hedging activities. At all stages of the corporate hedging transaction, that is from calculating the risk exposure, to determining the appropriate hedge ratio and choosing the right instrument, the know-how of the employees play a major role. Therefore, it has been assumed in the initial impact-analysis-model that the know-how of the employees and management with regards to corporate hedging is influencing their ability to do corporate hedging.</p>	<p>The know-how of employees is confirmed as a key determinant for the ability to hedge with derivatives. In the daily work as the employees require that knowhow to analyse the risk exposure and decide on how to hedge it in line with the policy. Furthermore, they propose the adjustments to the hedging policy and adequate instruments that are outside the policy. However, despite being an important determinant when it comes to setting up the strategy and presenting hedging possibilities, the company only hedged with plain vanilla derivatives and daily business is standardized to a high level which limits the required knowhow for the standardized trades.</p>
<p>Derivatives Market: This determinant is related to the availability of the required instruments and the required tenors. This is of course dependent on the derivatives market's situation because when the right instruments and tenors are not available for the NFCs, it would negatively influence their ability to hedge efficiently. Thus, also the situation on the derivatives market, be it directly the market or via the banks, was assumed to influence the ability of NFCs to conduct corporate hedging.</p>	<p>The situation on the derivatives markets is a key determinant for the ability to hedge with derivatives. In the daily decision making it is considered as given, as the company did not experience a situation in the past where market was not available at all. Thus, given that the company cannot hedge with the required instruments when the instruments are not available, the market situation is relevant for the ability to hedge efficiently with derivatives.</p>

Research Objective 2: Answer the question on how EMIR and Basel III impact corporate hedging activities in context of risk and return considerations.

In this section I will present a summary of my understanding of the impact of EMIR and Basel III on your corporate hedging activities based on your interview. Also, I will present my understanding of the consequence of the impact for your risk and return considerations. Please look for any mistakes in my interpretation and any other impact on your corporate hedging activities that you feel might not be captured by the seven determinants.

Regulation	Summary of your comments on impact on each determinant	My interpretation of your comments and consequence for risk and return considerations
EMIR / Basel III	<p>Risk Version: Both regulations had no impact on the way risk is calculated and evaluated, hedge ratio, instruments and tenors used.</p> <p>Trust: No changes to the counterparties you hedge with and the conditions for choosing those counterparties (e.g. rating, relationship).</p> <p>Costs: The costs for communication with banks have not been impacted. The prices of the transactions have increased due to Basel III, since banks price in XVA but not due to EMIR. The costs of monitoring and reporting have increased due to EMIR but not Basel III.</p> <p>Accounting: The applicability of hedge accounting and the hedge effectiveness have not been impacted by both regulations.</p> <p>Systems and Processes: EMIR had impact on your systems and processes, as system upgrades and new features were required, and processes/workflows have been adjusted to include the regulatory reporting requirements. Basel III had no impact on systems and processes.</p> <p>Knowhow: EMIR has impacted the required knowhow of your middle and back office employees in terms of reporting and monitoring the trade while it is less relevant for the activities of front-office employees. Employees attended some conferences and were supported by consultants. Basel III had no impact.</p> <p>Derivatives Market: EMIR had no impact on the instruments used and tenors required. Basel III had impact on the market as it has been noticed, that banks have less interest for long term derivatives.</p>	<p>With regards to the factors that influence your willingness to hedge with derivatives, only the determinant Costs has been impacted by EMIR and Basel III. The costs increases were moderate and given that the general costs of hedging decreased in recent years, this does not change the willingness to hedge with derivatives</p> <p>With regards to the determinants that influence your ability to hedge with derivatives the systems and processes and the required knowhow have been impacted by EMIR. However, the impact was moderate and manageable without any significant problems Also, the determinant Derivatives Market has been impacted by Basel III and is leading to less offers for long-term derivatives.</p> <p>Overall, EMIR and Basel III are leading to higher costs for hedging. These costs are not accompanied by profits, so that the impact on the returns is negative, while the impact on risk is neutral, as there is no change of risk hedging activities.</p>

Research Objective 3: Answer the question on how NFCs responded to EMIR and Basel III. In this section I will present a summary of my understanding of your comments on how you responded to the impact that EMIR and Basel III had on the above- mentioned determinants. Please look for any mistakes in my interpretation and any other response that you feel might not be captured by my understanding.

Regulation	Your interview comments	My understanding
Costs	EMIR - Reporting partly outsourced Basel III – No specific response	Impact of EMIR has been accepted as they are moderate and partly the obligations have been delegated to banks. Impact of Basel III also accepted but the company tries to limit this by increasing competition between banks.
Systems and Processes	Updated systems for reconciliation and process for reporting and reconciliation	
Knowhow	Conferences, learning by doing	
Derivatives Market	Increase competition	

Thank you for taking the time to read through the description of your interview interpretation and results. I look forward to receiving your feedback. Thank you again for your time and thoughtfulness.

PARTICIPANT SUMMARIES

Summary of results: NFC7

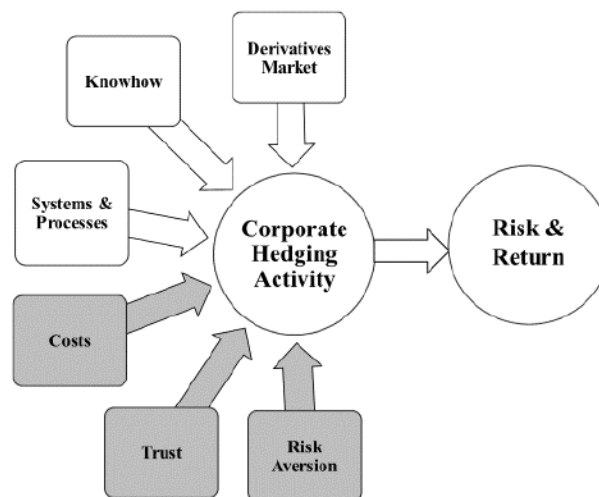
First, thank you so much for taking the time to review the summary of the interview findings. I will first provide a brief explanation of the study objectives, so that you will be able to accurately determine whether your interview was understood and analyzed correctly within the framework of the study objectives.

Purpose:

The aim of this research project is to analyze the impact of the implementation of EMIR and the reform of Basel II to Basel III on the corporate hedging activities of non-financial corporates in Germany. To do this in a systematic way, this research project aimed to create a model, called the impact-analysis-model. Furthermore, this research project explored the response of non-financial corporates in terms of adjustment of processes and strategy and proposes a conceptualization of responses.

Your interview has in an initial step been used to create the impact-analysis-model and analyze the impact of EMIR and Basel III. The model is made up of 7 key determinants that can influence your corporate hedging activities, defined here as the willingness and ability to hedge with financial derivatives. The idea is that based on the impact of the regulation on these seven key determinants (risk aversion, trust, costs, accounting, systems & processes, knowhow, derivatives market) one can systematically analyze the impact on the willingness and ability to do hedge with financial derivatives. The impact is then be evaluated in the context of risk and return considerations. In the second step the interview is used to explore your response, in terms of internal adjustments and external directed response, to the regulatory changes. The responses have then been conceptualized using an existing theory on organizational response to regulation. That theory divides the response in three categories, namely institutional level response (e.g. lawsuits, involvement in regulatory agencies), managerial level response (e.g. changes in processes, planning, budget, hiring of consultants) and technical level response (e.g. changes in hedging strategy, instruments used, tenors hedged).

Impact-analysis-model



What are you supposed to do?

This summary of the research is basically a way to check of my interpretation of your interview. I will explain my understanding of the findings with regards to your specific interview and would be grateful when you could provide me feedback if my understanding is correct. This feedback process provides me to check my understanding and it gives you the opportunity to correct any wrong interpretation or understanding. Your feedback is a critical element in this study. Thus, I appreciate that you read the following explanation and give it some thought. I will contact you to get a brief phone call and hear your feedback.

Research Objective 1: Create the impact-analysis-model

In the following table, I will explain each of the seven key determinants of the impact-analysis-model. This definition was used when analyzing your interview data. After that, I will provide examples of your statements showing your opinion of this determinant as a factor influencing corporate hedging activities and my conclusion out of it. Please look for any mistakes in my interpretation and add anything that you think is of additional help/value.

Explanation of Key Determinant	Your Interview Findings
Risk aversion: The theories on rationales for corporates to hedge suggest that the reason for hedging is maximisation of profits and subsequently firm value. This is done through elimination of volatility of cash flows and reduction of financial and tax costs. This suggests that shareholders' and managers' risk aversion (elimination of volatility) is the starting point of any hedging decision and thus a key element of the willingness to hedge.	Risk aversion is the main reason to hedge and is regarded as very conservative. The guidelines prescribe not to have any interest rate risk at all and to hedge a minimum level of 75% of foreign exchange risk. Overall, this determinant is confirmed to be a key determinant of willingness to hedge. Risk calculation – limited room for own forecasting. Hedge ratio: 100% of all interest rate risk and minimum 75% of all foreign exchange risk. Instruments: plain vanilla only swaps, forwards and occasionally options. Tenor: all tenors are covered fully for existing exposure and significantly for planned exposure.
Trust: Given that NFCs are replying to volatility of cash flows by hedging through derivatives, there must be a certain level of trust, in terms of feeling more secure, by the NFC into the derivatives market and the counterparty that is trading with them. Otherwise, NFCs would not feel more secure after the hedging with derivatives. Thus, it was assumed in the initial impact-analysis-model that the degree of trust that NFCs have in the derivatives market and the counterparty that is trading with them also influences their willingness to hedge.	Trust is an important factor for the willingness to hedge. Hedging is exclusively with core relationship banks which are known very well from other financing contracts and with a good investment grade credit rating of at least BBB-. The company has counterparty limits for the banks that are monitored regularly in connection with the rating and the financial situation of the bank as well as the development of the CDS. The company's does not trade with banks that are sub investment grade.
Costs: The theories on the rationales for corporates to hedge show that firms aim to reduce or control costs (financial costs and/or tax costs) through hedging. Thereby they aim to increase firm value. Subsequently, when the reduction in costs through hedging does not lead to increase of profits, for example due to higher transaction costs, this rationale for hedging would be meaningless. Therefore, it has been assumed that costs considerations, such as the	Cost considerations are an important factor for willingness to hedge with derivatives. The company has rules to take one of the best offers from banks and has to document this for evidence purposes. However, the costs of hedging are on a low level, especially, since implementation of electronic. Around 80% of trades is now done via electronic platforms. Overall, the determinant Costs is confirmed as a key determinant for the willingness to hedge with

premium that need to be paid for the hedge and the costs to accomplish the transaction as well as the fees of the banks, also impact the willingness of NFCs to hedge through derivatives.	derivatives but currently less relevant in the decision-making process due to the low level of costs for hedging.
Accounting: The accounting treatment of the hedge is of importance for NFC, given that they want to avoid unnecessary volatility of financial statements. Hedge accounting rules allow the reduction of volatility in financial figures through aligning the value movements of the hedged item with the hedging instrument.	The company applies hedge accounting and sees it as an important factor for the willingness of the company to hedge with derivatives. The company aims to give shareholders and creditors a true and fair view of their financial statements and do not want volatility due to accounting issues. The company aims to make as many deals as possible compliant to hedge accounting, but it nevertheless would not refrain from a hedging trade if it makes economically sense and is not considered compliant with hedge accounting rules.
Systems and processes: An important factor determining the ability of NFCs to hedge is the systems and processes of NFCs. The companies need to have the appropriate systems and processes in place to conduct and accommodate the derivatives trades. This includes the technological means to connect with the trade counterparties and accomplish the trade as well as to depict the trades in their accounting and booking systems. Also, appropriate processes, including guidelines, are required to handle the trade, the booking and monitoring properly. This includes the separation of front-office and back-office within the risk management department, with the first doing the trade and the latter booking and monitoring it.	Systems and processes are of core importance for the ability to hedge. The company has fully automated processes that are based on the connectedness of the IT systems. All relevant systems, from trading to booking and confirmations are connected, and all is done within few hours. It has been confirmed that efficient systems and processes are key determinant for the ability to conduct smooth hedging, otherwise an efficient hedging and risk monitoring would not be possible and not the timely reporting in line with the regulatory requirements.
Know-how: The theories on the optimal hedging strategy suggest that the expertise of the employees, that do the hedging, propose the hedging policy, and decide on hedging policy are of importance for the corporate hedging activities. At all stages of the corporate hedging transaction, that is from calculating the risk exposure, to determining the appropriate hedge ratio and choosing the right instrument, the know-how of the employees play a major role. Therefore, it has been assumed in the initial impact-analysis-model that the know-how of the employees and management with regards to corporate hedging is influencing their ability to do corporate hedging.	The know-how of employees is confirmed as a key determinant for the ability to hedge with derivatives. The company has very experienced employees whose expertise is not only required in the daily business, but also for advising management and monitoring existing risk. It has been mentioned that for the workflow and standard business processes are more and more standardised and expertise is becoming less relevant. But not for businesses that are a bit out of the ordinary. Furthermore, they propose the adjustments to the hedging policy or also adequate instruments that are outside the policy.
Derivatives Market: This determinant is related to the availability of the required instruments and the required tenors. This is of course dependent on the derivatives market's situation because when the right instruments and tenors are not available for the NFCs, it would negatively influence their ability to hedge efficiently. Thus, also the situation on the derivatives market, be it directly the market or via the banks, was assumed to influence the ability of NFCs to conduct corporate hedging.	The situation on the derivatives markets is an important determinant and as such relevant for the ability to hedge with derivatives. In the daily decision making it is considered as given for the standard instruments and tenors. Nevertheless, the company experienced a few times a shortage of availability of the required derivative instruments, especially after the financial crisis. Also, the company the reduction of offers from banks for long term interest rate derivatives. Non availability of instruments and tenors resulted in significant increase of the costs for the company.

Research Objective 2: Answer the question on how EMIR and Basel III impact corporate hedging activities in context of risk and return considerations.

In this section I will present a summary of my understanding of the impact of EMIR and Basel III on your corporate hedging activities based on your interview. Also, I will present my understanding of the consequence of the impact for your risk and return considerations. Please look for any mistakes in my interpretation and any other impact on your corporate hedging activities that you feel might not be captured by the seven determinants.

Regulation	Summary of your comments on impact on each determinant	My interpretation of your comments and consequence for risk and return considerations
EMIR / Basel III	<p>Risk Version: Both regulations had no impact on the way risk is calculated and evaluated, hedge ratio, instruments and tenors used.</p> <p>Trust: No changes to the counterparties you hedge with and the conditions for choosing those counterparties (e.g. rating, relationship).</p> <p>Costs: The costs for communication with banks have not been impacted. The prices of the transactions have increased due to Basel III, since banks price in XVA but not due to EMIR. The costs of monitoring and reporting have increased due to EMIR but not Basel III.</p> <p>Accounting: The applicability of hedge accounting and the hedge effectiveness have not been impacted by both regulations.</p> <p>Systems and Processes: EMIR had impact on your systems and processes, as system upgrades and new features were required, and processes/workflows have been adjusted to include the regulatory reporting requirements. Basel III had no impact on systems and processes.</p> <p>Knowhow: EMIR has impacted the required knowhow of your middle and back office employees in terms of reporting and monitoring the trade while it is less relevant for the activities of front-office employees. Employees attended some conferences and were supported by consultants. Basel III had no impact.</p> <p>Derivatives Market: EMIR had no impact on the instruments used and tenors required. Basel III had impact on the market as it has been noticed that banks have less interest for long term derivatives.</p>	<p>With regards to the factors that influence your willingness to hedge with derivatives, only the determinant Costs has been impacted by EMIR and Basel III. The costs increases were moderate and given that the general costs of hedging decreased in recent years, this does not change the willingness to hedge with derivatives</p> <p>With regards to the determinants that influence your ability to hedge with derivatives the systems and processes and the required knowhow have been impacted by EMIR. However, the impact was moderate and manageable without any significant problems Also, the determinant Derivatives Market has been impacted by Basel III and is leading to less offers for long-term derivatives.</p> <p>Overall, EMIR and Basel III are leading to higher costs for hedging. These costs are not accompanied by profits, so that the impact on the returns is negative, while the impact on risk is neutral, as there is no change of risk hedging activities.</p>

Research Objective 3: Answer the question on how NFCs responded to EMIR and Basel III. In this section I will present a summary of my understanding of your comments on how you responded to the impact that EMIR and Basel III had on the above- mentioned determinants. Please look for any mistakes in my interpretation and any other response that you feel might not be captured by my understanding.

Regulation	Your interview comments	My understanding
Costs	EMIR – No response. Basel III – Increase competition between banks.	Impact of EMIR has been accepted as they are moderate. Impact of Basel III also accepted but the company tries to limit this by increasing competition between banks and tying hedge business to other fee businesses (banks fee income and exposure the company is regularly monitored.
Systems and Processes	Updated systems for reconciliation and process for reporting and reconciliation	
Knowhow	Conferences, consultants learning by doing	
Derivatives Market	Increase competition, optimisation of bank strategy	

Thank you for taking the time to read through the description of your interview interpretation and results. I look forward to receiving your feedback. Thank you again for your time and thoughtfulness.

PARTICIPANT SUMMARIES

Summary of results: NFC8

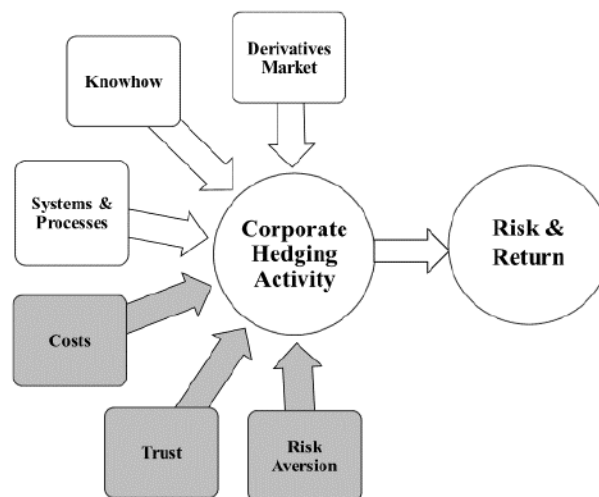
First, thank you so much for taking the time to review the summary of the interview findings. I will first provide a brief explanation of the study objectives, so that you will be able to accurately determine whether your interview was understood and analyzed correctly within the framework of the study objectives.

Purpose:

The aim of this research project is to analyze the impact of the implementation of EMIR and the reform of Basel II to Basel III on the corporate hedging activities of non-financial corporates in Germany. To do this in a systematic way, this research project aimed to create a model, called the impact-analysis-model. Furthermore, this research project explored the response of non-financial corporates in terms of adjustment of processes and strategy and proposes a conceptualization of responses.

Your interview has in an initial step been used to create the impact-analysis-model and analyze the impact of EMIR and Basel III. The model is made up of 7 key determinants that can influence your corporate hedging activities, defined here as the willingness and ability to hedge with financial derivatives. The idea is that based on the impact of the regulation on these seven key determinants (risk aversion, trust, costs, accounting, systems & processes, knowhow, derivatives market) one can systematically analyze the impact on the willingness and ability to do hedge with financial derivatives. The impact is then be evaluated in the context of risk and return considerations. In the second step the interview is used to explore your response, in terms of internal adjustments and external directed response, to the regulatory changes. The responses have then been conceptualized using an existing theory on organizational response to regulation. That theory divides the response in three categories, namely institutional level response (e.g. lawsuits, involvement in regulatory agencies), managerial level response (e.g. changes in processes, planning, budget, hiring of consultants) and technical level response (e.g. changes in hedging strategy, instruments used, tenors hedged).

Impact-analysis-model



What are you supposed to do?

This summary of the research is basically a way to check of my interpretation of your interview. I will explain my understanding of the findings with regards to your specific interview and would be grateful when you could provide me feedback if my understanding is correct. This feedback process provides me to check my understanding and it gives you the opportunity to correct any wrong interpretation or understanding. Your feedback is a critical element in this study; thus I appreciate that you read the following explanation and give it some thought. I will contact you to get a brief phone call and hear your feedback.

Research Objective 1: Create the impact-analysis-model

In the following table, I will explain each of the seven key determinants of the impact-analysis-model. This definition was used when analyzing your interview data. After that, I will provide examples of your statements showing your opinion of this determinant as a factor influencing corporate hedging activities and my conclusion out of it. Please look for any mistakes in my interpretation and add anything that you think is of additional help/value.

Explanation of Key Determinant	Your Interview Findings
Risk aversion: The theories on rationales for corporates to hedge suggest that the reason for hedging is maximisation of profits and subsequently firm value. This is done through elimination of volatility of cash flows and reduction of financial and tax costs. This suggests that shareholders' and managers' risk aversion (elimination of volatility) is the starting point of any hedging decision and thus a key element of the willingness to hedge.	Owners' and managements wish to avoid any risk from foreign exchange changes and interest rate changes are the most important reason to hedge. The company has strict rules in place giving guidance on how to hedge and which instruments to use. Overall, this determinant is confirmed to be a key determinant of the willingness to hedge with derivatives. Risk calculation – only very short-term risk (average 21 days)), no forecasting and no speculation. Hedge ratio: 100% of existing exposure. Instruments: plain vanilla only forwards. Tenor: all tenors are covered fully.
Trust: Given that NFCs are replying to volatility of cash flows by hedging through derivatives, there must be a certain level of trust, in terms of feeling more secure, by the NFC into the derivatives market and the counterparty that is trading with them. Otherwise, NFCs would not feel more secure after the hedging with derivatives. Thus, it was assumed in the initial impact-analysis-model that the degree of trust that NFCs have in the derivatives market and the counterparty that is trading with them also influences their willingness to hedge.	Trust is an important factor for the willingness to hedge and as such confirmed to be a key determinant. As trades are done via the parent company, there is a high level of trust into the parent company's ability to monitor the applicable banks and provide advice and guidance to the company. There are counterparty credit limits for each bank which are monitored and controlled by the Head Office of the company. CDS is not used for monitoring but counterparty exposure limits and a minimum rating of BBB- provide a control mechanism.
Costs: The theories on the rationales for corporates to hedge show that firms aim to reduce or control costs (financial costs and/or tax costs) through hedging. Thereby they aim to increase firm value. Subsequently, when the reduction in costs through hedging does not lead to increase of profits, for example due to higher transaction costs, this rationale for hedging would be meaningless. Therefore, it has been assumed that costs considerations, such as the	Cost considerations are an important factor for willingness to hedge with derivatives. The company hedges through their parent company and there are rules to take the best offer from the banks and this need to be documented. The costs of hedging are low given the usage of only plain vanilla and short-term derivatives. Overall, the determinant is confirmed as a key determinant for the willingness to hedge

premium that need to be paid for the hedge and the costs to accomplish the transaction as well as the fees of the banks, also impact the willingness of NFCs to hedge through derivatives.	with derivatives but less relevant in the actual hedge decision due to the low level of the costs of hedging.
Accounting: The accounting treatment of the hedge is of importance for NFC, given that they want to avoid unnecessary volatility of financial statements. Hedge accounting rules allow the reduction of volatility in financial figures through aligning the value movements of the hedged item with the hedging instrument.	The company applies hedge accounting and sees it as a factor for the willingness of the company to hedge with derivatives. The company tries to get the perfect hedge and apply hedge accounting. This is not a problem with nearly all the trades of the company, given their plain vanilla and short-term nature. When a trade would not be applicable to hedge accounting rules but makes sense from an business/economic point of view, the company would probably do that trade.
Systems and processes: An important factor determining the ability of NFCs to hedge is the systems and processes of NFCs. The companies need to have the appropriate systems and processes in place to conduct and accommodate the derivatives trades. This includes the technological means to connect with the trade counterparties and accomplish the trade as well as to depict the trades in their accounting and booking systems. Also, appropriate processes, including guidelines, are required to handle the trade, the booking and monitoring properly. This includes the separation of front-office and back-office within the risk management department, with the first doing the trade and the latter booking and monitoring it.	Systems and processes are important factor when it comes to the ability to hedge properly. The company's systems and processes are not fully automated. Currently the company is still using a self-created excel file as a treasury system and there is no need to register for electronic platforms as the trade is done thorough the parent company. Nevertheless, it has been confirmed that efficient systems and processes are key determinant for the ability to conduct smooth hedging, otherwise an efficient hedging and risk monitoring would not be possible.
Know-how: The theories on the optimal hedging strategy suggest that the expertise of the employees, that do the hedging, propose the hedging policy, and decide on hedging policy are of importance for the corporate hedging activities. At all stages of the corporate hedging transaction, that is from calculating the risk exposure, to determining the appropriate hedge ratio and choosing the right instrument, the know-how of the employees play a major role. Therefore, it has been assumed in the initial impact-analysis-model that the know-how of the employees and management with regards to corporate hedging is influencing their ability to do corporate hedging.	The company has very experienced employees in the treasury department. The know-how of employees is very important when it comes to the hedging strategy and making the required risk calculations. In the daily work, most of the trades are very much standardized and do not require special long-term expertise in the market. Furthermore, the knowhow of the employees is required when they propose adjustments to the hedging policy to Group Treasury. Overall, the know-how of employees is confirmed as a key determinant for the ability to hedge with derivatives.
Derivatives Market: This determinant is related to the availability of the required instruments and the required tenors. This is of course dependent on the derivatives market's situation because when the right instruments and tenors are not available for the NFCs, it would negatively influence their ability to hedge efficiently. Thus, also the situation on the derivatives market, be it directly the market or via the banks, was assumed to influence the ability of NFCs to conduct corporate hedging.	The situation on the derivatives markets is a key determinant for the ability to hedge with derivatives. In the daily decision making it is considered as given, as the company never experienced a situation in the past where market was not available at all. This might be connected to the fact that the company mainly uses only forwards with a very short-term tenor and standard currencies. However, given that the company cannot hedge with the required instruments when the instruments are not available, the market situation is relevant for the ability to hedge efficiently with derivatives.

Research Objective 2: Answer the question on how EMIR and Basel III impacted corporate hedging activities in context of risk and return considerations.

In this section I will present a summary of my understanding of the impact of EMIR and Basel III on your corporate hedging activities based on your interview. Also, I will present my understanding of the consequence of the impact for your risk and return considerations. Please look for any mistakes in my interpretation and any other impact on your corporate hedging activities that you feel might not be captured by the seven determinants.

Regulation	Summary of your comments on impact on each determinant	My interpretation of your comments and consequence for risk and return considerations
EMIR / Basel III	<p>Risk Version: Both regulations had no impact on the way risk is calculated and evaluated, hedge ratio, instruments and tenors used.</p> <p>Trust: No changes to the counterparties you hedge with and the conditions for choosing those counterparties (e.g. rating, relationship).</p> <p>Costs: The costs for communication with banks have not been impacted. The prices of the transactions have increased due to Basel III since banks price in XVA but not due to EMIR. The costs of monitoring and reporting have increased due to EMIR but not Basel III.</p> <p>Accounting: The applicability of hedge accounting and the hedge effectiveness have not been impacted by both regulations.</p> <p>Systems and Processes: EMIR had impact on your systems and processes, as system upgrades and new features were required, and processes/workflows have been adjusted to include the regulatory reporting requirements. Basel III had no impact on systems and processes.</p> <p>Knowhow: EMIR has impacted the required knowhow of your middle and back office employees in terms of reporting and monitoring the trade while it is less relevant for the activities of front-office employees. Employees attended some conferences and were supported by consultants. Basel III had no impact.</p> <p>Derivatives Market: EMIR had no impact on the instruments used and tenors required. Basel III had impact on the market as it has been noticed that banks have less interest for long term derivatives.</p>	<p>With regards to the factors that influence your willingness to hedge with derivatives, only the determinant Costs has been impacted by EMIR and Basel III. The costs increases were moderate and given that the general costs of hedging decreased in recent years, this does not change the willingness to hedge with derivatives</p> <p>With regards to the determinants that influence your ability to hedge with derivatives the systems and processes and the required knowhow have been impacted by EMIR. However, the impact was moderate and manageable without any significant problems Also, the determinant Derivatives Market has been impacted by Basel III and is leading to less offers for long-term derivatives.</p> <p>Overall, EMIR and Basel III are leading to higher costs for hedging. These costs are not accompanied by profits, so that the impact on the returns is negative, while the impact on risk is neutral, as there is no change of risk hedging activities.</p>

Research Objective 3: Answer the question on how NFCs responded to EMIR and Basel III. In this section I will present a summary of my understanding of your comments on how you responded to the impact that EMIR and Basel III had on the above- mentioned determinants. Please look for any mistakes in my interpretation and any other response that you feel might not be captured by my understanding.

Regulation	Your interview comments	My understanding
Costs	EMIR - Reporting outsourced to parent Basel III – No specific response	Impact of EMIR has been accepted as they are not so relevant for the company. Reporting and reconciliation requirements are done by the parent company. In terms of costs, the increases are very moderate. Impact of Basel III also accepted but is also limited since the XVA that banks price in for short term trades are very low.
Systems and Processes	Updated systems and processes for confirmations	
Knowhow	Learning by doing	
Derivatives Market	No specific response	

Thank you for taking the time to read through the description of your interview interpretation and results. I look forward to receiving your feedback. Thank you again for your time and thoughtfulness.

PARTICIPANT SUMMARIES

Summary of results: NFC9

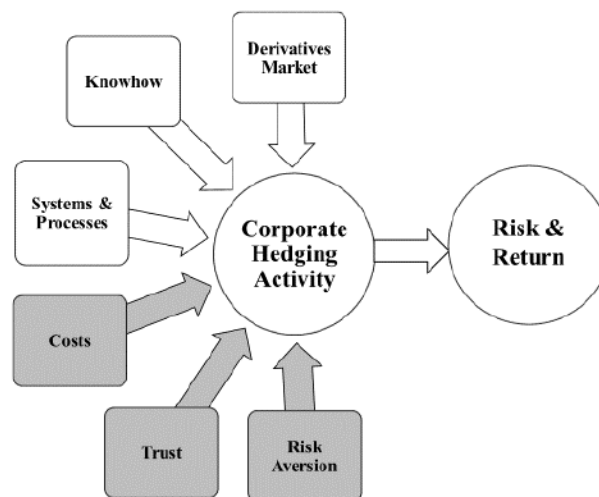
First, thank you so much for taking the time to review the summary of the interview findings. I will first provide a brief explanation of the study objectives, so that you will be able to accurately determine whether your interview was understood and analyzed correctly within the framework of the study objectives.

Purpose:

The aim of this research project is to analyze the impact of the implementation of EMIR and the reform of Basel II to Basel III on the corporate hedging activities of non-financial corporates in Germany. To do this in a systematic way, this research project aimed to create a model, called the impact-analysis-model. Furthermore, this research project explored the response of non-financial corporates in terms of adjustment of processes and strategy and proposes a conceptualization of responses.

Your interview has in an initial step been used to create the impact-analysis-model and analyze the impact of EMIR and Basel III. The model is made up of 7 key determinants that can influence your corporate hedging activities, defined here as the willingness and ability to hedge with financial derivatives. The idea is that based on the impact of the regulation on these seven key determinants (risk aversion, trust, costs, accounting, systems & processes, knowhow, derivatives market) one can systematically analyze the impact on the willingness and ability to do hedge with financial derivatives. The impact is then be evaluated in the context of risk and return considerations. In the second step the interview is used to explore your response, in terms of internal adjustments and external directed response, to the regulatory changes. The responses have then been conceptualized using an existing theory on organizational response to regulation. That theory divides the response in three categories, namely institutional level response (e.g. lawsuits, involvement in regulatory agencies), managerial level response (e.g. changes in processes, planning, budget, hiring of consultants) and technical level response (e.g. changes in hedging strategy, instruments used, tenors hedged).

Impact-analysis-model



What are you supposed to do?

This summary of the research is basically a way to check of my interpretation of your interview. I will explain my understanding of the findings with regards to your specific interview and would be grateful when you could provide me feedback if my understanding is correct. This feedback process provides me to check my understanding and it gives you the opportunity to correct any wrong interpretation or understanding. Your feedback is a critical element in this study. Thus, I appreciate that you read the following explanation and give it some thought. I will contact you to get a brief phone call and hear your feedback.

Research Objective 1: Create the impact-analysis-model

In the following table, I will explain each of the seven key determinants of the impact-analysis-model. This definition was used when analyzing your interview data. After that, I will provide examples of your statements showing your opinion of this determinant as a factor influencing corporate hedging activities and my conclusion out of it. Please look for any mistakes in my interpretation and add anything that you think is of additional help/value.

Explanation of Key Determinant	
Risk aversion: The theories on rationales for corporates to hedge suggest that the reason for hedging is maximisation of profits and subsequently firm value. This is done through elimination of volatility of cash flows and reduction of financial and tax costs. This suggests that shareholders' and managers' risk aversion (elimination of volatility) is the starting point of any hedging decision and thus a key element of the willingness to hedge.	Risk aversion is the main reason to hedge and is regarded as very conservative. The guidelines prescribe not to have any interest rate risk at all and to hedge a minimum level of 80% of foreign exchange risk above EUR 0.5m. Overall, this determinant is confirmed to be a key determinant of willingness to hedge. Risk calculation – some room for own forecasting. Hedge ratio: 100% of all interest rate risk and 80 % of all existing foreign exchange risk. Instruments: plain vanilla only swaps, forwards, and options. Tenor: If possible, all tenors should be covered fully for existing exposure, but at least a major part should be hedged as decided in the risk committee.
Trust: Given that NFCs are replying to volatility of cash flows by hedging through derivatives, there must be a certain level of trust, in terms of feeling more secure, by the NFC into the derivatives market and the counterparty that is trading with them. Otherwise, NFCs would not feel more secure after the hedging with derivatives. Thus, it was assumed in the initial impact-analysis-model that the degree of trust that NFCs have in the derivatives market and the counterparty that is trading with them also influences their willingness to hedge.	Trust is confirmed to be an important factor for the willingness to hedge. Hedging is exclusively with core relationship banks which are known very well from other financing contracts and with a good investment grade credit rating of at least BBB-. The company has counterparty limits for the banks that are analysed, evaluated, and monitored regularly in connection with the rating and the financial situation of the bank as well as the development of the CDS. The company's does not trade with banks that are sub investment grade.
Costs: The theories on the rationales for corporates to hedge show that firms aim to reduce or control costs (financial costs and/or tax costs) through hedging. Thereby they aim to increase firm value. Subsequently, when the reduction in costs through hedging does not lead to increase of profits, for example due to higher transaction costs, this rationale	Cost considerations are an important factor for willingness to hedge with derivatives. The company has rules to take one of the best offers from banks and must document this for audit evidence purposes. However, the costs of hedging are on a low level, especially, since implementation of electronic trading. The company aims to make most of its trades via the

for hedging would be meaningless. Therefore, it has been assumed that costs considerations, such as the premium that need to be paid for the hedge and the costs to accomplish the transaction as well as the fees of the banks, also impact the willingness of NFCs to hedge through derivatives.	electronic platform, currently around 90% of FX trades is now done via electronic platforms. Overall, the determinant Costs is confirmed as a key determinant for the willingness to hedge with derivatives but less relevant in the decision-making process due to the low level of costs for hedging.
Accounting: The accounting treatment of the hedge is of importance for NFC, given that they want to avoid unnecessary volatility of financial statements. Hedge accounting rules allow the reduction of volatility in financial figures through aligning the value movements of the hedged item with the hedging instrument.	The company applies hedge accounting and sees it as an important factor for the willingness of the company to hedge with derivatives. The company aims to give shareholders and creditors a true and fair view of their financial statements and do not want volatility due to accounting issues. The company aims to make as many deals as possible compliant to hedge accounting and in some cases adjusts the strategy to be compliant with accounting rules, but it nevertheless would not refrain from a hedging trade if it makes economically sense and is not considered compliant with hedge accounting rules.
Systems and processes: An important factor determining the ability of NFCs to hedge is the systems and processes of NFCs. The companies need to have the appropriate systems and processes in place to conduct and accommodate the derivatives trades. This includes the technological means to connect with the trade counterparties and accomplish the trade as well as to depict the trades in their accounting and booking systems. Also, appropriate processes, including guidelines, are required to handle the trade, the booking and monitoring properly. This includes the separation of front-office and back-office within the risk management department, with the first doing the trade and the latter booking and monitoring it.	Systems and processes are of core importance for the ability to hedge. The company has fully automated processes that are based on the connectedness of the IT systems. All relevant systems, from trading to booking and confirmations are connected, and all is done within few hours. It has been confirmed that efficient systems and processes are key determinant for the ability to conduct smooth hedging , otherwise an efficient hedging and risk monitoring would not be possible and not the timely reporting in line with the regulatory requirements.
Know-how: The theories on the optimal hedging strategy suggest that the expertise of the employees, that do the hedging, propose the hedging policy, and decide on hedging policy are of importance for the corporate hedging activities. At all stages of the corporate hedging transaction, that is from calculating the risk exposure, to determining the appropriate hedge ratio and choosing the right instrument, the know-how of the employees play a major role. Therefore, it has been assumed in the initial impact-analysis-model that the know-how of the employees and management with regards to corporate hedging is influencing their ability to do corporate hedging.	The know-how of employees is confirmed to be a key determinant for the ability to hedge with derivatives. The company has very experienced employees whose expertise is not only required in the daily business, but also for advising management and monitoring existing risk. It has been mentioned that for the workflow and standard business is pretty much standardised and can be done by less experienced employees but not for businesses that are a bit out of the ordinary. Furthermore, the employees propose the adjustments to the hedging policy or also adequate instruments that are outside the policy.
Derivatives Market: This determinant is related to the availability of the required instruments and the required tenors. This is of course dependent on the derivatives market's situation because when the right instruments and tenors are not available for the NFCs, it would negatively influence their ability to hedge efficiently. Thus, also the situation on the derivatives market, be it directly the market or via the banks, was assumed to influence the ability of NFCs to conduct corporate hedging.	The situation on the derivatives markets is an important determinant and as such relevant for the ability to hedge with derivatives. In the daily decision making it is considered as given for the standard instruments and tenors but regularly checked for more exotic currencies and certain jurisdictions. The company experienced a few times a shortage of availability of the required derivative instruments, especially after the financial crisis and in certain jurisdictions. Also, the company recognizes the reduction of offers from banks for long term interest

	rate derivatives and is sometimes adjusting the strategy to cope with that. Non availability of instruments and tenors can result in significant increase of the costs for the company.
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Research Objective 2: Answer the question on how EMIR and Basel III impact corporate hedging activities in context of risk and return considerations.

In this section I will present a summary of my understanding of the impact of EMIR and Basel III on your corporate hedging activities based on your interview. Also, I will present my understanding of the consequence of the impact for your risk and return considerations. Please look for any mistakes in my interpretation and any other impact on your corporate hedging activities that you feel might not be captured by the seven determinants.

Regulation	Summary of your comments on impact on each determinant	My interpretation of your comments and consequence for risk and return considerations
EMIR / Basel III	<p>Risk Version: Both regulations had no impact on the way risk is calculated and evaluated, hedge ratio, instruments and tenors used.</p> <p>Trust: No changes to the counterparties you hedge with and the conditions for choosing those counterparties (e.g. rating, relationship).</p> <p>Costs: The costs for communication with banks have not been impacted. The prices of the transactions have increased due to Basel III since banks price in XVA but not due to EMIR. The costs of monitoring and reporting have increased due to EMIR but not Basel III. Furthermore, more manpower has been allocated to regulatory reporting.</p> <p>Accounting: The applicability of hedge accounting and the hedge effectiveness have not been impacted by both regulations.</p> <p>Systems and Processes: EMIR had impact on your systems and processes, as system upgrades and new features were required, and processes/workflows have been adjusted to include the regulatory reporting requirements. Basel III had no impact on systems and processes.</p> <p>Knowhow: EMIR has impacted the required knowhow of your middle and back office employees in terms of reporting and monitoring the trade while it is less relevant for the activities of front-office employees. Employees attended some conferences and were supported by consultants. Basel III had no impact.</p>	<p>With regards to the factors that influence your willingness to hedge with derivatives, only the determinant Costs has been impacted by EMIR and Basel III. The costs increases were moderate and given that the general costs of hedging decreased in recent years, this does not change the willingness to hedge with derivatives</p> <p>With regards to the determinants that influence your ability to hedge with derivatives the systems and processes and the required knowhow have been impacted by EMIR. However, the impact was moderate and manageable without any significant problems Also, the determinant Derivatives Market has been impacted by Basel III and is leading to less offers for long-term derivatives.</p>

	Derivatives Market: EMIR had no impact on the instruments used and tenors required. Basel III had impact on the market as it has been noticed that banks have less interest for long term derivatives.	Overall, EMIR and Basel III are leading to higher costs for hedging. These costs are not accompanied by profits, so that the impact on the returns is negative, while the impact on risk is neutral, as there is no change of risk hedging activities.
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Research Objective 3: Answer the question on how NFCs responded to EMIR and Basel III. In this section I will present a summary of my understanding of your comments on how you responded to the impact that EMIR and Basel III had on the above- mentioned determinants. Please look for any mistakes in my interpretation and any other response that you feel might not be captured by my understanding.

Regulation	Your interview comments	My understanding
Costs	EMIR – No response. Basel III – Increase competition between banks.	Impact of EMIR has been accepted as they are moderate. Impact of Basel III also accepted but the company tries to limit this by increasing competition between banks.
Systems and Processes	Updated systems for reconciliation and process for reporting and reconciliation	
Knowhow	Conferences, consultants learning by doing	
Derivatives Market	Increase competition between banks	

Thank you for taking the time to read through the description of your interview interpretation and results. I look forward to receiving your feedback. Thank you again for your time and thoughtfulness.

PARTICIPANT SUMMARIES

Summary of results: NFC10

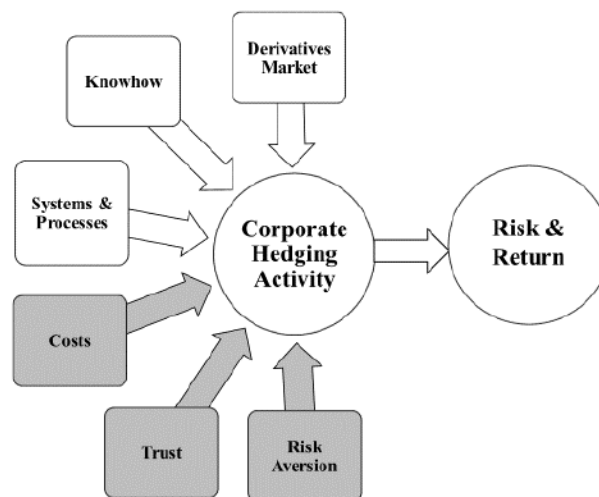
First, thank you so much for taking the time to review the summary of the interview findings. I will first provide a brief explanation of the study objectives, so that you will be able to accurately determine whether your interview was understood and analyzed correctly within the framework of the study objectives.

Purpose:

The aim of this research project is to analyze the impact of the implementation of EMIR and the reform of Basel II to Basel III on the corporate hedging activities of non-financial corporates in Germany. To do this in a systematic way, this research project aimed to create a model, called the impact-analysis-model. Furthermore, this research project explored the response of non-financial corporates in terms of adjustment of processes and strategy and proposes a conceptualization of responses.

Your interview has in an initial step been used to create the impact-analysis-model and analyze the impact of EMIR and Basel III. The model is made up of 7 key determinants that can influence your corporate hedging activities, defined here as the willingness and ability to hedge with financial derivatives. The idea is that based on the impact of the regulation on these seven key determinants (risk aversion, trust, costs, accounting, systems & processes, knowhow, derivatives market) one can systematically analyze the impact on the willingness and ability to do hedge with financial derivatives. The impact is then be evaluated in the context of risk and return considerations. In the second step the interview is used to explore your response, in terms of internal adjustments and external directed response, to the regulatory changes. The responses have then been conceptualized using an existing theory on organizational response to regulation. That theory divides the response in three categories, namely institutional level response (e.g. lawsuits, involvement in regulatory agencies), managerial level response (e.g. changes in processes, planning, budget, hiring of consultants) and technical level response (e.g. changes in hedging strategy, instruments used, tenors hedged).

Impact-analysis-model



What are you supposed to do?

This summary of the research is basically a way to check of my interpretation of your interview. I will explain my understanding of the findings with regards to your specific interview and would be grateful when you could provide me feedback if my understanding is correct. This feedback process provides me to check my understanding and it gives you the opportunity to correct any wrong interpretation or understanding. Your feedback is a critical element in this study. Thus, I appreciate that you read the following explanation and give it some thought. I will contact you to get a brief phone call and hear your feedback.

Research Objective 1: Create the impact-analysis-model

In the following table, I will explain each of the seven key determinants of the impact-analysis-model. This definition was used when analyzing your interview data. After that, I will provide examples of your statements showing your opinion of this determinant as a factor influencing corporate hedging activities and my conclusion out of it. Please look for any mistakes in my interpretation and add anything that you think is of additional help/value.

Explanation of Key Determinant	Your Interview Findings
Risk aversion: The theories on rationales for corporates to hedge suggest that the reason for hedging is maximisation of profits and subsequently firm value. This is done through elimination of volatility of cash flows and reduction of financial and tax costs. This suggests that shareholders' and managers' risk aversion (elimination of volatility) is the starting point of any hedging decision and thus a key element of the willingness to hedge.	Owners' and managements risk aversion is the fundamental reason to hedge. Given that the owners and management do not want any risk from foreign exchange and interest rate movements, stance towards risk is very conservative. Strict rules set out how to hedge and which instruments to use. Overall, this determinant is confirmed to be a key determinant for the willingness to hedge. Risk calculation – no own opinion on market development but forecasting of exposure based on experience. Hedge ratio: 100% of existing exposure and 80% of planned exposure for a hedge horizon of 12 months. Instruments: plain vanilla only swaps and forwards. Options are allowed but not used. Tenor: all tenors are covered fully for existing exposure and significantly for planned exposure.
Trust: Given that NFCs are replying to volatility of cash flows by hedging through derivatives, there must be a certain level of trust, in terms of feeling more secure, by the NFC into the derivatives market and the counterparty that is trading with them. Otherwise, NFCs would not feel more secure after the hedging with derivatives. Thus, it was assumed in the initial impact-analysis-model that the degree of trust that NFCs have in the derivatives market and the counterparty that is trading with them also influences their willingness to hedge.	Trust is an important factor for the willingness to hedge and as such confirmed to be a key determinant. There is a high level of trust in the counterparties as hedging is only done with core relationship banks with an investment grade credit rating but also there is limited alternative to the banks from the corporate's perspective. This determinant is controlled through the minimum credit rating that is required from banks and the fact that hedging is only done with core relationship banks. CDS is not used for monitoring purposes but counterparties need to have credit rating of BBB- or better.
Costs: The theories on the rationales for corporates to hedge show that firms aim to reduce or control costs (financial costs and/or tax costs) through hedging. Thereby they aim to increase firm value.	Cost considerations are an important factor for willingness to hedge with derivatives. The company has rules to take one of the best offers from the banks with some room for relationship considerations, i.e. it

Subsequently, when the reduction in costs through hedging does not lead to increase of profits, for example due to higher transaction costs, this rationale for hedging would be meaningless. Therefore, it has been assumed that costs considerations, such as the premium that need to be paid for the hedge and the costs to accomplish the transaction as well as the fees of the banks, also impact the willingness of NFCs to hedge through derivatives.	does not have to be the cheapest. The costs of hedging have been significantly reduced in the last years, due to higher level of transparency and the intense competition between banks. Especially, since implementation of electronic platforms, costs of hedging decreased significantly. The company uses electronic platforms for more than 80% of their hedging trades. Thus, the determinant is confirmed as a key determinant for the willingness to hedge with derivatives but currently less relevant due to the low levels of costs of hedging.
Accounting: The accounting treatment of the hedge is of importance for NFC, given that they want to avoid unnecessary volatility of financial statements. Hedge accounting rules allow the reduction of volatility in financial figures through aligning the value movements of the hedged item with the hedging instrument.	The company applies hedge accounting and sees it as an important factor for the willingness to hedge with derivatives. Hedge accounting applicability is also a reason to remain with plain vanilla derivatives and simple strategies. The company aims to make as many deals as possible compliant to hedge accounting, but it nevertheless will not refrain from a hedging trade if it makes economically sense but cannot be treated under hedge accounting.
Systems and processes: An important factor determining the ability of NFCs to hedge is the systems and processes of NFCs. The companies need to have the appropriate systems and processes in place to conduct and accommodate the derivatives trades. This includes the technological means to connect with the trade counterparties and accomplish the trade as well as to depict the trades in their accounting and booking systems. Also, appropriate processes, including guidelines, are required to handle the trade, the booking and monitoring properly. This includes the separation of front-office and back-office within the risk management department, with the first doing the trade and the latter booking and monitoring it.	Systems and processes are of core importance for the ability to hedge. Processes are fully automated as the trading, confirmation, treasury, and accounting systems are connected to each other. Trading is done through electronic platform, which then send automatically send over the trades to the confirmation system and mirrors it in the treasury and accounting systems. It has been confirmed that efficient systems and processes are key determinant for the ability to conduct smooth hedging , otherwise an efficient hedging and risk monitoring would not be possible and not the timely reporting in line with the regulatory requirements.
Know-how: The theories on the optimal hedging strategy suggest that the expertise of the employees, that do the hedging, propose the hedging policy, and decide on hedging policy are of importance for the corporate hedging activities. At all stages of the corporate hedging transaction, that is from calculating the risk exposure, to determining the appropriate hedge ratio and choosing the right instrument, the know-how of the employees play a major role. Therefore, it has been assumed in the initial impact-analysis-model that the know-how of the employees and management with regards to corporate hedging is influencing their ability to do corporate hedging.	The know-how of employees is confirmed as a key determinant for the ability to hedge with derivatives. In the daily work as the employees require that knowhow to analyse the risk exposure and decide on how to hedge it in line with the policy. Furthermore, they propose the adjustments to the hedging policy and adequate instruments that are outside the policy. Despite that the company only hedges with plain vanilla derivatives and daily business is standardized to a high level, the expertise of employees is regarded very important to deal with the non-ordinary trades and also to propose new strategies and advise management on the market.
Derivatives Market: This determinant is related to the availability of the required instruments and the required tenors. This is of course dependent on the derivatives market's situation because when the right instruments and tenors are not available for the NFCs, it would negatively influence their ability to hedge efficiently. Thus, also the situation on the derivatives market, be it directly the market or via the banks,	The situation on the derivatives markets is a key determinant for the ability to hedge with derivatives. In the daily decision making it is mostly considered as given, despite that the company a few times experienced a situation in the past where market was not available at all. The reason for that is that hedging is mainly done with standard products and currencies. Overall, given that the company cannot hedge with the required instruments when the instruments are not

was assumed to influence the ability of NFCs to conduct corporate hedging.	available, the market situation is relevant for the ability to hedge efficiently with derivatives.
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Research Objective 2: Answer the question on how EMIR and Basel III impact corporate hedging activities in context of risk and return considerations.

In this section I will present a summary of my understanding of the impact of EMIR and Basel III on your corporate hedging activities based on your interview. Also, I will present my understanding of the consequence of the impact for your risk and return considerations. Please look for any mistakes in my interpretation and any other impact on your corporate hedging activities that you feel might not be captured by the seven determinants.

Regulation	Summary of your comments on impact on each determinant	My interpretation of your comments and consequence for risk and return considerations
EMIR / Basel III	<p>Risk Version: Both regulations had no impact on the way risk is calculated and evaluated, hedge ratio, instruments and tenors used.</p> <p>Trust: No changes to the counterparties you hedge with and the conditions for choosing those counterparties (e.g. rating, relationship).</p> <p>Costs: The costs for communication with banks have not been impacted. The prices of the transactions have increased due to Basel III, since banks price in XVA but not due to EMIR. The costs of monitoring and reporting have increased due to EMIR but not Basel III.</p> <p>Accounting: The applicability of hedge accounting and the hedge effectiveness have not been impacted by both regulations.</p> <p>Systems and Processes: EMIR had impact on your systems and processes, as system upgrades and new features were required, and processes/workflows have been adjusted to include the regulatory reporting requirements. Basel III had no impact on systems and processes.</p> <p>Knowhow: EMIR has impacted the required knowhow of your middle and back office employees in terms of reporting and monitoring the trade while it is less relevant for the activities of front-office employees. Employees attended some conferences and were supported by consultants. Basel III had no impact.</p> <p>Derivatives Market: EMIR had no impact on the instruments used and tenors required. Basel III had impact on the market as it has been noticed that banks have less interest for long term derivatives.</p>	<p>With regards to the factors that influence your willingness to hedge with derivatives, only the determinant Costs has been impacted by EMIR and Basel III. The costs increases were moderate and given that the general costs of hedging decreased in recent years, this does not change the willingness to hedge with derivatives</p> <p>With regards to the determinants that influence your ability to hedge with derivatives the systems and processes and the required knowhow have been impacted by EMIR. However, the impact was moderate and manageable without any significant problems Also, the determinant Derivatives Market has been impacted by Basel III and is leading to less offers for long-term derivatives.</p> <p>Overall, EMIR and Basel III are leading to higher costs for hedging. These costs are not</p>

		accompanied by profits, so that the impact on the returns is negative, while the impact on risk is neutral, as there is no change of risk hedging activities.
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Research Objective 3: Answer the question on how NFCs responded to EMIR and Basel III. In this section I will present a summary of my understanding of your comments on how you responded to the impact that EMIR and Basel III had on the above- mentioned determinants. Please look for any mistakes in my interpretation and any other response that you feel might not be captured by my understanding.

Regulation	Your interview comments	My understanding
Costs	EMIR – No response. Basel III - Optimisation of bank strategy.	Impact of EMIR has been accepted as they are moderate. Impact of Basel III also accepted but the company tries to limit this by increasing competition between banks and tying hedge business to other fee businesses (banks fee income and exposure the company is regularly monitored.
Systems and Processes	Updated systems for reconciliation and process for reporting and reconciliation	
Knowhow	Conferences, consultants, learning by doing	
Derivatives Market	Increase competition, optimisation of bank strategy	

Thank you for taking the time to read through the description of your interview interpretation and results. I look forward to receiving your feedback. Thank you again for your time and thoughtfulness.

PARTICIPANT SUMMARIES

Summary of results: NFC11

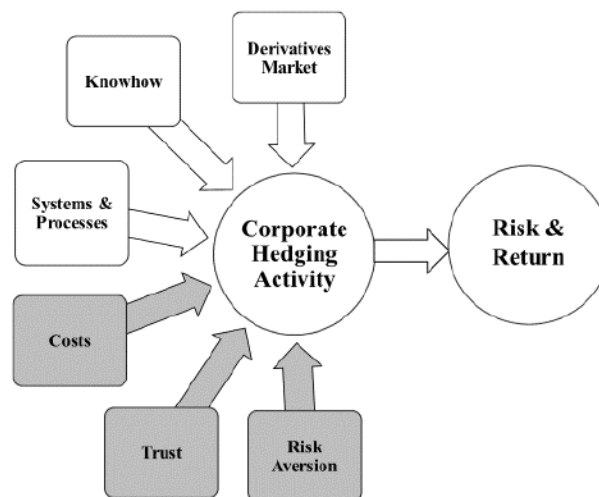
First, thank you so much for taking the time to review the summary of the interview findings. I will first provide a brief explanation of the study objectives, so that you will be able to accurately determine whether your interview was understood and analyzed correctly within the framework of the study objectives.

Purpose:

The aim of this research project is to analyze the impact of the implementation of EMIR and the reform of Basel II to Basel III on the corporate hedging activities of non-financial corporates in Germany. To do this in a systematic way, this research project aimed to create a model, called the impact-analysis-model. Furthermore, this research project explored the response of non-financial corporates in terms of adjustment of processes and strategy and proposes a conceptualization of responses.

Your interview has in an initial step been used to create the impact-analysis-model and analyze the impact of EMIR and Basel III. The model is made up of 7 key determinants that can influence your corporate hedging activities, defined here as the willingness and ability to hedge with financial derivatives. The idea is that based on the impact of the regulation on these seven key determinants (risk aversion, trust, costs, accounting, systems & processes, knowhow, derivatives market) one can systematically analyze the impact on the willingness and ability to do hedge with financial derivatives. The impact is then be evaluated in the context of risk and return considerations. In the second step the interview is used to explore your response, in terms of internal adjustments and external directed response, to the regulatory changes. The responses have then been conceptualized using an existing theory on organizational response to regulation. That theory divides the response in three categories, namely institutional level response (e.g. lawsuits, involvement in regulatory agencies), managerial level response (e.g. changes in processes, planning, budget, hiring of consultants) and technical level response (e.g. changes in hedging strategy, instruments used, tenors hedged).

Impact-analysis-model



What are you supposed to do?

This summary of the research is basically a way to check of my interpretation of your interview. I will explain my understanding of the findings with regards to your specific interview and would be grateful when you could provide me feedback if my understanding is correct. This feedback process provides me to check my understanding and it gives you the opportunity to correct any wrong interpretation or understanding. Your feedback is a critical element in this study. Thus, I appreciate that you read the following explanation and give it some thought. I will contact you to get a brief phone call and hear your feedback.

Research Objective 1: Create the impact-analysis-model

In the following table, I will explain each of the seven key determinants of the impact-analysis-model. This definition was used when analyzing your interview data. After that, I will provide examples of your statements showing your opinion of this determinant as a factor influencing corporate hedging activities and my conclusion out of it. Please look for any mistakes in my interpretation and add anything that you think is of additional help/value.

Explanation of Key Determinant	Your Interview Findings
Risk aversion: The theories on rationales for corporates to hedge suggest that the reason for hedging is maximisation of profits and subsequently firm value. This is done through elimination of volatility of cash flows and reduction of financial and tax costs. This suggests that shareholders' and managers' risk aversion (elimination of volatility) is the starting point of any hedging decision and thus a key element of the willingness to hedge.	Risk aversion is the key reason to hedge with derivatives. Company's risk policy is regarded as conservative with guidelines prescribing to use derivatives to hedge out all interest rate risk and booked foreign exchange risk. Overall, this determinant is confirmed to be a key determinant of willingness to hedge. Risk calculation – limited room for own forecasting. Hedge ratio: 100% of all interest rate risk and foreign exchange risk. Instruments: Mainly plain vanilla swaps, forwards and occasionally options. Tenor: all existing risk tenors are covered fully.
Trust: Given that NFCs are replying to volatility of cash flows by hedging through derivatives, there must be a certain level of trust, in terms of feeling more secure, by the NFC into the derivatives market and the counterparty that is trading with them. Otherwise, NFCs would not feel more secure after the hedging with derivatives. Thus, it was assumed in the initial impact-analysis-model that the degree of trust that NFCs have in the derivatives market and the counterparty that is trading with them also influences their willingness to hedge.	Trust is an important factor for the willingness to hedge and confirmed to be a key determinant. Hedging is mainly with core relationship banks which are known very well from other financing contracts and with a good investment grade credit rating of at least BBB-. In difficult jurisdictions, hedging is also done with non-core banks. The company has counterparty limits for the banks that are monitored regularly in connection with the rating and the financial situation of the bank as well as the development of the CDS. The company has no trades outstanding with banks that are sub investment grade.
Costs: The theories on the rationales for corporates to hedge show that firms aim to reduce or control costs (financial costs and/or tax costs) through hedging. Thereby they aim to increase firm value. Subsequently, when the reduction in costs through hedging does not lead to increase of profits, for example due to higher transaction costs, this rationale for hedging would be meaningless. Therefore, it has been assumed that costs considerations, such as the	Cost consideration is confirmed to be a key determinant of the willingness to hedge with derivatives. The company has rules to take one of the best offers from banks and must document this for evidence purposes. However, given that the costs of hedging are on a low level, especially, since implementation of electronic platforms, cost considerations have lost relevance during the hedging

premium that need to be paid for the hedge and the costs to accomplish the transaction as well as the fees of the banks, also impact the willingness of NFCs to hedge through derivatives.	decision making. Around 90% of trades is now done via electronic platforms.
Accounting: The accounting treatment of the hedge is of importance for NFC, given that they want to avoid unnecessary volatility of financial statements. Hedge accounting rules allow the reduction of volatility in financial figures through aligning the value movements of the hedged item with the hedging instrument.	The company applies hedge accounting and sees it as an important factor for the willingness of the company to hedge with derivatives. The company aims to reduce volatility in the P&L and thus aims to make most of the deals compliant to hedge accounting rules. Given that the company mainly hedges with plain vanilla derivatives, generally the hedges are compliant with hedge accounting rules. Nevertheless, the company will not refrain from a trade if it makes economically sense and is not considered compliant with hedge accounting rules.
Systems and processes: An important factor determining the ability of NFCs to hedge is the systems and processes of NFCs. The companies need to have the appropriate systems and processes in place to conduct and accommodate the derivatives trades. This includes the technological means to connect with the trade counterparties and accomplish the trade as well as to depict the trades in their accounting and booking systems. Also, appropriate processes, including guidelines, are required in order to handle the trade, the booking and monitoring properly. This includes the separation of front-office and back-office within the risk management department, with the first doing the trade and the latter booking and monitoring it.	Systems and processes are confirmed to be the most important determinant for the ability to hedge. The company has fully automated processes that are based on the connectedness of the systems. All relevant systems, from trading to booking, confirmations and accounting are connected, and all is done within few hours. It has been confirmed that efficient systems and processes are key or the ability to conduct smooth hedging, otherwise an efficient hedging and risk monitoring would not be possible and not the timely reporting in line with the regulatory requirements.
Know-how: The theories on the optimal hedging strategy suggest that the expertise of the employees, that do the hedging, propose the hedging policy and decide on hedging policy are of importance for the corporate hedging activities. At all stages of the corporate hedging transaction, that is from calculating the risk exposure, to determining the appropriate hedge ratio and choosing the right instrument, the know-how of the employees play a major role. Therefore, it has been assumed in the initial impact-analysis-model that the know-how of the employees and management with regards to corporate hedging is influencing their ability to do corporate hedging.	The know-how of employees is confirmed to be a key determinant for the ability to hedge with derivatives. The company has very experienced employees whose expertise is not only required in the daily business, but also for advising management and monitoring existing risk. It has been mentioned that for the workflow and standard business processes are more and more standardised and expertise is becoming less relevant. However, for businesses that are not ordinary the expertise of employees are very important. Furthermore, the knowhow is important because the employees propose the adjustments to the hedging policy or also adequate instruments that are outside the policy.
Derivatives Market: This determinant is related to the availability of the required instruments and the required tenors. This is of course dependent on the derivatives market's situation because when the right instruments and tenors are not available for the NFCs, it would negatively influence their ability to hedge efficiently. Thus, also the situation on the derivatives market, be it directly the market or via the banks, was assumed to influence the ability of NFCs to conduct corporate hedging.	The situation on the derivatives markets is an important determinant and as such relevant for the ability to hedge with derivatives. In the daily decision making it is considered as given for the standard instruments and tenors. Nevertheless, the company experienced a few times a shortage of availability of the required derivative instruments, especially in some regions with regulated financial markets. Non availability of instruments and tenors resulted in significant increase of the costs for the company.

Research Objective 2: Answer the question on how EMIR and Basel III impact corporate hedging activities in context of risk and return considerations.

In this section I will present a summary of my understanding of the impact of EMIR and Basel III on your corporate hedging activities based on your interview. Also, I will present my understanding of the consequence of the impact for your risk and return considerations. Please look for any mistakes in my interpretation and any other impact on your corporate hedging activities that you feel might not be captured by the seven determinants.

Regulation	Summary of your comments on impact on each determinant	My interpretation of your comments and consequence for risk and return considerations
EMIR / Basel III	<p>Risk Version: Both regulations had no impact on the way risk is calculated and evaluated, hedge ratio, instruments and tenors used.</p> <p>Trust: No changes to the counterparties you hedge with and the conditions for choosing those counterparties (e.g. rating, relationship).</p> <p>Costs: The costs for communication with banks have not been impacted. The prices of the transactions have increased due to Basel III, since banks price in XVA but not due to EMIR. The costs of monitoring and reporting have increased due to EMIR but not Basel III.</p> <p>Accounting: The applicability of hedge accounting and the hedge effectiveness have not been impacted by both regulations.</p> <p>Systems and Processes: EMIR had impact on your systems and processes, as system upgrades and new features were required, and processes/workflows have been adjusted to include the regulatory reporting requirements. Basel III had no impact on systems and processes.</p> <p>Knowhow: EMIR has impacted the required knowhow of your middle and back office employees in terms of reporting and monitoring the trade while it is less relevant for the activities of front-office employees. Employees attended some conferences and were supported by consultants. Basel III had no impact.</p> <p>Derivatives Market: EMIR had no impact on the instruments used and tenors required. Basel III had impact on the market as it has been noticed, that banks have less interest for long term derivatives.</p>	<p>With regards to the factors that influence your willingness to hedge with derivatives, only the determinant Costs has been impacted by EMIR and Basel III. The costs increases were moderate and given that the general costs of hedging decreased in recent years, this does not change the willingness to hedge with derivatives</p> <p>With regards to the determinants that influence your ability to hedge with derivatives the systems and processes and the required knowhow have been impacted by EMIR. However, the impact was moderate and manageable without any significant problems Also, the determinant Derivatives Market has been impacted by Basel III and is leading to less offers for long-term derivatives.</p> <p>Overall, EMIR and Basel III are leading to higher costs for hedging. These costs are not accompanied by profits, so that the impact on the returns is negative, while the impact on risk is neutral, as there is no change of risk hedging activities.</p>

Research Objective 3: Answer the question on how NFCs responded to EMIR and Basel III. In this section I will present a summary of my understanding of your comments on how you responded to the impact that EMIR and Basel III had on the above- mentioned determinants. Please look for any mistakes in my interpretation and any other response that you feel might not be captured by my understanding.

Regulation	Your interview comments	My understanding
Costs	EMIR – No response. Basel III – Increase competition between banks.	Impact of EMIR has been accepted as they are moderate. Impact of Basel III also accepted but the company tries to limit this by increasing competition between banks and tying hedge business to other fee businesses (banks fee income and exposure the company is regularly monitored.
Systems and Processes	Updated systems for reconciliation and process for reporting and reconciliation	
Knowhow	Conferences, consultants, learning by doing	
Derivatives Market	Increase competition, optimisation of bank strategy	

Thank you for taking the time to read through the description of your interview interpretation and results. I look forward to receiving your feedback. Thank you again for your time and thoughtfulness.

PARTICIPANT SUMMARIES

Summary of results: NFC12

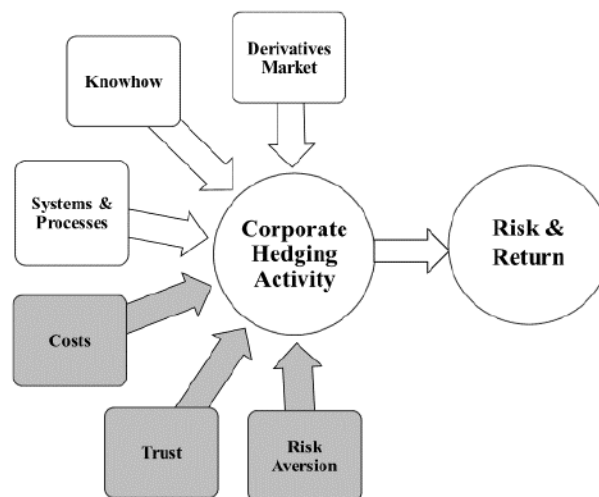
First, thank you so much for taking the time to review the summary of the interview findings. I will first provide a brief explanation of the study objectives, so that you will be able to accurately determine whether your interview was understood and analyzed correctly within the framework of the study objectives.

Purpose:

The aim of this research project is to analyze the impact of the implementation of EMIR and the reform of Basel II to Basel III on the corporate hedging activities of non-financial corporates in Germany. To do this in a systematic way, this research project aimed to create a model, called the impact-analysis-model. Furthermore, this research project explored the response of non-financial corporates in terms of adjustment of processes and strategy and proposes a conceptualization of responses.

Your interview has in an initial step been used to create the impact-analysis-model and analyze the impact of EMIR and Basel III. The model is made up of 7 key determinants that can influence your corporate hedging activities, defined here as the willingness and ability to hedge with financial derivatives. The idea is that based on the impact of the regulation on these seven key determinants (risk aversion, trust, costs, accounting, systems & processes, knowhow, derivatives market) one can systematically analyze the impact on the willingness and ability to do hedge with financial derivatives. The impact is then be evaluated in the context of risk and return considerations. In the second step the interview is used to explore your response, in terms of internal adjustments and external directed response, to the regulatory changes. The responses have then been conceptualized using an existing theory on organizational response to regulation. That theory divides the response in three categories, namely institutional level response (e.g. lawsuits, involvement in regulatory agencies), managerial level response (e.g. changes in processes, planning, budget, hiring of consultants) and technical level response (e.g. changes in hedging strategy, instruments used, tenors hedged).

Impact-analysis-model



What are you supposed to do?

This summary of the research is basically a way to check of my interpretation of your interview. I will explain my understanding of the findings with regards to your specific interview and would be grateful when you could provide me feedback if my understanding is correct. This feedback process provides me to check my understanding and it gives you the opportunity to correct any wrong interpretation or understanding. Your feedback is a critical element in this study. Thus, I appreciate that you read the following explanation and give it some thought. I will contact you to get a brief phone call and hear your feedback.

Research Objective 1: Create the impact-analysis-model

In the following table, I will explain each of the seven key determinants of the impact-analysis-model. This definition was used when analyzing your interview data. After that, I will provide examples of your statements showing your opinion of this determinant as a factor influencing corporate hedging activities and my conclusion out of it. Please look for any mistakes in my interpretation and add anything that you think is of additional help/value.

Explanation of Key Determinant	Your Interview Findings
Risk aversion: The theories on rationales for corporates to hedge suggest that the reason for hedging is maximisation of profits and subsequently firm value. This is done through elimination of volatility of cash flows and reduction of financial and tax costs. This suggests that shareholders' and managers' risk aversion (elimination of volatility) is the starting point of any hedging decision and thus a key element of the willingness to hedge.	Owners' and managements risk aversion is the fundamental reason to hedge. Given that the owners and management do not want any risk from foreign exchange and interest rate movements, stance towards risk is very conservative. Strict rules set out how to hedge and which instruments to use. Overall, this determinant is confirmed to be a key determinant for the willingness to hedge. Risk calculation - no opinion on market development/forecasting of exposure based on experience. Hedge ratio: 100% of existing exposure and 70% of planned exposure for a hedge horizon of 12 months. Instruments: plain vanilla only swaps and forwards. Tenor: Tenors are covered fully for existing exposure and significantly for planned exposure.
Trust: Given that NFCs are replying to volatility of cash flows by hedging through derivatives, there must be a certain level of trust, in terms of feeling more secure, by the NFC into the derivatives market and the counterparty that is trading with them. Otherwise, NFCs would not feel more secure after the hedging with derivatives. Thus, it was assumed in the initial impact-analysis-model that the degree of trust that NFCs have in the derivatives market and the counterparty that is trading with them also influences their willingness to hedge.	Trust is an important factor for the willingness to hedge and as such confirmed to be a key determinant. There is a high level of trust in the banks as hedging is only done with core banks with an investment grade credit rating or better. This determinant is controlled through the minimum credit rating that is required from banks and the fact that hedging is only done with core relationship banks. CDS is not used for monitoring purposes but counterparties need to have credit rating of BBB- or better.
Costs: The theories on the rationales for corporates to hedge show that firms aim to reduce or control costs (financial costs and/or tax costs) through hedging. Thereby they aim to increase firm value. Subsequently, when the reduction in costs through hedging does not lead to increase of profits, for	Cost considerations are an important factor for willingness to hedge with derivatives. The company has rules to take the best offer from the banks with no exceptions. However, the costs of hedging have been significantly reduced in the last years, due to higher level of transparency and the intense competition

<p>example due to higher transaction costs, this rationale for hedging would be meaningless. Therefore, it has been assumed that costs considerations, such as the premium that need to be paid for the hedge and the costs to accomplish the transaction as well as the fees of the banks, also impact the willingness of NFCs to hedge through derivatives.</p>	<p>between banks. Especially, since implementation of electronic platforms, costs of hedging decreased significantly. The company uses electronic platforms for more than 90% of their hedging trades. Overall, the determinant is confirmed as a key determinant for the willingness to hedge with derivatives but currently less relevant due to the low costs of hedging.</p>
<p>Accounting: The accounting treatment of the hedge is of importance for NFC, given that they want to avoid unnecessary volatility of financial statements. Hedge accounting rules allow the reduction of volatility in financial figures through aligning the value movements of the hedged item with the hedging instrument.</p>	<p>The company applies hedge accounting and sees it as an important factor for the willingness to hedge with derivatives. Hedge accounting applicability is also a reason to remain with plain vanilla derivatives and simple strategies. The company aims to make only deals that are compliant to hedge accounting rules, but it nevertheless will not refrain from a trade if it makes economically sense and is not considered compliant with hedge accounting rules.</p>
<p>Systems and processes: An important factor determining the ability of NFCs to hedge is the systems and processes of NFCs. The companies need to have the appropriate systems and processes in place to conduct and accommodate the derivatives trades. This includes the technological means to connect with the trade counterparties and accomplish the trade as well as to depict the trades in their accounting and booking systems. Also, appropriate processes, including guidelines, are required in order to handle the trade, the booking and monitoring properly. This includes the separation of front-office and back-office within the risk management department, with the first doing the trade and the latter booking and monitoring it.</p>	<p>Systems and processes are of core importance for the ability to hedge. Processes are fully automated from trading through electronic platforms and sending it automatically to the treasury and confirmation systems. Also, there is an automatic mirroring in the accounting system. It has been confirmed that efficient systems and processes are key determinant for the ability to conduct smooth hedging, otherwise an efficient hedging and risk monitoring would not be possible and not the timely reporting in line with the regulatory requirements.</p>
<p>Know-how: The theories on the optimal hedging strategy suggest that the expertise of the employees, that do the hedging, propose the hedging policy and decide on hedging policy are of importance for the corporate hedging activities. At all stages of the corporate hedging transaction, that is from calculating the risk exposure, to determining the appropriate hedge ratio and choosing the right instrument, the know-how of the employees play a major role. Therefore, it has been assumed in the initial impact-analysis-model that the know-how of the employees and management with regards to corporate hedging is influencing their ability to do corporate hedging.</p>	<p>The know-how of employees is confirmed to be a key determinant for the ability to hedge with derivatives. In the daily work, the employees require that knowhow to analyse the risk exposure and decide on how to hedge it in line with the policy. Furthermore, they propose the adjustments to the hedging policy and adequate instruments that are outside the policy. However, despite being an important determinant when it comes to setting up the strategy and presenting hedging possibilities, the company only hedged with plain vanilla derivatives and daily business is standardized to a high level which limits the required knowhow for the standardized trades.</p>
<p>Derivatives Market: This determinant is related to the availability of the required instruments and the required tenors. This is of course dependent on the derivatives market's situation because when the right instruments and tenors are not available for the NFCs, it would negatively influence their ability to hedge efficiently. Thus, also the situation on the derivatives market, be it directly the market or via the banks, was assumed to influence the ability of NFCs to conduct corporate hedging.</p>	<p>The situation on the derivatives markets is a key determinant for the ability to hedge with derivatives. In the daily decision making it is considered as given, as the company did not experience a situation in the past where the derivatives market was not available at all. However, given that the company cannot hedge with the required instruments when the instruments are not available, the market situation is confirmed to be of key relevance for the ability to hedge efficiently with derivatives.</p>

Research Objective 2: Answer the question on how EMIR and Basel III impact corporate hedging activities in context of risk and return considerations.

In this section I will present a summary of my understanding of the impact of EMIR and Basel III on your corporate hedging activities based on your interview. Also, I will present my understanding of the consequence of the impact for your risk and return considerations. Please look for any mistakes in my interpretation and any other impact on your corporate hedging activities that you feel might not be captured by the seven determinants.

Regulation	Summary of your comments on impact on each determinant	My interpretation of your comments and consequence for risk and return considerations
EMIR / Basel III	<p>Risk Version: Both regulations had no impact on the way risk is calculated and evaluated, hedge ratio, instruments and tenors used.</p> <p>Trust: No changes to the counterparties you hedge with and the conditions for choosing those counterparties (e.g. rating, relationship).</p> <p>Costs: The costs for communication with banks have not been impacted. The prices of the transactions have increased due to Basel III since banks price in XVA but not due to EMIR. The costs of monitoring and reporting have increased due to EMIR but not Basel III.</p> <p>Accounting: The applicability of hedge accounting and the hedge effectiveness have not been impacted by both regulations.</p> <p>Systems and Processes: EMIR had impact on your systems and processes, as system upgrades and new features were required, and processes/workflows have been adjusted to include the regulatory reporting requirements. Basel III had no impact on systems and processes.</p> <p>Knowhow: EMIR has impacted the required knowhow of your middle and back office employees in terms of reporting and monitoring the trade while it is less relevant for the activities of front-office employees. Employees attended some conferences and were supported by consultants. Basel III had no impact.</p> <p>Derivatives Market: EMIR had no impact on the instruments used and tenors required. Basel III had impact on the market as it has been noticed that banks have less interest for long term derivatives.</p>	<p>With regards to the factors that influence your willingness to hedge with derivatives, only the determinant Costs has been impacted by EMIR and Basel III. The costs increases were moderate and given that the general costs of hedging decreased in recent years, this does not change the willingness to hedge with derivatives</p> <p>With regards to the determinants that influence your ability to hedge with derivatives the systems and processes and the required knowhow have been impacted by EMIR. However, the impact was moderate and manageable without any significant problems Also, the determinant Derivatives Market has been impacted by Basel III and is leading to less offers for long-term derivatives.</p> <p>Overall, EMIR and Basel III are leading to higher costs for hedging. These costs are not accompanied by profits, so that the impact on the returns is negative, while the impact on risk is neutral, as there is no change of risk hedging activities.</p>

Research Objective 3: Answer the question on how NFCs responded to EMIR and Basel III.

In this section I will present a summary of my understanding of your comments on how you responded to the impact that EMIR and Basel III had on the above- mentioned determinants. Please look for any mistakes in my interpretation and any other response that you feel might not be captured by my understanding.

Regulation	Your interview comments	My understanding
Costs	EMIR - Reporting outsourced Basel III – No specific response	Impact of EMIR has been accepted as they are moderate and partly the obligations have been delegated to banks. Impact of Basel III also accepted but the company tries to limit this by increasing competition between banks.
Systems and Processes	Updated systems and processes for reporting checking and reconciliation	
Knowhow	Conferences, learning by doing	
Derivatives Market	Increase competition	

Thank you for taking the time to read through the description of your interview interpretation and results. I look forward to receiving your feedback. Thank you again for your time and thoughtfulness.