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The role of small and medium-sized towns in rural development

Final Report

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The role of small and medium-sized towns in rural development

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Executive Summary

1. OBJECTIVES AND SETTING OF THE RESEARCH PROJECT

Rural Europe has to find and promote appropriate forms of economic development to maintain and improve the vitality of rural areas as they adjust to the changing demands of society and the market economy. The aim of this project was to focus on the role that small and medium-sized towns play in rural development and to measure the economic linkages between such towns and the surrounding countryside, in order to assess their present and potential role as growth poles.

Small and medium-sized towns within three types of rural area, in each of five different countries were compared. The project intended to provide information to guide policy formulation, implementation and evaluation at regional, national and EU levels.

The project had the following specific objectives:

(i) to measure the flows of goods, services and labour between firms and households in a sample of small and medium-sized rural towns and their surrounding countryside in order to establish the extent and nature of local economic integration;
(ii) to compare the degree of local economic integration of different types and size of town, firm and household found in the selected areas;
(iii) to draw conclusions and make recommendations to those seeking to stimulate more diversified economic activities and employment opportunities in rural areas; and
(iv) to provide an accessible source of spatially referenced microeconomic data to those seeking to model the future impact of EU policies on the rural economy.

Small and medium-sized towns could be important to Europe's rural regeneration as they potentially enable the concentration of support initiatives that can take advantage of economies of agglomeration while allowing income and employment benefits to spread out into the surrounding countryside. They may also contain concentrations of human and institutional capacity required for 'bottom-up'

initiatives. The growing interest in this topic by policy-makers and researchers has contributed to the development of methodological tools, which were applied in a systematic comparative study across different EU countries and types of rural area. The outcomes of this research will help identify Rural Development policy measures to achieve the fostering of social and economic cohesion among member states.

2. THE RESEARCH TEAM

The project was co-ordinated by the Centre for Agricultural Strategy of The University of Reading (UK) and involved research teams from the Department of Land Use and Rural Management, The University of Plymouth (UK), the Joint Research Unit INRA-ENESAD for Agricultural Economics and Sociology, Dijon (France), the LEI-Agricultural Economics Research Unit at the Hague (The Netherlands), the Institute of Rural and Agricultural Development of the Academy of Sciences, Warsaw (Poland) and the Economics and Sociology Department of the University of Trás-os-Montes and Alto Douro (Portugal).

3. RESEARCH MATERIALS AND METHODOLOGY

3.1 Selection of case study towns

In order to facilitate a comparison between towns and across different countries, it was decided to make a purposive selection of towns within different types of rural context. Thus, in each country, one small town (population 5-10,000) and one medium-sized town (15-20,000) was selected in each of three types of area (agricultural, tourism and peri-urban) chosen to mirror the differing range of circumstances and contexts across rural Europe. A total of 30 case study towns were selected across the five countries.

3.2 Data collection tools

Drawing on previous experience and methods from earlier University of Plymouth studies, draft questionnaires were developed and piloted on a single town in each country during the first half of 2002. Three questionnaires were designed, one for Farm Businesses, one for Non-Farm Businesses and one for Households. Following a pilot study, some modifications were made to try to maximise response and improve data accuracy.

The structure of all three questionnaires was similar. The first set of questions gathered information on the characteristics of the entity in question - the farm, firm or household. A second set of questions sought to identify the location and value of particular types of economic transaction. The final set of questions gathered information on the workforce and their salaries for the firms and farm businesses, and on the employment and income levels for the households.

3.3 Survey response

Response rates varied between countries and study areas but target response rates were achieved in most cases. Whilst the questionnaires were intended for self-completion, for logistical reasons, the Polish and Portuguese teams undertook the questionnaires on a face-to-face personal interview basis hence achieving a 100% response. Analysis for non-response bias was carried out for the UK, French and Dutch data sets. On the whole, this proved satisfactory given that secondary data were used to weight data sets for the multivariate analysis.

3.4 Analytical methods

A variety of analyses were designed to measure the flows of goods, services and labour between the case study towns and the surrounding local, regional, national and international economies. This aimed to map the spatial patterns of firm, farm and household transactions, identify the key characteristics of firm, farm and household and town that are associated with strong (or weak) local economic integration and estimate subsequent income and employment effects in the local economy. This was achieved using four main methods:

(i) construction of economic and employment 'footprints';
(ii) bivariate analyses of local economic integration;
(iii) multivariate analysis of local economic integration and spatial economic behaviours; and
(iv) construction of local Social Accounting Matrices (SAMs) for each town.

3.5 Practitioners workshops

Following completion of the individual country reports, all initial findings, and possible implications, were presented at workshops for practitioners involved in fostering local economic development. These practitioners were mainly drawn from local government, councils, municipalities and other related community organisations. Most of them had been approached prior to data collection to seek support to help achieve credible response rates to the surveys. These workshops had two overarching aims: to allow research teams to identify the differences between the practitioners' preconceptions about the local integration of the various types of firm, household and town (their working assumptions) and the survey findings; and to help the research team identify any policy implications that might be of relevance, whether directly or indirectly, for EU policy implementation at 'grassroots' level.

3.6 Timing and responsibilities

The project started on 1 September 2001 and finished on 28 February 2005. Whilst all partners were involved in the data collection exercise in their countries and construction of economic footprints and bivariate analyses of local economic integration, the multivariate analyses was carried out by the teams from France and

the UK and the construction of SAMs by the teams from the Netherlands and the UK. All played a part in interpreting results and drawing conclusions. The University of Reading team, as co-ordinators, put the final report together with help from other partners.

4. RESULTS

4.1 Construction of economic footprints

The data collected from the questionnaires provided the research teams with a clear insight into the first round transactions taking place within each town and its hinterland and enabled the researchers to make some first generalisations about the economic functioning of these towns. First, it could be seen that for local businesses, the purchasing tends to be far less local than the sales. The reverse is true for the agricultural businesses, and may well relate to the establishment of local cooperatives who provide outlets for purchases locally. Second, most consumers spent very locally, particularly on low order goods. High order goods, however, were purchased further afield. Third, a very high percentage of labour employed was locally based emphasising the importance of local labour markets to the small and medium-sized towns and hinterland firms.

4.2 Bivariate analyses of local economic integration

The results from some bivariate analyses undertaken by individual study teams indicated that the level of local economic integration appeared to be readily influenced by the economic and demographic structure of case study towns, as well as by systematic differences in the behaviour of firms, farms and households by virtue of their geographic location. For example, firm size and sector was found to influence the degree of local sales integration and, in the case of household expenditure, the most common factors influencing levels of local integration were social class and income level. The results of these preliminary analyses proved useful in devising variables for the multivariate analysis, where the relative significance of local integration predictors was subsequently examined.

4.3 Multivariate analyses of local economic integration and economic behaviour

The level of economic integration of the firms was explained first using local context variables (town type and size, town or hinterland location of firm). The second set of variables describes characteristics of the firm and owner/manager (e.g. firm size, age, ownership and indigeneity) and the third set describes firm environment variables (including indices of local competition and market size). Chow tests determined that separate country OLS regressions would give more reliable parameters, so it is the results of these that are summarised here.

The results show that downstream integration is more influenced by location in the study area than by town type although, in Portugal and Poland, medium-sized

agricultural towns tend to have more self-contained markets. Firms in the town, as opposed to the hinterland, show greater levels of local integration. Sector, firm, age, workforce size and indigeneity are also all significant predictors of the strength of downstream integration. Manufacturing and producer services have a relatively strong export base in all countries apart from Poland and the UK, where Consumer services show a relatively strong degree of integration in the local economy. Older, and smaller, firms also exhibit stronger local downstream linkages, as do firms run by an owner/manager who has lived locally for at least ten years. The technological characteristics of the firm show that traditional firms (with lower labour productivity) are more likely to be locally integrated.

Local upstream integration is stronger in, and around, larger towns of high agricultural employment in Poland, Portugal and the UK. The other, very significant, indicator of strong upstream integration is the indigeneity of the owner/manager. Examining individual sectors, the construction sector seems to source more locally than other sectors.

Amongst the farms, size is the most consistent predictor of local integration, where smaller farms (in terms of workforce) tend to serve local agricultural markets. In Portugal and Poland, small farms (in terms of land area) tend to purchase more locally and those less reliant on agricultural income sources tend to sell and purchase more locally.

In all countries those residents living in the town are more locally integrated in terms of low order shopping than those living in the hinterland. There is also a strong negative correlation between household income and propensity to purchase low order goods and services locally. Workplace is also highly influential, whereby those commuting outside the area to work spend proportionally less on low order goods and services in the local economy.

Local integration in terms of high order expenditure is also associated with lower incomes and lower occupational groups. Indigeneity is also influential, whereby households who have recently moved in to the study area tend to spend proportionally less on high order goods and services in the local economy.

4.4 Results from the construction of local Social Accounting Matrices

Output, employment and income multipliers were calculated for each of the 30 case study town SAMs. The majority of multipliers from the Portuguese and Polish towns are much larger than those from the other countries. This implies that any injection into those local economies will have a larger local impact than on local economies in the other countries.

The output and employment multipliers tend to be larger from the hinterland firms than from the town firms. However, the household income and wage income multipliers are larger in the towns. This means that stimulation to the businesses in

the hinterland will have a greater local impact than stimulation to businesses in the towns, yet stimulation to wages and income will have a bigger impact when focused on the town locations.

The key sectors vary a great deal from one country to another. However, services, especially Banking and financial services, other 'knowledge-intensive' industries (e.g. chemicals and computing), Food and drink and Construction appear important sectors for both output and employment.

When the impact is decomposed into impact on town location and that on hinterland location, the results show very consistently (although to a greater extent in Portugal, Poland and the Netherlands) that stimulation to a firm in a town has far less impact on the hinterland, than equivalent stimulation to a firm in the hinterland which will impact upon businesses and households in the town to a far greater extent. This shows that even when the multipliers are larger from town businesses, this is often from intra-town linkages, rather than town-hinterland linkages. This is an important result when we are considering the use of small and medium-sized towns as a generator for rural development within its local economy.

5. CONCLUSIONS

As a way of drawing out implications from this large research project that might be of benefit and relevance to European rural policy-making, the research team framed their conclusions around eight broad questions deemed relevant to local economic development policy:

(i) *The service sector was most likely to establish local linkages and to help generate local growth*. Banking and financial services and other 'knowledge-intensive' industries were especially important although, perhaps surprisingly, Agriculture generated large output multipliers in the Dutch and Polish towns.

(ii) *In the UK and France, the sectors that best support local employment were found to be the Banking and financial services sector, Machinery, metals and computing and the Food and drink industries*; the latter were also important for the Netherlands, Portugal and Poland. Transport services were important in France and Portugal.

(iii) A key research question was *'what is the most appropriate spatial distribution of development in rural areas?'* Output and employment multipliers are usually greatest in the hinterlands. Household income and wage income multipliers are greater in the town locations. However, where development is within the town, relatively little of such development impacts on the hinterlands whereas, conversely, development within the hinterland is likely to have a relatively much greater impact on the town. Thus, in order to maximize potential economic development, a balance needs to be struck between town and hinterland development and between

providing local services and generating income through exporting goods and services.

(iv) Whether development agencies *should encourage inward investment into small and medium-sized towns or foster local business start-ups* is a major rural development issue. Although no clear differences emerged from the project as to sourcing patterns, the indigeneity of owners/managers was found to be important in that they tended to source more locally than those who had not lived in the local area all of their lives. This suggests that fostering 'locally grown' business start-ups is likely to be more beneficial to local income generation.

(v) The project assessed *whether local stakeholders had a good appreciation of the functioning of the rural economies* in their 'own' small and medium-sized towns. On the whole, they had a good understanding of the situation and would encourage policies to promote more local working and local facilities being converted from their original use including farm buildings.

(vi) A further matter assessed was the *relationship between workplace location and household shopping patterns* as a means to identifying the economic impact of commuting. It was found that journey to work was often combined with low order shopping suggesting that, if business and residential development are combined, local income retention will occur and local low order retail services will be supported.

(vii) Despite the radical nature of the Fischler 2003 reforms, the CAP will still support farmers albeit in a way that is decoupled from production. Thus, it is interesting to ask *whether by supporting agriculture, society will also support rural communities*? Our research shows that, in many rural areas, agriculture remains an important sector, with relatively strong links to neighbouring towns. This is especially so in Poland, but applies in all the study countries. We also found that, not only do the agricultural sectors have relatively large first round impacts and multipliers, but much of this impact is transferred to the town.

(viii) The final, and perhaps the most important, research question the project had to answer was *'are small and medium-sized towns appropriate foci for rural development initiatives and, if so, which types of town and where?'* The results show that, currently, a stimulation to a small or medium-sized town's economy is unlikely to have a significant impact on its hinterland. However, this research has helped us identify factors which will increase the potential of small and medium-sized towns to generate wealth in their hinterlands. Compared to towns in peri-urban and tourism areas, towns in areas where employment in agriculture is above the national average are more likely to be an appropriate focus for rural development initiatives, because linkages will generate the greatest local trickle-down effects. In addition, larger towns in all areas tend to generate the greatest multiplier effects.

6. POLICY IMPLICATIONS

This study indicated that local economic development in, and around, small and medium-sized towns will be best served by national and regional policies which:

(i) focus on larger market towns (a population of 15-20,000), particularly in areas where employment in agriculture is above the national average;
(ii) foster service industry growth, especially Banking and financial services, 'knowledge-intensive' industries, Construction and Food and drink;
(iii) promote residential and business development in town locations, whilst facilitating targeted business growth in hinterland locations; and
(iv) encourage ' locally-grown' business start-ups.

7. POSSIBLE FUTURE WORK

Whilst the objectives have been fully met, inevitably in a project of this size and complexity, large amounts of data have been collected, and further analysis could usefully be carried out. For example, the volume of transactions made by households and firms could be analysed in detail to aid understanding of the local economy. The role of retail services in small and medium-sized towns could also be examined to see if there are any differences between retail establishments that source locally and those that are national/internationally based. It would also be interesting to analyse separately the most important sectors highlighted by the SAM analysis to identify in more detail factors influencing linkage patterns. The potential impact of a variety of changes to the agricultural sector would clearly be worth examining.

In carrying out this project, several new areas of research on small and medium-sized towns in rural areas have been identified by the research team. These include:

(i) A further examination of the factors influencing the economic activity of firms, farms and households, e.g. why are older firms more integrated into local economies?
(ii) Testing the role of linkages in driving economic growth and performance including an examination of non-market linkages.
(iii) The collection of data to enable assessment of the environmental impacts of various economic transactions.
(iv) Research to examine local economic growth and social exclusion in tandem, particularly the role of public services on the local economies of small and medium-sized towns.
(v) An examination of the wider impacts of migration on local economies could usefully include the impact of different types of in-migrants on rural areas, e.g. retired persons.
(vi) Widening the project's case study approach to include more towns being investigated to enable findings to be generalised to un-surveyed towns.
(vii) Adopting a longitudinal approach to investigate changes in linkages and activity patterns over time.

1 INTRODUCTION

1.1 Aims and objectives

The major challenge currently facing rural Europe is to find and promote appropriate forms of economic development to maintain and improve the social and economic vitality of rural areas as they adjust to the changing demands placed upon them by society and by the market economy. This project has focused on the role that small and medium-sized towns play in rural development, and the measurement of the economic linkages between such towns and the surrounding countryside, in order to assess their present and potential role as growth poles.

The aim was to achieve two kinds of output: first, to provide an informed basis for advice to policy-makers at regional, national and EU level who are seeking to foster sustainable rural development; and second, to improve the methodologies through which the impact of changing agricultural and rural development policy may be modelled in *ex-ante* and *ex-post* policy evaluations.

The methodology used by the project was able to measure the economic impact of small and medium-sized towns and calculate their degree of integration into the local economy, comparing the local economic integration of small and medium-sized towns within three types of rural area, in each of five different countries. These countries were selected to reflect the varied conditions of the EU15 and EU25, viz France, Poland, Portugal, the Netherlands and the UK. Thus, the project aimed to provide information to guide policy formulation, implementation and evaluation at the regional, national and EU levels.

As a means of validating the information provided by this project in terms of its usefulness for policy formulation, implementation and evaluation, the findings of the project were compared with the current 'working assumptions' of a range of actors currently involved in rural economic development, including the agricultural sector. As recognised by the current Rural Development Regulation, the heterogeneity of rural areas means that many decisions over the allocation of funds available to foster rural development must be taken at a regional or sub-regional level, for example by LEADER groups or by the officials of local or regional economic development agencies. These decisions are necessarily based on the present knowledge that these officials have, and the assumptions that they make about the workings of the rural economy. The project critically examined these assumptions, comparing them with the findings of our own surveys and analyses.

The project had the following specific objectives:

(i) to measure the flows of goods, services and labour between firms and households in a purposively-selected sample of small and medium-sized rural towns and their surrounding countryside in order to establish the extent and nature of local economic integration;

(ii) to compare the degree of local economic integration of different types and size of town, firm and household found in the selected areas;
(iii) to draw conclusions and make recommendations to those at local, national and EU level seeking to stimulate more diversified economic activities and employment opportunities in rural areas;
(iv) to provide an accessible source of spatially referenced microeconomic data to those seeking to model the future impact of EU policies on the rural economy.

1.2 Context: relationship to previous and current rural policy thinking

With the transformation of agriculture and the decline of other primary industries, rapid changes are taking place in the economic and social structure of Europe's rural areas, giving rise, in some localities, to severe unemployment and underemployment, deprivation and depopulation (Marsden *et al*., 1993). Agriculture is no longer the main economic driver in rural economies, as it was 50 years ago, and it is now widely accepted that the traditional analytical framework that saw rural areas through an agricultural perspective is out-moded. Different sets of internal and external drivers have forced rural economies to change in an uneven manner; one of the key processes behind this being counter urbanization (Roberts, 2002). Settlement patterns vary between different parts of Europe. While some of their determinants are universal - such as the economies of agglomeration - others vary. For example, in the most densely populated countries such as the Netherlands, strong planning controls have sought to contain economic activity and housing within towns to protect the surrounding countryside. In other countries a more diverse settlement pattern is found with some very small settlements still containing a relatively wide range of economic activities. Small and medium-sized towns (with a population of 5,000-40,000) form an important component of the economic structure of Europe's 'rural world', but despite this important role, data and knowledge on market towns is generally weak (KPMG, 2000). In the UK, market towns include not just traditional rural areas but also coastal, mining and manufacturing towns (Countryside Agency, 2001). Historically, they have formed an integral part of both the agricultural sector and the rural economy as a whole (Countryside Agency, 2003b). As a source of farm inputs (both goods and services), as a first destination for farm outputs, as a provider of supplementary employment and income to pluriactive farm households, and as a source of consumer goods and services for farm households, the small market town has had a symbiotic relationship with its surrounding area (Lloyd, 1984; Tacoli, 1998, 2003) so that changes in agricultural policy may have a substantial impact upon them. This will be particularly significant where the towns in question form part of the distinctive cultural 'flavour' of the rural area in question, a fact long-recognised by organisations such as the *European Council for Villages and Small Towns* (ECOVAST) and *Action for Market Towns*.

While the prosperity of these small towns has thus owed much to the prosperity of local agriculture, farm incomes and the living standards of farm households have owed much to their proximity to these towns. However, the restructuring of the rural

economy may be breaking these links and undermining the traditional function of small rural towns, in some cases leading to the 'death' of the market town where no remedial action is taken. Where this occurs communities can be left without social or commercial foci. The factors that contribute to these 'broken links' have been well documented (Collis *et al.*, 2000; Thomas and Bromley, 2002, 2003; Action for Market Towns, 2004). They range from the globalisation of markets, to the centralisation of health and education services and reduced transport services, to the growth of new types of shopping facilities (which are usually in decentralised locations and have negative effects on market towns) and the development of telecommunications networks which reduce the transactions costs that have, until now, encouraged rural firms and households to conduct most of their transactions in the immediate locality (Marsden *et al*., 1993; Saraceno, 1993; Curran and Blackburn, 1994). Whilst technological changes are providing opportunities for a more diverse range of firms and individuals to relocate to some of these rural settlements (Countryside Agency, 2003 and 2003a), it does not necessarily follow that all the benefits of such initiatives flow to the surrounding countryside. Such trends can lead to existing small rural firms being disadvantaged if they are slow to exploit these new technologies (Smallbone *et al*., 2003). This is illustrated by a study by Mitchell and Clark (1999) who investigated the reasons why rural firms choose to use information and communications technology. Their results showed pronounced variation in rates of adoption (explained by the pressures exerted by customers and suppliers and the way these are responded to by managers) leading to a two-tier rural economy.

The focus of this research mirrors the increasing concern of national and local governments for their rural towns. In the UK, the government has been pro-actively developing policies for rural town development. For example the Rural White Paper (DETR, 2000) recognised that in the future, market towns should act as 'a focus for growth in areas which need regeneration, and more generally as service centres and hubs for the surrounding hinterland, exploiting their potential as attractive places to live, work and spend leisure time'. In order to achieve this, the UK Government's Market Town Initiative was launched in England in 2001 and coordinated by the Countryside Agency and RDAs. One of the first steps was in the form of market towns 'health checks', which placed emphasis on evaluation, decision-making and action by local communities, the initial results of which have recently been published (Countryside Agency, 2003b; Roger Tym and Partners, 2003). Also, England's Rural Development Commission has recently established a national Market Towns Forum to diagnose problems and identify feasible solutions. However, these policy initiatives have not been based on any empirical research. Some research has been done in this area, however. For example, at a very local level, the University of Plymouth has funded a research project examining the local economic linkages of two towns within the Objective 5b areas of Cornwall. 'Future Search' conferences have recently been held with the aim of encouraging community-led regeneration, by offering a forum for stakeholders to conduct a dialogue and find a common sense of direction (Whittaker and Hutchcroft, 2002; The Community Planning Website, 2004).

On the other hand, in the other partner countries, there have been no explicit policies promoting development of rural towns. In the Netherlands, there has only been socio-economic support for 19 larger cities - the 'big city policy', but support for small rural towns has been available in areas eligible for EU structural funds. The strict policy of not allowing the geographical spread of business sites or residential building can hinder economic development, but a number of towns have been given 'extra local function' status which means that they may extend their business site areas. Portugal has layers of stratified regional development plans, going down to the NUTS IV (Concelhos level), but these currently concentrate more on the development of the town itself than on stimulating the surrounding rural economy.

The 'European Conference on Rural Development' held in Austria in 2002 reaffirmed the significant value of Europe's rural areas. However, the ongoing restructuring of the agricultural sector, the effects of CAP reform and changing patterns of agricultural trade are affecting all rural areas across the EU (European Commission, 2003). In order to preserve Europe's rural areas, future rural development policy must promote sustainable development - a point which was highlighted in a recent report to DEFRA (2004b), which was commissioned to investigate the changing nature of rural England in order to enhance the Government's ability to target policy delivery to reach communities and businesses that most need support. Market towns may have an increasingly important role to play in the future diversification of the rural economy and the establishment of multifunctional agriculture. Serious consideration is being given to mechanisms that could transfer resources from bulk commodity production of traditional crop and livestock products into promoting a more diversified rural economy in order to safeguard the well-being of both the farming community and the wider rural population while still conserving the environmental assets which are such a valued feature of Europe's rural areas.

Small and medium-sized towns could play a central role in Europe's rural regeneration strategy. They are potentially attractive as a focus for future rural development initiatives because:

1. Their concentration of initiatives within such settlements takes advantage of economies of agglomeration while allowing the benefits (in terms of both employment and income) to spread out from these sub-poles into the surrounding countryside in a way that meets the economic objectives of sustainable rural development;
2. They contain concentrations of both human and institutional capacity required for 'bottom-up' initiatives exemplified by the LEADER approach to integrated rural development (Geissendorfer *et al.*, 1998; Perez, 2000; Ray, 2000; Scott, 2002 and 2004);
3. They provide locations in which to foster beneficial integrated rural development while conserving the environmental assets of the open countryside, so meeting the ecological objectives of sustainable rural development initiatives.

In short, the growing interest in this topic by policy-makers, as well as researchers, has contributed to the development of methodological tools, which can now be applied in a systematic comparative study across different EU countries and different types of rural area. This research will help identify Rural Development policy measures that will achieve the objective of fostering social and economic cohesion among EU member states.

A more detailed perspective on this policy context from each partner country is provided in Appendix 1**.**

1.3 Previous and related work

Debates on the nature of rural-urban relations have held a prominent position in development theory and planning for some time (Funnell, 1988; Douglass, 1998; Countryside Agency, 2002; Satterthwaite and Tacoli, 2003). As the CAP becomes more closely integrated with Structural Policies and more concerned with rural development as a whole, it is increasingly important to have a clear picture of the various economic links between small rural towns and their surrounding hinterlands. Establishing the degree to which a settlement is integrated into its locality is important in highlighting its contemporary functions and potential role in rural development (Courtney and Errington, 2000). While extensive government-funded Household, Family Expenditure and Farm Accounting surveys are found all over Europe, they contain, at present, inadequate spatial information to allow inter relationships within the local rural economy to be explored. Links between agriculture and the rest of the economy have been investigated in many different countries, with results often showing high income and employment multipliers for agriculture (Lewis and Thorbecke, 1992; Delgado *et al.*, 1994); but there is little analysis of their spatial location. An article on modelling the 'Seamless Web' of the rural economy by Errington (1991) highlighted the importance of agriculture's links with the local economy. Harrison (1993) and Harrison-Mayfield (1996) subsequently developed techniques of 'spatial tracking' to measure the local interdependencies of farm businesses, while more recent work has used input-output (IO) methods to model the impact of CAP reform on rural employment (Errington *et al.*, 1996). In the UK, two national seminars have explored the use of input-output methods and Social Accounting matrices (Midmore, 1991; Midmore and Harrison-Mayfield, 1996). A more recent paper by Harris and Liu (1998) examined input-output modelling of the urban and regional economy, highlighting the potential for use of hybrid local IO tables to minimise the bias associated with use of the more usual LQ approach. Bishop *et al*. (2000) have also emphasized the usefulness of IO methodology, focussing on its use for economic analysis at the local level. They developed a model for Devon and Cornwall, which indicated that the main problems encountered (such as funding of initial development of the model and expense of regular surveys) could be overcome by partnership arrangements. They also provided a rich and detailed database on the structure of the local economy. The results of this study indicated that development of such IO models throughout the UK (potentially facilitated by the new

Regional Development Agencies (RDAs)) would provide a major step forward in the understanding of economic relationships at a local level.

At the same time, work on economic linkages within the rural economy has extended beyond agriculture and its ancillary industries. Investigations in Ireland for the Fermoy Region Enterprise Board was based on socio-economic and resource audits with the objective of developing a balanced multi-sectoral approach to bottom-up development (Centre for Cooperative Studies and The Department of Food Economics, 1993). Research into the nature and level of interdependency between coastal towns and their hinterlands commissioned by the Countryside Agency (Countryside Agency, 2002) established that that market towns play a pivotal role in providing essential services for rural communities. This study relied heavily on existing data and a small survey of rural residents in the area. Using an inter-regional SAM model by Roberts (1998) has illustrated the potential of social accounting methods for analysing the strength, nature and distribution of contemporary rural-urban interdependencies. Other work of interest is that of measuring the degree of economic support provided by the local area's non-resident community to the local town.. Small area income models have been developed by Keane (1990) to identify the proportion of income kept in the locality. Based on the economic theory of central places, these used a simple Keynesian multiplier approach. Meanwhile, Errington (1994, 1996, 1997), and Courtney and Errington (2000) began to explore the integration of small rural towns with their hinterlands. This project takes their methodology to a much wider scale, and pursues the linkages in a much more rigorous and quantitative manner.

In parallel, during the two last decades, numerous theoretical works as well as empirical ones emphasise the role of the markets in the localisation process of firms and households. Theoretical approaches as those related to the New Economy Geography put at the heart of the location process the imperfect (i.e. monopolistic) competition, the increasing returns, the size of final demand market, the strength of the vertical linkages and the differential of local labour costs (see for details Krugman, 1991; Krugman and Venables, 1995; Fujita *et al.*, 1999; or, Fujita and Thisse, 2002). Some empirical studies tried to test the real influence of these factors in several different contexts (see for overviews of these studies Combes and Overman, 2003; or, Overman *et al.*, 2001). The Marketowns study can help determine whether these factors influence the spatial economic flows to and from firms and households located in the small and medium-sized towns and surrounding rural areas.

Appendix 2 describes previous research on this topic that relates specifically to the partner country.

2 MATERIALS AND METHODS

2.1 Overview of research method

Researchers working initially at the University of Plymouth developed techniques for measuring the spatial distribution of the economic transactions of both firms and households in and around small towns in the UK, thus providing empirical evidence of their contemporary function in relation to the local economy (Courtney, 2000; Courtney and Errington, 2000). This built upon previous work by Harrison (1993) who tracked flows of farm inputs and outputs in the rural economy using her 'spatial tracking' method. Successive studies of the functioning of rural communities since the mid-1990s have developed different aspects of the methodology, culminating in the current study which is exploring the spatial distribution of economic transactions in and around thirty case study towns in the five European countries.

The Marketowns study has substantially developed and enhanced the original methodologies to compare the local economic integration of small and medium sized towns within three types of rural area - agricultural, tourism and peri-urban - in each of five different countries - UK, France, Netherlands, Poland and Portugal. The methodology is designed first, to calculate indicators of local (and regional, national and international) economic integration of case study towns and the entities - firms, farms and households - within them. Second, it compares the local integration of different types of business and household within the towns themselves and the surrounding hinterland to identify the types of economic activity most closely associated with high levels of local economic integration. Through more formal modelling techniques, it also provides an indication of local employment and income multipliers.

2.2 Selection of case study towns

All towns are unique, each with a different endowment of natural capital (by virtue of their location) and cultural capital (by virtue of their history). In this sense each town selected for research can be regarded as an individual case study. However, in order to facilitate a comparison between towns and across different countries, it was decided to make a purposive selection of towns within different types of rural context. Thus, one small town (population 5-10,000) and one medium-sized town (15-20,000) was to be selected in each of three types of area chosen to mirror the differing range of circumstances and contexts across rural Europe (see Table 2.1).

In order to enable a selection of suitably comparable towns for study, partners were first asked to make an initial selection of twelve towns for possible study, two in each of the six cells shown in Table 2.1. Prior to this selection, partners resolved a number of key issues regarding the choice of study area:

(i) the size of the study area surrounding the town to be included in the surveys (a 7 km radius from the town centre was agreed);

(ii) the availability of secondary data to be used in the selection process; and
(iii) the definition of the tourism sector in terms of standard industrial classifications. Further information about study area definitions are in Appendix 3.

Table 2.1. Types of town selected in the Marketowns study

	Small (5-10,000 Population)	**Medium (15-20,000 Population)**
Area where employment in agriculture is well above national average	√	√
Area where employment in tourism is well above national average	√	√
'Accessible' peri-urban area within daily commuting distance of metropolitan centre	√	√

2.2.1 Town selection process

Partners submitted their initial selection to the Plymouth team early in 2002 together with the key secondary data (as a basis for socio-economic profiling) and other descriptive information about the towns. The sixty short listed towns are shown in Table 2.2.

Under the guidance of the Technical Director, the University of Plymouth team examined the data and, where possible, made an initial selection of six towns from each country for the main study. Based on the information provided by partners it had been hoped to select towns that were reasonably similar in terms of some of their basic socio-economic characteristics. In the event, this proved more difficult than expected, because:

- Data was not always readily available. The availability of secondary data varied between countries both in terms of its accessibility and the cost of access.

- Directly comparable data was not always available. There were some differences in definition and data collection procedures as well as differences in the type of data routinely collected by Governments. The frequency of data collection also varied between countries.

- Where data was available it often showed substantial differences in some of the socio-economic characteristics of the towns, most likely reflecting some systematic variation between countries in the physical, institutional and cultural context within which the towns are embedded.

- In the Netherlands, population density is so great and settlements so closely clustered together that it was not always possible to find sufficient towns of the specified size. This was the case even when the requirement that there should be 'no settlements greater than 3K within the 7 km radius' was necessarily relaxed to 'no settlements greater than 6K within the 7 km radius'.

- It was expected that settlement patterns and definitions of what constitutes a small town in The Netherlands and Portugal would make it necessary to recalibrate the population-size definition for small and medium towns in these countries. In the event, this only proved necessary in Portugal.

Table 2.2. Initial selection of towns

Type of Area	Small Town	Medium-sized Town
Agricultural	Brioude (FR) Condom (FR) Leominster (UK) Crediton (UK) Dalfsen (NL) Medemblik (NL) Głogówek (PL) Opatów (PL) Mirandela (PT) Peso da Régua (PT)	Mayenne (FR) Parthenay (FR) Tiverton (UK) Wisbech (UK) Schagen (NL) Ommen (NL) Jędrzejów (PL) Namysłów (PL) Vila Real (PT) Chaves (PT)
Tourism	Prades (FR) Saint Flour (FR) Swanage (UK) Seaton (UK) Bolsward (NL) Yerseke (NL) Duszniki Zdrój (PL) Ruciane-Nida (PL) Tavira (PT) Vila Real de Santo António (PT)	Dignes-les-Bains (FR) Douarnenez (FR) Burnham-on-Sea (UK) Skegness (UK) Terneuzen (NL) Nunspeet (NL) Krynica (PL) Ustroń (PL) Silves (PT) Olhão (PT)
Periurban	Magny-en-Vexin (FR) Hauterive (FR) Towcester (UK) Great Dunmow (UK) Oudewater (NL) Zuidlaren (NL) Mszczonów (PL) Ożarów Mazowiecki (PL) Lixa (PT) Freamunde (PT)	Ballancourt-sur-Essonne (FR) Fosses (FR) Saffron Walden (UK) Crowborough (UK) Gemert (NL) Schoonhoven (NL) Lask (PL) Aleksandrów Łódzki (PL) Esposende (PT) Espinho (PT)

Despite these difficulties, relevant sets of comparable towns were eventually selected whereby, within each of the six main categories (i.e. three types of area *x* two sizes of town), variation between towns had been minimised as far as possible. A preliminary review identified the main characteristics for which reasonably comparable data was available and which were likely to influence the level and type of economic activity within the study area. These were the population size, age distribution of the population, occupational status (i.e. proportion in employment, retired, unemployed etc.) and proportion of the workforce in agriculture and tourism-related sectors. In some cases additional information, drawing upon local knowledge from the partners, was required before a final choice could be made. The final selection of case study towns (shown in Table 2.3) was made at a project meeting in February 2002.

Table 2.3. The Selected Case Study Towns

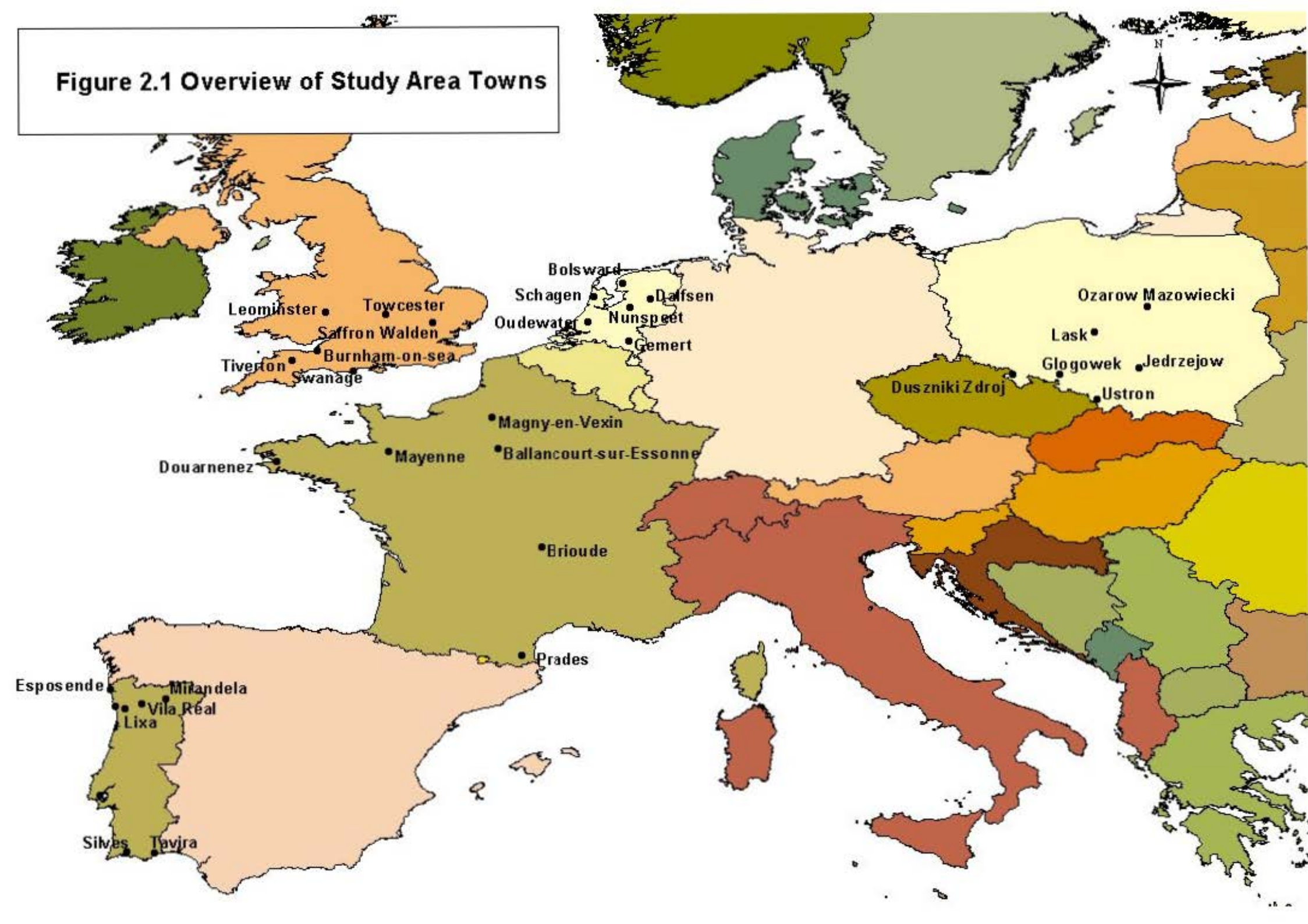
Type of Area	Small Town	Medium-sized Town
Agricultural	Brioude (FR) Leominster (UK) Dalfsen (NL) Głogówek (PL) Mirandela (PT)	Mayenne (FR) Tiverton (UK) Schagen (NL) Jędrzejów (PL) Vila Real (PT)
Tourism	Prades (FR) Swanage (UK) Bolsward (NL) Duzniki (PL) Tavira (PT)	Douarnenez (FR) Burnham-on-Sea (UK) Nunspeet (NL) Ultsroń (PL) Silves (PT)
Periurban	Magny-en-Vexin (FR) Towcester (UK) Oudewater (NL) Ożarów (PL) Lixa (PT)	Ballancourt-sur-Essonne (FR) Saffron Walden (UK) Gemert (NL) Lask (PL) Esposende (PT)

The location of all case study towns is shown in Figure 2.1. Profiles of all thirty towns are provided in Appendix 4.

2.3 Survey procedures

This section explains the survey procedures undertaken by each of the five research teams. As each team experienced a unique set of circumstances and associated problems with regard to data collection, detailed information about survey procedures is provided for each country. In this way, the considerable efforts taken to assimilate a comprehensive data set on thirty towns across Europe can be fully appreciated.

Figure 2.1 Overview of Study Area Towns



2.3.1 Data collection tools

Drawing on previous experience and methods from earlier University of Plymouth studies, draft questionnaires were developed and piloted on a single town in each country during the first half of 2002. Three questionnaires were designed for Farm Businesses, Non-Farm Businesses and Households[1]. Following the pilot study, some modifications were made to the three survey instruments in order to try and maximise response rates and improve the accuracy of collected information.

The structure of all three questionnaires is similar. The first set of questions gather information on the characteristics of the entity in question, for example the size and type of farm, the length of time the business has been located in the study area, the number and ages of people in the household. The second sets of questions seek to allocate particular types of economic transaction to each of a series of eight 'zones' (as shown in Figure 2.2). Drawing on the experience of the previous University of Plymouth studies, the pilot survey used a map showing the location of Zones A-C to aid the respondent.

Figure 2.2. Zones used in the Marketowns surveys

A	within the town
B	up to 7 Km from the town
C	7-16 Km from the town
D	elsewhere in the county*
E	elsewhere in the region
F	elsewhere in the country
G	elsewhere in the EU
H	rest of the world

*Note: Zone D is not distinguished in the Netherlands

A subsequent question sought more detailed information on the sourcing of individual inputs to the business and location of sales. The equivalent section in the Farm Business Questionnaire gathered information on farm inputs and outputs while those in the Household questionnaire gathered information on the sourcing of both high-order and low-order goods and services.

The final set of questions for the farm and non-farm businesses gathered information about the workforce, primarily occupation type, annual salary and place of residence. For the household questionnaire, this final section gathers information on the employment of the respondent and up to one other adult in the household who

[1] The farms covered in the Marketowns study were asked to complete both a Farm Business questionnaire and a Household Questionnaire.

is in full-time or part-time employment. In this case information is gathered on their job title, the industry in which they work and their place of employment (once again in terms of the eight pre-specified zones).

A copy all survey instruments is located in Appendix 5.

2.3.2 Sampling frames

The availability and format of sampling frames for firms, farms and households varied between the countries. In selecting sampling frames two criteria were considered to be of key importance: 1) they needed to cover a large segment of the population and not omit certain sectors or socio-economic groups; and 2) they needed to be as up to date as possible in order to maximise response rates. On the whole this criteria was achieved. Sampling frames used in the UK, France, the Netherlands and Portugal are detailed in Tables 2.4 and 2.4a.

Table 2.4. Sampling frames used in the study: by country and survey type: UK and France

UK	**Sampling frame**	**Date**	**Inclusions**	**Exclusions**	**Other comments**
Businesses	BT Business Database	2002	All businesses listed within the study area	All public sector organisations	Only lists VAT registered businesses
Households	BT Phone Disc	2002	All households listed within the study area	All households with a 'farm' address	Only lists those households with a registered phone number
Farms	BT Business Database BT Phone Disc Royal Mail Postcode Book	2002 2002 1991	All businesses listed as farms within the study area All households with a 'farm' address within the study area All 'farm' addresses listed within the study area		Only lists VAT registered businesses Only lists households with registered number
France	**Sampling frame**	**Date**	**Inclusions**	**Exclusions**	**Other comments**
Businesses	SIRENE	2002	Firms, services activities, non-profit organisation		Up to date for business start-ups but not up to date for closures
Households	France telecom (yellow pages)	2002	All households with a FT phone line	households not wishing to divulge their telephone number (red list)	Good updates
Farms	SIRENE	2002	Farms having an economic activity (principal or secondary business)		Up to date for business start-ups but not up to date for closures.

Table 2.4a. Sampling frames used in the study: by country and survey type: Netherlands and Poland

Netherlands	**Sampling frame**	**Date**	**Inclusions**	**Exclusions**	**Other comments**
Businesses	Chamber of Commerce	October 2002	Private firms	Public firms	Stratification levels: geographic, SIC, people employed
Non-farm households	Cendris	October 2002	Households with telephone	Households without telephone	Stratification levels: households, firms, farms
Farm businesses and farm households	LASER	May 2002	Farm types		Stratification levels: geographic, type, size, age
Poland	**Sampling frame**	**Date**	**Inclusions**	**Exclusions**	**Other comments**
Businesses	Systematic selection based on register of firms plus list of large firms	Three weeks prior to survey date	Attempted to ensure adequate representation of largest firms and sectors	Refusals to participate in the survey and lack of current information in registers	After exhausting basic list, refusals were replaced by similar units
Households	Systematic selection based on inhabitants register, voting list or central register.	Three weeks prior to survey date	All household types were included	Refusals to participate in the survey and lack of current information in registers	After exhausting the list, additional drawing. Refusals were replaced by interviews with closest neighbour
Farms	Systematic selection based on agricultural census data verified in the field	Three weeks prior to survey date	The list embraced all farms paying agricultural tax	Sporadic refusals to participate in the survey	Another similar farm indicated by headman

In Portugal the sample frame reproduces the population structure for the *concelho*'s territorial unit. Thus, the non-farm household sample was created according to dimension criteria (number of elements belonging to each household), since it allows an immediate identification and classification of the units to interview.

The non-farm business sample frame took into account the distribution of the non-farm businesses according to the Economic Activity Classification (NACE codes) and was divided into businesses based either on urban or rural *freguesias*. Finally, the farm business sample was built according to dimension criteria, precisely the size of the farm business in terms of arable land (SAU) measured in hectares. The goal was to interview 30 farm businesses distributed by area classes so that the distribution of

the total number of the *concelho*'s farm businesses could be inferred. As regards farm business households, the dimension criterion was not used, since the questionnaire was designed households of all sizes.

The sources used to define farm and non-farm households, were: 2001 General Population Census (provisional data); (INE (2002); The Northern Region Statistic Yearbook 2000, and the Statistic Yearbook of the Algarve Region 2000; INE (2001); 1999 General Agricultural Census for Trás-os-Montes, Algarve and Entre Douro e Minho - INE (2001).

2.3.3 Sample selection and survey administration

Following experience of the pilot survey in 2002, minimum sample sizes for firms, farms and households were agreed. The pilot survey indicated that it would not be possible to sample as many farms in the peri-urban and tourism study areas as was originally anticipated. The agreed targets are set out in Table 2.5.

Table 2.5. Agreed targets for sample size following the pilot study

Agricultural study areas	**Tourism and peri-urban study areas**
Non-farm households: town 100; hinterland 50	Non-farm households: town 100; hinterland 50
Non-farm businesses: town 100; hinterland 50	Non-farm businesses: town 100; hinterland 50
Farm businesses: 100	Farm businesses: 30
Farm households: 100	Farm households: 30

The method of sample selection varied between countries, with research teams having to adapt to local and national circumstances with regard to sample selection and survey administration. Experience of the pilot survey, and previous studies carried out by the research teams, indicated that postal surveys would not work in all of the countries. On balance, the face-to-face method of data collection proved relatively successful, particularly in the case of businesses and farm businesses. Experiences of each research team varied greatly, in fact the study represents an important advancement in collecting primary economic data at a local level in a trans-national research project. To gain an overview of this, and to ensure that due attention is paid to these experiences and the various methods employed to overcome problems, extracts are provided from each of the five national reports.

2.3.3.1 Sample selection

UK

Sampling of households and non-farm businesses was relatively straightforward. All households were systematically sampled from the lists whereas exhaustive samples of business were taken in most study areas, involving sampling all, or in some cases, the majority of businesses in the frame. In Towcester, businesses in the hinterland were

stratified in terms of SIC and systematically sampled to achieve the desired sample size.

Sample selection for farm businesses was more complex as farm addresses were drawn from a variety of sources in order to maximise response rates. In Leominster 75 addresses were found from the BT Business Database, whilst a further 57 addresses from BT Phone Disc, containing the word 'farm' were also contacted. In contrast, farm businesses in Swanage were contacted through the local NFU representative, with questionnaires sent to 42 businesses. In Towcester, 34 addresses were obtained from the BT Business Database and a further 12 addresses containing the word 'farm' were obtained from BT Phone Disc. As in the case of Leominster, the post code book for Northampton and District was later used to contact a further 34 potential farms. In Saffron Walden, 58 farm businesses were identified using the BT Business Database, with a further 107 addresses containing the word 'farm' identified and contacted through the BT Phone Disc.

France

Three criteria were used to define business samples: location (town, countryside), industrial classification and firm size. Whilst all firms with 10 or more employees were selected, a systematic sample of small and medium sized firms (SMEs) were selected, stratified by industrial sector. Sampling rates varied between study areas due to the size of respective business populations.

In the Ballancourt study area, where business sample size was considerably higher than the sample selected, some firms could be kept in reserve in the event of low response rates. In Brioude or Prades, almost firms were included in the samples (82% and 92% respectively) and by sampling all firms located in Magny-en-Vexin and in its surrounding communes, not enough firms were available to build the required sample. In Mayenne and Douarnenez the situation was more favourable, with sampling rates around 65% and 70% respectively.

Surveyed farms were also selected from the SIRENE database. Douarnenez and Prades contained enough farms to select a sample large enough to achieve the target number, assuming a 20% response rate. In the other study areas there was a shortfall in the number of farms available to achieve the desired sample size. Thus, the expected response rate to achieve the target number of questionnaires was 52% in Brioude, 36% in Ballancourt-sur-Essonne, 29% in Magny-en-Vexin, and 25% in Mayenne (where the number of farms was the highest). In order to obtain an adequate number of completed farm questionnaires, all farm addresses contained in the respective database were retained. It subsequently transpired that the target number of farms was unrealistic for four out of the six study areas. Households were systematically sampled from the Yellow Pages database and this proved straightforward.

The Netherlands
Firms were first stratified according to 13 SIC sectors and 3 size categories (1 employee, 2-10 employees and more than 10 employees) for both zone A and zone B in the study areas. Firms were then systematically sampled to avoid over-sampling in any of the groups.

As the actual number of farms in the most of the selected towns was rather small (around 450 to 500 according to LASER but less in Nunspeet), and the fact that relatively low response rates were expected for the farm survey, the research team decided to select all farms in each study area. However, for the Gemert study area a stratified sample was drawn according to six farming types and five economic size categories (measured in gross standard margins: GSM). All selected farms also received a farm household survey. Sampling of non-farm households proved relatively straightforward, with all systematic sampled from Cendris.

Poland
The primary data collection method employed was face-to-face interviews. The fact that each study area covered rural areas belonging to several *gminas* (administrative units), or sections of them, caused some problems in terms of sampling. To ensure an adequate distribution of the sample in the hinterland a list of villages in zone B, stratified in terms of *gminas*, was prepared (on the basis of local authority information) and weights for each *gmina* in zone B were determined. This weighting reflected the number of inhabitants of each *gmina* living in zone B.

A systematic selection method was used both for the town and hinterland areas, which consisted of determining a sampling interval and selecting every *n*-th unit from the list. Initial sample sizes were over-estimated by 10% in order to create a reserve list, which was utilised after exhausting the basic list. In cases where the reserve was too small, additional sampling was organised. When a firm was removed from the list, it was replaced by a firm of similar size and sector. In the case of farm businesses, another farm from the same village (pointed out as 'similar' by the headman) was introduced into the list. Neighbouring households replaced un-obtainable households after exhausting main and reserve lists.

Portugal
The methodology employed in the Portuguese study also involved face-to-face interviews; with an average of ten interviews carried out per day per researcher. As it was stipulated that questionnaires not fully completed would not be usable, no incomplete or unusable questionnaires resulted from the interviewing process.

Chosen sampling frames allowed immediate identification and classification of survey units, which helped to make the survey process a lot easier, and avoid unnecessary deviations from the previously defined samples. It also helped ensure that samples were broadly representative of the populations from which they were drawn. In some cases it did not prove easy to recruit willing firms and households and obtain the necessary information, mainly due to a lack of available time on the part of the

respondents. In the case of the farms, it proved easier to collect data from larger businesses, who tended to be better organised with regard to management and bookkeeping.

For agricultural towns, and especially Mirandela, it was impossible to administer the agreed number of questionnaires to farm businesses and households. Thus, in view of the time and budget available for data collection, farm response rates were limited to 72%. In Vila Real, farm data was collected during April and May 2003, at a time of intense work for most farmers. This accounts for the difference between the number of previously agreed questionnaires (100) and the number of questionnaires actually completed (65). As a result of the farmers' unwillingness to answer both the farm business questionnaire and the household questionnaire, the fieldwork was not concluded in a way that met initial expectations.

2.3.3.2 Survey administration and influencing response

UK

All postal surveys were carried out between September 2002 and March 2003. Two reminders were sent, the second also containing a replacement questionnaire. A number of steps were taken during the course of the surveys to maximise response rates. For example, Towcester was visited at the end of November 2002 and non-responding businesses telephoned and encouraged to participate. The purpose of sending someone to the town was to offer help in completing the questionnaire, though this was only taken up by one individual. A number of replacement forms were also delivered. A number of those individuals who had promised to complete the forms were contacted again by telephone in late January 2003, though in the event this did not lead to more responses being received. All non-responding farmers in Towcester were contacted by telephone in October 2002, with a further sample of farmers derived from the postcode book contacted in May 2003. In Saffron Walden, 79 businesses that had not so far responded were also telephoned in November, though 29 of these could not be reached. Farm businesses in Saffron Walden were also telephoned in October 2002 and again in May 2003. Of the initial 165 potential farmers in the Saffron Walden area, only 4 were not re-contacted at some point. In the Tiverton study area, all farm businesses that had not responded were telephoned in early January, instead of being sent a second reminder letter. All non-respondents were then telephoned again in early June. Non responding non-farm businesses were also telephoned in early February in an attempt to boost response rates.

In all cases, survey endorsement (primarily in the form of use of a logo on the covering letter) was requested from a number of different local bodies, including town and district councils and Chambers of Commerce. In Towcester, the logos of South Northamptonshire District Council and Northamptonshire Chamber of Commerce were used on the covering letters. In Tiverton, Mid Devon District Council consented to the use of their logo on the letter, whilst in Swanage, the logo of Purbeck District Council was used and in Saffron Walden, Uttlesford District Council also gave permission for the use of their logo. A number of surveys had recently taken place in

Leominster, including a market towns 'health check'[2] and it was felt that use of the council's logo would have been counter productive to response rates. It was also agreed that the start date of the survey would be delayed until the beginning of 2003 to avoid survey fatigue in the area. In Burnham, there had also been a number of recent surveys and consultations carried out and following discussions with the district council it was felt that use of the logo would in this case also be detrimental to the survey. Endorsement was therefore achieved in all areas apart from Burnham and Leominster.

In all towns, local newspapers and radio stations were contacted prior to the first mail out. In Towcester, the press officer for the District Council handled all press releases, with articles published in several local newspapers. In Tiverton, a second press release was sent at the time of the second reminder letter to maintain awareness of the project and help maximise response rates. Follow up conversations were held with a number of reporters in all towns, and the Technical Director gave a number of radio interviews. Overall, press coverage in the study areas was found to be good.

France

In general, the respective local municipalities and other local government agencies, including Chambers of Commerce and Chambers of Agriculture supported all surveys. Local press agencies (newspaper, local TV and radio) were also requested to publish press releases or articles informing people of the existence of the study and of the survey. Between five to ten press releases or articles were published by local newspapers in each study area, although it appeared that the impact of this publicity on responses rate was limited. However, the contacts made did assist in obtaining local contextual information and with preparations for the local practitioners' workshops.

The postal survey was organised as initially planed: two weeks after the initial mail-out a first reminder was sent to non-respondents, with a second reminder sent two weeks later. Surveys commenced on the following dates:

- Periurban study areas: 25 October 2002
- Agricultural study areas: 20 November 2002
- Tourism study areas: 3 February 2003

Low response rates combined with some poor quality answers led the research team to modify the survey procedure. Three additional steps were taken in the case of firms and farm businesses, and to a lesser degree, households. First, telephone calls were made to respondents who did not complete the questionnaire to satisfactory

[2] The Market Towns Initiative was launched by England's Countryside Agency in association with the Regional Development Agencies. It encourages a baseline survey of the town (a 'health check') to provide a knowledge base to help local people identify the economic, environmental and social strengths and weaknesses and to act as an evidence base to support applications for funds to promote economic development initiatives.

standard; the aim being to improve the quality of the response. Second, telephone calls were made to non-respondents, requesting that they complete and return the questionnaire. Both of these steps greatly improved response rates, especially in the case of non-farm businesses. Around 40% of firm responses, 25% of farm responses, and 14% of household responses were obtained in this way. Finally, two team members spent three weeks in each study area in order to carry out face-to-face interviews. This proved particularly useful in the case of farms. Indeed, 37% of all farm responses were obtained this way; 68% in the case of Ballancourt where farm response rates were the lowest. Furthermore, 22% of firm responses and 11% of household responses were obtained through face-to-face interviews.

The Netherlands

A postal survey was administered on 16 October 2002, with a first reminder (including a copy of the questionnaire) sent out on days 15 and 16 following the initial mail-out and a second reminder (letter only) sent out on day 29. To increase the response rate, press releases were published in local journals during the week before the mail out. Radio interviews were also given in Bolsward and Schagen.

The relatively low percentage of usable response from firm and farm businesses can be attributed to the relative complexity of the questionnaires. In particular, many firms experienced difficulties in understanding the question about distribution of purchases by industry. For example, many retailers perceived that goods were being purchased direct from manufacturers, whereas in reality they were being sourced from wholesalers. In addition, often no accountants or bank costs were reported. In cases where the research team had doubts about answers to this question or when the question was insufficiently completed, they approached the firm by telephone and requested further information about their purchases to increase the number of usable responses. On the whole, the main difficulties experienced in this telephone follow-up were twofold: first, it was difficult to trace the person who had completed the survey; and second, information could not be provided, either because it was not readily available or it was only accessible by employing accountants at considerable cost.

In addition, some incomplete surveys were corrected through following the guidelines for missing data set by the Marketowns team; this re-estimation procedure was restricted to about 10% of the usable surveys.

As usable responses remained below the required minimum threshold of 150 firms, despite the efforts to improve response rate described above, the research team decided to extend the sample and mail surveys to a newly selected sub-set of firms. This additional survey commenced on 1 May 2003, with questionnaires sent out to 800 firms in Gemert, over 700 firms in Nunspeet, around 800 firms in Oudewater and 800 firms in Schagen. Additional surveys could not be mailed to firms in Bolsward and Dalfsen, as the team had already approached all firms in zones A and B during October/November 2002.

Unfortunately, overall response rates to these additional surveys was only 5%. Likely reasons for this is a lack of local press coverage, the location of firms in Zone B, which may have had less commitment to the respective towns than firms in Zone A, and the fact that the survey was administered during a holiday period. Further, a number of returned surveys were not fully completed. These firms were contacted by telephone directly after surveys were returned, and in about 50% of such cases, researchers were able to obtain the required information.

Poland

The experience gained during the pilot suggested that a face-to-face method would be required to collect the data. Whilst a number of researchers were involved in the data collection process, all were either fully qualified or trained in interviewing techniques and all were adequately informed about the purpose of the study.

A person responsible for quality control was present in each study area during the survey. This person was also obliged to apportion periodically (every day or every few days) a part of the sample and collect and verify completed questionnaires. In case of errors or omissions, i.e. with respect to poor quality data or missing information, the questionnaire was returned to the relevant researcher to obtain the necessary information.

A considerable importance was attached to supplying researchers with a written authorisation to conduct the survey in the given study area. The authorisation issued by the Institute of Rural and Agricultural Development was countersigned by the mayor or district headman, who stated that the local authorities were aware of the research and requested that people assist surveyors in obtaining further contacts. This process of 'snowballing' proved successful.

Attempts were made to gain publicity about the surveys prior to their commencement in order try and maximise participation. Local media assisted with this process in each of the study areas. One or two articles about the survey were published in each case study area and information was broadcast on local television at Jędrzejów. Parish churches were also used to disseminate the information; a short communiqué about the survey was read there after mass. This proved very useful, especially in more remote rural areas and neighbourhoods inhabited by a greater proportion of elderly people.

In some cases, village headmen with whom the research team were in contact with personally informed respondents that they had been selected. Surveys commenced on the following dates: tourism areas - 16 September 2002, agricultural areas - 1 November 2002 and peri-urban areas - 15 February 2003. The survey in Ożarów was delayed due to closure of a local factory, which dominated the local media and resulted in a number of protests in the town.

Portugal
In each town contacts were made with important local institutions (town halls, managerial associations, commercial and industrial associations, the Regional Agriculture Board and Regional Tourism Boards) to gain endorsement and support for the surveys. Contacts made also supplied the team with information regarding potential interviewees in the form of lists of businesses and farm businesses and were extremely helpful in generating local publicity for the project. Local institutions also provided useful geographical information with which it was possible to accurately define zones A and B. In each town, press releases were addressed to both local newspapers and radio stations. This proved to be particularly useful with regard to non-farm businesses as it made contacts between team members and business people a lot easier.

The methodology used in the surveying process involved face-to-face interviews. Interviews with households were carried out in several places; namely town halls, primary and secondary schools, and often at places of work. Each interview lasted approximately 30 minutes.

The majority of businesses were sampled using a door-to-door approach, although some interviews were pre-arranged by telephone. Each interview lasted an average of 20 minutes, depending on the business type or size, but especially on the owners' willingness to provide access to financial records. In cases where bookkeeping was contracted out to an independent accountancy firm, the surveying process was slowed down considerably.

Surveying farm businesses proved very demanding in terms of time and financial resources, not least because of their geographical spread. Without the assistance provided by the Agriculture Ministry technicians belonging to the Agrarian Zones of the *concelhos,* this element of the fieldwork would not have been possible. Each questionnaire lasted an average of 35 minutes in the case of farm businesses and 30 minutes in the case of respective households.

2.3.4 Survey response

As with data collection methods, response rates varied between countries and study areas. Importantly, target response rates were achieved in most cases. Analysis for non-response bias was carried out for the UK, French and Dutch data sets. On the whole this analysis proved satisfactory and was not deemed too problematic given that secondary data were used to weight data sets for the multivariate analysis.

All research teams compiled details of useable response rates for the three main types of analysis in the study: economic footprints (including bivariate analysis and regression modelling), employment footprints and input-output analysis. Usable response rates for economic footprint analysis are given in Appendix 6, which indicate the percentage of questionnaires received where the data was of sufficient quality to be used for constructing economic footprints. This provides the most

accurate indication of the distribution and breakdown of entity samples that were used in the main analyses. To ensure accurate coverage of information from each of the research teams, relating particularly to the reasons for deviations in response rate, a short report on survey response in each of the five countries is provided.

UK

Responses to the non-farm household questionnaire in each town were good, with the target sample size exceeded both inside and outside the town. Response rates for non-farm businesses were close to the 20% response rate assumed at the beginning of the survey, with the exception of the Burnham study area, where they were lowest. One important point to note is that in a number of towns, response rates exceed the 20% level yet sample size targets were not achieved. This is because in many cases there were not sufficient businesses within the sampling frame to allow a 20% response rate to be achieved. The required sample size for businesses in zone A was almost achieved in Tiverton, Leominster and Saffron Walden. Responses in Burnham and Towcester for businesses in zone B were close to the required number and exceeded in Saffron Walden. Similarly, for the farm surveys, response rates in excess of 20% were achieved in Tiverton and Towcester, yet target numbers were not met primarily due to the number of farms within the survey area. A fairly consistent response rate of about 13% was obtained for the other towns.

The problem of small sample sizes highlighted above was compounded by the quality of the data received. Responses from Saffron Walden were of the highest quality overall, with the lowest percentages of useable questionnaires being from Swanage. Whilst a high proportion of responses from farms were useable, the initially small sample sizes were reduced still further by a lack of good quality data. A lack of employment information was particularly acute as many businesses were unwilling to declare information on salaries or the residential district of their employees. Accurate information about purchases of inputs was also lacking in a number of cases, largely because the question appeared too complex or required too much financial information. In many cases, question 13 was either not completed, or a significant proportion of expenditure remained unaccounted for. In the case of households, the problem was not so much incomplete information, as absence of information, with some questions on household consumption simply not completed.

In order to maximise the utility of the data provided, some data adjustment was carried out. Where possible, information was extracted from answers to other questions. For a small number of farm and non-farm businesses, average expenditure figures from national input-output tables were used where only input expenditure information was missing. In some cases, detailed information about expenditure did not tally precisely with the overall figure given. Where the difference between the two figures was less than 30%, the average pattern of input expenditure was examined and missing values treated as zero. On average, 13% of non-farm business data was adjusted in this way. As numbers of obtained household questionnaires exceeded the required sample size, only good responses were used.

France

It is worth noting that the additional steps taken to help improve response rates[3] (which were demanding in terms of time and financial resources) still did not allow the predefined targets to be reached. Despite considerable efforts, only 575 valid responses were obtained from firms (as opposed to a target of 900), 178 from farms (as opposed to 320) and 921 from farm and non-farm households (as opposed to 1220). Final totals were:

- around 100 usable firm questionnaires in each study area;
- around 40 usable farm questionnaires in each agricultural study area, 30 in each tourist area, 20 in each peri-urban area;
- around 150 usable household questionnaires in each agricultural area and in Magny-en-Vexin, 130 in the tourist areas, and 120 in the remaining peri-urban area (Ballancourt-sur-Essonne).

It would appear that the self-completion questionnaires proved too complex and too time consuming for the owner/managers of firms and farms to complete. Furthermore, the target numbers for farms were too high given the density of farms in the respective study areas. The household surveys, however, proved more successful.

The number of usable responses obtained for the various types of analyses was relatively low, although in many cases response rates fell only marginally short of targets. The 20% response rate was achieved for households, except in the case of the tourism towns and in the Ballancourt study area. It was also achieved for farms, except in Mayenne and Douarnenez where the response rates were 10%. However, all response rates were lower than 20% for the non-farm business surveys. Interestingly, they were higher in the hinterlands (zone B) than within the towns (zone A) and they were particularly low for Prades (a tourism area in decline) and for the peri-urban area of Ballancourt (the proximity to Paris may be indicative of a lack of concern for rural development).

The Netherlands

Out of a total of over 18,000 mailed surveys, over 3,200 were returned, yielding a response rate of just over 17%, with Bolsward and Dalfsen achieving a higher response rate than the other towns. In relative terms, non-farm households returned the highest share of distributed surveys and firms the lowest. In addition, firms in zone A returned relatively more surveys than firms in zone B, with the exception of Dalfsen. Non-farm households in zone A also returned a higher share of surveys than non-farm households in zone B. However, apart from the case of Bolsward, observed differences are quite small.

Non-farm households returned the highest number of surveys and farm households/businesses the lowest number. Despite various efforts to improve response rates, minimum thresholds for usable responses were not always reached.

[3] Additional steps to help improve response rates included telephone calls and face-to-face interviews. See section 2.3.3.2 for further details.

Response to the non-farm businesses survey

In all study areas the number of usable responses for economic footprints and i/o analyses remained below the minimum threshold of 100 usable surveys for zone A and 50 for zone B. In Gemert, Bolsward, Schagen and Nunspeet, the number of usable surveys returned was the highest (around 130), while the number of usable surveys in Dalfsen and Oudewater was more modest (around 115). In addition, it should be noted that minimum thresholds for usable responses were not met in zone A. In particular, given the relatively small number of firms in Dalfsen (162 firms), Oudewater (400 firms) and Bolsward (376 firms) all received a survey. To reach the minimum threshold of 100 in zone A would have demanded very high usable response rates (e.g., 60% in Dalfsen). As this was deemed unrealistic, relatively more firms were drawn from zone B in these cases, hence usable response in zone B were higher than equivalent response rates for zone A. In addition, firms found it easier to estimate the spatial distribution of sales compared to purchases.

Response to the farm household survey

For the agricultural towns, Dalfsen and Schagen, the minimum threshold for usable response was set at 100. However, the usable responses achieved were 80 and 65 respectively. For the other study areas, the target of 30 usable responses was successfully reached.

Poland

Researchers experienced a number of problems in recruiting respondents to participate in the survey, many of which showed characteristic regularities. In the case of non-farm households, those respondents living in detached houses (i.e. on higher incomes) and those who were informed about the survey by an acquaintance working for local authority were more willing to take part. The greatest problems were encountered in the case of lower income groups, particularly those residing in cheaper forms of housing (i.e. high-rise flats). In relative terms there were less refusals in rural areas (zone B) in comparison to the towns (zone A), a pattern which applied to business and household surveys. Refusals to participate in the survey were relatively rare in the case of farm businesses but were more frequent in the case of non-farm businesses. Two reasons for non-participation were cited most frequently: financial confidentiality and a lack of time. The latter reason was commonly quoted by small (one-person) firms, shops or service outlets, as participation would often mean closing the business for the required amount of time. In a few cases owners of such firms agreed to meet the researcher out of business hours.

Despite the fact that face-to-face interviews were used, which potentially alleviated problems associated with missing or poor quality data, not all responses were in fact usable. With respect to households, problems were experienced in cases where income sources were derived from welfare payments, including pensions, social security or sickness benefit. In the case of farm businesses, it was found that some did not sell any of their produce but simply catered for their own needs. Likewise, there were some non-farm businesses that were ceasing to trade at the time

of the survey and thus did not actually make any purchases or sales. Thus, the fact that not all surveys were usable did not result from collection of poor quality data but instead from the nature and character of the sample.

Portugal
A key choice criterion in selecting sampling frames was the ability to identify and classify potential respondents easily. As well as helping to avoid unnecessary deviations from the previously defined samples, it also helped to guarantee the sample's representativeness. Some inaccuracies were observed in some sampling frames (both firm and household) and the number of interviews actually carried out was determined by the ease in which respondents could be identified and, in some cases, their unwillingness or lack of time to be interviewed. Constant monitoring of the survey process was also rendered more difficult due to there being several researchers in the field at the same time.

In the case of the surveyed farm businesses, observed differences relate to the relationship between farm size and ease of obtaining of the data. Larger farm businesses were usually better organised with regards management and bookkeeping.

2.3.5 Validation exercise

To check for data validity the study was designed to compare key variables (i.e. proportions of transactions by value that are attributed to 'locality') to independent measures of the same variables, known as criterions. The most effective way of doing this was to compare the data collected via self-completion methods, based on recall and estimation, with that which had been recorded directly from reliable sources, such as firm invoices and receipts. Ultimately, we could then compare our self-completion questionnaires with methods that can be acknowledged as 'gold standards' for assessing the same variable. In the case of the business validation, this involved going back to a sample of the respondents and recording information from the firms' invoices and receipts. To validate the household data, a sample of respondents were requested to complete a diary to record expenditure over a two-week period.

Experience from the pilot survey revealed that the task of data collection via these methods was far from straightforward. The main reasons for this included a lack of willingness on the part of the respondent to give up the required time; a reluctance to impart with confidential financial information; and un-availability of the required information. It was therefore agreed that each country would attempt to validate data in one of the agricultural towns (which would allow a more comprehensive validation of farm data given relative sample sizes), sampling 10% of households (15), businesses (15) and farm businesses (15). As only five study area towns would take part in the validation, it was agreed that the exercise would not be used to calibrate the data but merely to allow comments to be made on the likely accuracy of the data collected by the surveys. In any case, results of the pilot validation exercises were encouraging with regard to the accuracy of the data collected via self-completion

methods. A short report on the validation exercise in each of the five countries is provided below.

UK

A sample of businesses, households and farms drawn from the Tiverton study area were asked to participate in the validation exercise. Twelve non-farm businesses agreed to participate and information on suppliers and expenditure on inputs was recorded for a random sample of invoices. For ten of these businesses, invoices were sampled from across the whole of the previous financial year, whereas for the remaining two, only invoices stretching back over the past few months were available for examination. Only data pertaining to input expenditure was validated as those businesses agreeing to participate did not have information about the origin of their customers. Information was obtained for eight farm businesses regarding sales revenue and input expenditure. Fifteen households initially agreed to complete a diary of purchases over a two-week period, though only eleven were returned completed. Farm households were not validated as it had taken considerable effort to generate responses to the Tiverton survey. With a relatively small sample size, it was felt important to focus upon validating the business survey, which differed from that sent to non-farm businesses.

Results of the household validation are given in Table 2.6. The data indicates the percentage deviation between expenditure in the different zones obtained from the original questionnaire when compared to the diary. The results show that the estimated data is very close to the data recorded in the diary, with the largest deviation being only 6.5%. Data obtained from the household questionnaire can therefore be assumed to be a valid record of actual household expenditure.

Table 2.6. Deviations of estimated data from recorded data (in %) for non-farm households in Tiverton

Zone	**Non-farm**
A. Within town	-4.26
B. Within 4 mile radius	1.06
C. Within 4-10 mile radius	3.47
D. Elsewhere within Devon	-4.89
E. Elsewhere within the South West	6.51
F. Elsewhere within the UK	-1.88
G. Elsewhere in the EU	0.00
H. Elsewhere in the rest of the world	0.00

Results of the validation exercise for farm and non-farm businesses are given in Table 2.7. Examining the data we also find very little difference between the percentage distribution of expenditure across the zones obtained from the questionnaire and that obtained from recorded data. The greatest deviation relates to the percentage of total expenditure attributed to national suppliers, with a difference of 10.8% between the two. For the remaining zones, all deviations are less then 5%. The data from the questionnaire can therefore be taken as a valid record of business behaviour, though it slightly underestimates the importance of the national economy in business supply.

Table 2.7. Deviations of estimated data from recorded data (in %) for purchases and sales of non-farm and farm businesses in Tiverton

Zone	**Non-farm purchases**	**Farm purchases**	**Farm sales**
A. Within town	2.39	15.99	1.40
B. Within 4 mile radius	-4.28	-5.61	13.28
C. Within 4-10 mile radius	-2.51	14.04	-11.42
D. Elsewhere within Devon	-1.44	-24.36	17.67
E. Elsewhere within the South West	-4.79	-7.88	-26.80
F. Elsewhere within the UK	10.80	7.92	5.78
G. Elsewhere in the EU	-0.36	0.00	0.00
H. Elsewhere in the rest of the world	0.00	0.00	0.00

France

The validation exercise was attempted in Brioude, whereby those respondents that had taken part in face-to-face interviews were requested to complete household diaries or provide access to financial records respectively. However, respondents would not co-operate in the exercise due to an unwillingness to give up the required time and concern over financial confidentiality. Nevertheless, it should be noted that a substantial amount of data was collected via face-to-face interviews, which yielded more comprehensive, and arguably better quality, data than was derived from self-completion methods.

Results of the validation exercise carried out as part of the pilot study (Genlis in Burgundy) does, however, provide a useful indication of data validity. Three firms that agreed to take part in the exercise were visited and up to four hours was spent recording information from invoices and receipts in financial records relating to the previous six months. In some cases records related to three months due to the number of invoices available. Table 2.8 presents the deviations of estimated (i.e. questionnaire) data from recorded data for non-farm businesses.

Table 2.8. Deviations of estimated data from recorded data (in %) for purchases by non-farm businesses

Zone	Purchases
A. Within town	-4.0
B. Within 4 mile radius	11.3
C. Within 4-10 mile radius	-8.3
D. Elsewhere within Cote d'Or	0.3
E. Elsewhere within Burgundy	3.3
F. Elsewhere within France	-2.3
G. Elsewhere in the EU	-0.7
H. Elsewhere in the rest of the world	0.0

The validation exercise indicates that approximations made by respondents regarding the location of firm expenditures are relatively good. The most significant differences between the estimated and recorded data are between the zones A to C and zones E and F. In both cases, local expenditures (zones A, B and C) tend to be underestimated by the respondents.

The Netherlands

In the Netherlands, the small 'agricultural' town of Dalfsen was selected for the validation of household and farm data. For firms, however, the small 'tourist' town of Bolsward was selected as secondary data on the employment distribution of local firms was available.

Firm validation

From the pilot survey it became evident that firm owner/managers were not at all willing to provide access to their financial records. This was principally due to a reluctance to give up their time (a severe problem for micro-businesses) but it was also related to a mis-trust that the data would be subject to a breach of confidentiality, which is understandable. Hence, a different approach was taken to the firm validation than the one originally proposed.

In an attempt to validate the non-farm business data, use was made of findings from another study that had examined the spatial distribution of employment in the industrial and transport sectors in the municipality of Bolsward (Unpublished information of the Municipality Bolsward). The findings from this study were used to make a within-group comparison (Table 2.9). Deviations do exist, especially for the shares of employees living in zone A and B on the one hand, and the share living in zone C and D on the other. However, these deviations are within reasonable limits. The deviations may be related to the fact that the zones used in the Bolsward study do not fully match the zones in the market towns survey: zones A and B in the Bolsward study cover the area of the municipality of Bolsward, which is smaller than the area covered in the present survey (up to 7 km from the town Bolsward). As a consequence, zones C and D in the Bolsward study are larger than zone C and D in the market towns survey.

Table 2.9. Deviation of estimated survey data from Bolsward study and the Marketowns study in terms of location of persons employed (in % points)

Zone	Location	Firms with 1-10 persons			Firms with >10 persons		
		Bolsward study (%)	survey (%)	dev.	Bolsward study (%)	survey (%)	dev.
A-B	In Bolsward and its 7 km radius	53	69	16	35	43	9
C-D	Elsewhere in the province of Friesland	46	30	-16	58	49	-9
E-G	Elsewhere	1	1	-	7	8	-1

Farm validation

To assist with the farm validation, the Central Farm Accounting Department of LEI provided access to accounting data (Farm Accountancy Data Network (FADN)), based on a sample of approximately 1500 farms in the Netherlands). Although data is available down to individual farm level in the Dalfsen study area, direct comparisons between FADN farms and survey farms were not possible as no FADN farms had responded to the survey. Therefore, accountants were asked to select 9 dairy farms and 1 mixed livestock farm from FADN in zones A, B and C around Dalfsen (to make up a stratified sample).

Purchases and sales of these farms were then classified according to the distinguished categories in the farm survey and three size groups were defined: dairy farms with 18-30 ha of land, dairy farms with more than 30 ha, and mixed livestock farms. As a next step, the average purchases and sales were calculated for the relevant farms in both the FADN and the survey groups. Table 2.10 compares the estimated data from the questionnaires with the recorded data derived from the FADN for the three farm groups in Dalfsen. Deviations are calculated as the percentage of average input and output structures for these groups according to FADN minus the percentage of average input and output structures for similar groups according to the survey. Almost all deviations are less than 10%, which would imply a reasonable level of accuracy of the market towns farm business survey in Dalfsen.

Table 2.10. Deviations of estimated data from recorded data for farm groups in FADN and from the Marketowns study in terms of purchases and sales structure in the study area Dalfsen (in % points)

	Dairy farming 18-30 ha	**Dairy farming > 30 ha**	**Mixed livestock farming**
Inputs			
Seeds, fertilizer etc.	-3	-3	-3
Medicines	-1	1	0
Concentrates	-6	-2	8
Contractors	-2	1	-5
Fuel, power, water	-3	-4	-5
Other inputs	14	7	5
Outputs			
Milk and cattle	-1	-3	-3
Pigs	0	-1	3
Other outputs	1	4	0

Household validation

For the purpose of the household survey validation, the sample of households in Dalfsen was stratified according to life stage (Table 2.11). Households were requested to keep a diary of their expenditure over a two-week period. To ensure an adequate participation rate, respondents were offered a gift coupon to the value of €20. This proved successful.

Table 2.11. Sample stratification for household validation in Dalfsen

	n
Young adults (17-24) without children	-
Family with dependent children	6
Family of adults, all of working age	5
Elderly (pensionable age)	4
Total sample	15
Number of returned diaries	15

Table 2.12 compares the estimated data obtained from the surveys with recorded data provided in the diaries. Deviations are calculated as the percentage of total purchases (per zone) according to the diary minus the percentage of total purchases (per zone) according to the questionnaire for those individual respondents. A total of twenty-five deviations were evident from recorded data, of which almost three

quarters deviate by less than 10% points. This seems to reflect a reasonable level of accuracy of the Marketowns household survey in Dalfsen.

Table 2.12. Deviations in survey data from data of household diaries for non-farm households in Dalfsen in terms of expenditure on goods and services (in % points)

Zone		Family with 4 children	Elderly	Family with 2 children	Adults without children	Family with 1 child
A	In the town Dalfsen	6	1	4	-10	-4
B	Up to 7 km from the town of Dalfsen	8	2	0	9	-10
C	7-16 km from the town of Dalfsen	-11	1	-6	21	0
D*)						
D^{NL} *(=E)*	Elsewhere in the province of Overijssel	4	0	-3	-15	22
E^{NL} *(=F)*	Elsewhere in the Netherlands	-7	-1	6	-6	-8
F^{NL} *(=G)*	Elsewhere in the European Union	0	0	0	0	0
G^{NL} *(=H)*	Elsewhere international	0	-2	0	1	0

*) Zone D according to the Marketowns study is not distinguished in the Dutch survey; zone D^{NL} equals with zone E in the Marketowns study, zone E^{NL} equals with zone F, zone F^{NL} equals with zone G and zone G^{NL} equals with zone H.

Poland

The business surveys revealed the inherent difficulties in obtaining information about firm activities, and in fact proved that in some cases it is impossible (there were a number of refusals to participate in the main survey). Under conditions of the Polish transformation, firms consider this type of information as highly confidential and thus all respondents refused access to financial records at the time of the interviews. For these reasons, it was not possible to validate the business data.

Validation of the household data carried out, however. Household diaries of expenditures were prepared in order to verify the collected data. Transaction diaries were completed by 10 farm households and 5 non-farm households in the Głogówek study area. The results of the exercise are given in Table 2.13.

The deviations of estimated data from recorded data given in Table 2.13 indicate that non-farm households located in the town tended to slightly under-estimate expenditure in the town, particularly in the case of services. Non-farm households located in the hinterland, however, tended to over-estimate expenditures in the local economy (zones A, B and C) and under-estimate regional expenditure. The data would suggest that farm households tended to over-estimate consumer expenditure in the hinterland, and over-estimate the amount of expenditure carried out in the town.

Table 2.13. Deviation of estimated data for transactions by non-farm and farm households in Głogówek

Zone	Boundary	Non-farm households (Zone A)	Non-farm households (Zone B)	Farm households (Zone B)
	Purchase of goods			
A	In the town	-6,1	-4,2	-17,1
B	Up to 4 miles/7km from the town	1,8	5,8	8,0
C	4-10 miles/7-16 km from the town	-3,2	5,7	2,3
D	Elsewhere in the county	3,0	2,2	4,7
E	Elsewhere in the region	2,9	-10,8	-0,8
F	Elsewhere in the country	0,1	1,3	2,7
G	European Union	0,8	0	0,3
H	Elsewhere international	0,6	0	0
	Purchase of services			
A	In the town	-18,3	27,6	-30,6
B	Up to 4 miles/7km from the town	4,3	16,5	49,9
C	4-10 miles/7-16 km from the town	0,9	10,9	-9,8
D	Elsewhere in the county	7,0	-16,3	-6,0
E	Elsewhere in the region	1,5	-53,8	-5,3
F	Elsewhere in the country	0,8	3,0	1,8
G	European Union	3,0	12,0	0
H	Elsewhere international	0,8	0	0

Portugal

The validation exercise was carried out in Mirandela. The number of households in zones A and B requested to complete a diary is shown in Table 2.14.

Table 2.14. Validation frame - Non-farm households

	Zone A	*Zone B*
1 resident	1	1
2 residents	4	2
3 residents	4	2
4 residents	5	2
5 or + residents	1	1
Total	15	8

Initially it was difficult to find willing participants for the second survey but the importance of the exercise was stressed by the research team. Together with the diary, interviewees were given a pre-paid envelope to encourage the completion and return of the questionnaire. However, no diaries were returned and the validation exercise was therefore not completed.

The number of farm and non-farm businesses approached according to size and activity sector is given in Table 2.15. Some owner/managers who were interviewed did provide access to financial records at the time of the initial interview, thus allowing an immediate form of validation. However, access to information regarding suppliers' and customers' invoices and receipts was denied, which prevented the validation exercise from being accomplished.

Table 2.15. Validation frame - Non-farm business

	Economic Activity Classification - NACE cods	*Zone A*	*Zone B*
A + B	Fishing and Forestry	-	-
C	Mining	-	-
D	Manufacturing	2	1
E	Energy and water	-	-
F	Construction	1	1
G	Wholesale and Retail and car repairs	8	2
H	Hotels and restaurants	2	1
I	Transport, storage and communications	-	-
J	Banking, finance, insurance, etc.	-	-
K	Real estate, renting and business activities	1	-
L a Q	Public administration, education, health,	1	-
	Total	15	5

2.4 Analytical methods

The study involved a variety of analyses designed to measure the flows of goods, services and labour between the case study towns and the surrounding local, regional, national and international economies. In so doing, it aimed to map the spatial patterns of firm, farm and household transactions, identify the key characteristics of firm, farm and household and town that are associated with strong (or weak) local economic integration and estimate subsequent income and employment effects in the local economy. It achieved this through four main methods of analyses:

(i) construction of economic and employment 'footprints';
(ii) bivariate analyses of local economic integration;
(iii) multivariate analysis of local economic integration and spatial economic behaviours; and
(iv) construction of local SAMs.

These four analytical methods are described below.

2.4.1 Economic Footprints

The questionnaires were designed to collection information about transactions within distinct boundaries of the local, regional, national and international economy (Zones A-H, see Figure 2.2). It was therefore possible to construct a series of 'economic footprints' and 'employment footprints' for each case study town. The footprint simply shows the proportion of a given type of transaction (e.g. input purchases, output sales, low order purchases, distribution of salary payments etc) that take place between entities in the study area and those located in each of these zones. It therefore provides a simple overview of the degree of local integration of the study area as a whole. Economic footprints for all sampled businesses and households within a study area relate to the spatial distribution of transactions by value across the eight zones A-H, and were constructed on the basis of aggregate sales, purchases and employment for all entities in each study area.

2.4.2 Bivariate analyses

Where a firm or household exhibits strong integration into the local economy, customers or suppliers in this predefined area account for a large proportion of its respective revenue or expenditure and a large proportion of its workforce is drawn from this same area. Similarly, where a household exhibits strong integration into the local economy shops and service providers in this predefined area account for a large proportion of household expenditure on consumer goods and services. To aid interpretation of this, the footprint data was used to calculate a series of Local Integration Indicators (LIIs) for each of these different types of transaction. The LII is a continuous variable whose value lies in the interval [0,1]. The indicators were then used as dependent variables to compare different types of firm, farm, household, town and location in the study area with respect to their economic integration into the local economy. In most cases Mann-Whitney U tests were employed to compare two groups (i.e. small vs. large firms; low income vs. high income households). In other cases Kruskall Wallis tests were used to compare sub samples that involved more than two groups. This analyses was carried out at study area and national level.

2.4.3 Multivariate analyses

Multivariate analyses differed from previous analyses in two main ways. First, it was carried out at international, as opposed to national and study area level using pooled data sets; and second it involved the use of data that was weighted to take account of the industrial and demographic structures in each of the 30 case study areas. Standard Industrial Classification was used to weight business samples and family stage categories were used to weight household samples. An example of the weighted data for the UK is provided in Table 2.16.

Table 2.16. Data weighting for UK households and non-farm businesses

	Leominster			Tiverton			Swanage		
	Response	**Actual**	**weight**	**Response**	**Actual**	**weight**	**Response**	**Actual**	**weight**
Household:	*%*	*%*		*%*	*%*		*%*	*%*	
Retired (%)	36.3	17.7	0.49	37.7	20.8	0.55	48.6	30.3	0.62
Non-farm business:									
Forestry and Fishing	2.6	2.3	0.88	3.5	2.8	0.80	0	2.5	0.00
Energy, water	0	0	0.00	0	0	0.00	0	0	0.00
Manufacturing	10.5	14.4	1.37	13.2	12.2	0.92	4.9	9.8	2.00
Construction	11.4	8.7	0.76	3.5	8.1	2.31	11.7	6.4	0.55
Distribution	0	3.7	0.00	4.4	3.1	0.70	1	3.4	3.40
Retail	25.4	24.5	0.96	25.4	23.6	0.93	23.3	23.1	0.99
Hotels and Catering	5.3	8.3	1.57	7	8.5	1.21	17.5	19.9	1.14
Transport & Communications	1.75	5.2	2.97	5.3	3.1	0.58	3.9	6.1	1.56
Banks & business services	21.05	15.5	0.74	15.8	15.5	0.98	13.6	10.3	0.76
Public admin, health, education	12.3	9.2	0.75	4.4	8.1	1.84	5.8	6.1	1.05
Personal services	10.5	8.1	0.77	17.5	12.2	0.70	17.5	11.3	0.65

	Burnham			Towcester			Saffron-Walden		
	Response	**Actual**	**weight**	**Response**	**Actual**	**weight**	**Response**	**Actual**	**weight**
Household:	*%*	*%*		*%*	*%*		*%*	*%*	
Retired (%)	43.8	25.6	0.58	23	17.6	0.77	28.4	15.7	0.55
Non-farm business:									
Forestry and Fishing	2	2.7	1.35	1.1	2.5	2.27	0	1.1	0.00
Energy, water	0	0	0.00	1.1	0	0.00	0	0	0.00
Manufacturing	7.9	14.4	1.82	8.7	13.4	1.54	8	16.8	2.10
Construction	12.9	9.9	0.77	7.6	6.5	0.86	9.4	7	0.74
Distribution	5	6.2	1.24	2.2	2.3	1.05	7.2	2.4	0.33
Retail	34.7	22.6	0.65	19.6	15.5	0.79	23.9	19.6	0.82
Hotels and Catering	9.9	14	1.41	7.6	10.6	1.39	2.9	6.8	2.34
Transport & Communications	7.9	7.1	0.90	5.4	5.1	0.94	4.3	5.2	1.21
Banks & business services	6.9	11	1.59	26.1	24	0.92	28.3	22.3	0.79
Public admin, health, education	6.9	6.1	0.88	5.4	6.7	1.24	0	6.5	0.00
Personal services	5.9	9	1.53	15.2	13.2	0.87	15.9	11.7	0.06

Two phases of multivariate analysis were undertaken:

(i) A series of Ordinary Least Squares (OLS) Regressions to examine the key characteristics of entity and local environment associated with strong local economic integration, using the various Local Integration indicators as dependent variables; and

(ii) A factor, cluster and logit analyses, first to classify entities according to the their patterns of spatial behaviour throughout the local, regional, national and international economy, and then to identify the key characteristics that help to differentiate these groups.

Ordinary Least Squares Regression

Ordinary Least Squares (OLS) Regression[4] was employed to help identify key characteristics of towns, firms, farms and households associated with strong local economic integration. The basic model can be expressed as:

$$y_i = X_i \beta + u_i$$

where i = 1, ... n, representing the number of firm, farm or household entities in the model (also serving as number of observations), y_i = is the respective dependent variable (as set out in Table 2.17), X_i = is a vector of independent variables representing the relevant entity characteristics, β is a vector of parameters to be estimated, u_i is an independently distributed error term assumed to be normal with zero mean and constant variance σ^2. The advice of Hair *et al.* (1998) and Gujarati (2002) was taken with regard to meeting and testing the suitability of data for multiple regression, including examination of residual and normal probability plots and carrying out data transformations as appropriate. The derivation of all dependent variables is set out in Table 2.17.

The independent variables each compared sub-sets of towns, firms, farms and households to examine the influence of a range of characteristics and distinctions between entities on local economic integration.

There were a total of eight dependent variables of interest within the three data sets; firms, farms and households were modelled separately. The dependent variables were specified in terms of the mean proportions of transactions (by financial value) attributed to specific geographical boundaries, or zones. Arc sin transformations were applied to all dependent variables to improve the distributions and to allow model fit using an OLS specification. This is a standard method of transformation for proportional data (Hair *et al.,* 1998).

[4] The Technical Annex stated that Logistic Regression would be used for this purpose. However, the data gathered allows a linear regression model to be fitted to the data, which is preferable to logistic regression because more information about the distribution of linkages is retained. Multinomial logistic regression (logit analysis) is used to examine variations in spatial economic behaviour, including local integration, in section 3.8.

Table 2.17. Derivation of dependent variables for the Phase I analysis

Data set	Linkage	Variable name	Variable definition*
Firm and farm	Local sales	salabsin	(arcsin) % of sales in Zones A+B
	Extended local sales	sala1sin	(arcsin) % of sales in Zones A+B+C
	Local purchases	purabsin	(arcsin) % of purchases in Zones A+B
	Extended local purchases	pura1sin	(arcsin) % of purchases in Zones A+B+C
Household	Local low order spend	lowabsin	(arcsin) % of low order spend in Zones A+B
	Extended local low order spend	low2sin	(arcsin) % of low order spend in Zones A+B+C
	Local high order spend	hiabsin	(arcsin) % of high order spend in Zones A+B
	Extended local high order spend	hi2sin	(arcsin) % of high order spend in Zones A+B+C

* All dependent variables are equivalent to the Local Integration Indicators used by partners in the bivariate analysis. They are based on the proportion of respective transactions by financial value attributed to selected zones.
** (arcsin) denotes transformation by arc sin squared (also known as the angular transformation)

Analysis of spatial behaviour

This analysis differed from the first in two main aspects:

i) it took account of the spatial distribution of transactions throughout the entire economy (Zones A-H); and
ii) it attempted to classify firms and households according to their spatial behaviour in different markets: final goods market, intermediate goods market and labour market. Firms could be classified according to different combinations of sourcing and marketing behaviour (i.e. weak/strong local, regional, national, international purchases combined with weak/strong local, regional, national, international sales and with weak/strong local, regional, national wage flows). Households could be classified according to different combinations of purchasing behaviour between low and high order goods and services. The rationale for this approach can be defended on both theoretical and policy grounds.

The analysis was carried out in three stages:

A) Principal Component Analysis (PCA) The aim was to identify new variables based on proportions of:
    i) sales;
    ii) purchases; and
    iii) employment salary payments across the eight zones (A-H).

Thus, a maximum of 24 variables were specified for the PCA, although descriptive analyses suggested a reduction in the number of variables according to the distribution of sales, purchases and salary across zones A to H). In the case of the household data set, a maximum of 16 variables were specified for entry into the PCA, based on proportions of:

(i) low order purchases, and
(ii) high order purchases across the 8 zones (A-H).

The new variables were identified by the distinct factors identified by the analysis, and their corresponding values by the factor scores.

B) Cluster Analysis

The aim of the cluster analysis was to identify classifications of firms, farms and households according to the new variables by entering the factor scores into a cluster analysis, which classifies observations according to defined variables. This allowed identification of specific sectors or entity types according to the observed transaction groups. This step was necessary to create the dependant variables to be used in the multinomial logit analysis.

C) Multinomial logit analysis

The aim of the logit analysis was to identify the key characteristics of firms, farms and households (and local economy) associated with cluster membership. It therefore allowed identification of entity types associated with a variety of distinct transaction patterns (i.e. combining sales, purchases and employment) in the local, regional, national and international economy.

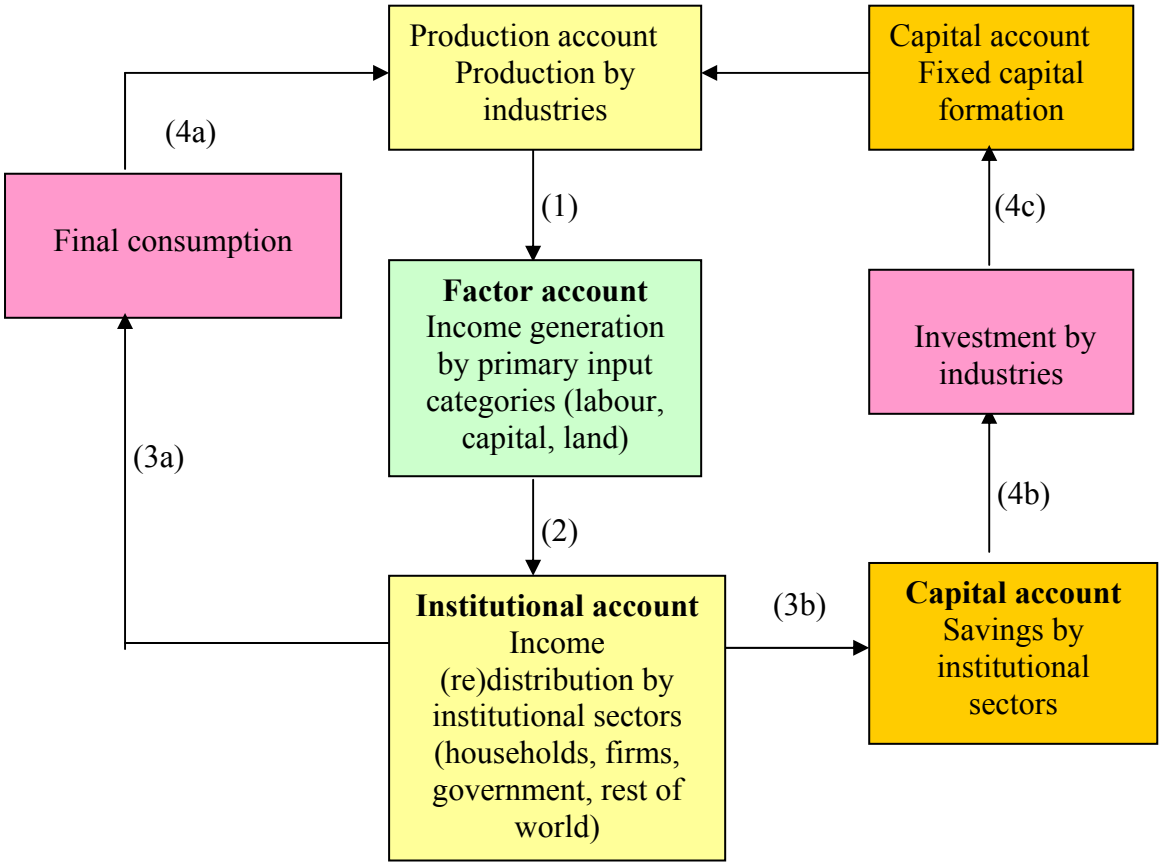
2.4.4 Input-output and Social Accounting Matrices (SAM) analysis

2.4.4.1 SAM construction and modelling

Theoretical framework

One of the main objectives of the Marketowns study was to construct Social Accounting Matrices (SAMs) to study the economic linkages within and between sectors and households of the local economy. The SAM is based on the Leontief input-output model, but where the input-output model only covers detailed flows for the production account in an economy, the SAM consists of a wider variety of endogenous accounts (Figure 2.3). It can be described as a general equilibrium data system of income and expenditure accounts, linking the production activities, factors of production and institutions (firms, households, government) in an economy. The industrial production generates value added payable to primary inputs like employed persons (which can be distinguished in wages and self-employed) and various types of productive assets (like land and financial assets) in the factor account. In turn, incomes generated in production are handed over to the institutional units such as households (which can be distinguished into various groups), corporations and government. After a re-distribution process, incomes are either used for final consumption expenditures or saved. The circle is closed when the consumption and the savings result in additional industrial production (Pyatt and Round, 1985).

Figure 2.3. Flow chart of a SAM model



Source: Efstratoglou and Psaltopoulos (1999).

Multiplier analysis can then be used to measure the impact of changes in final demand on the whole economic system, from production to income. This type of analysis requires the division of the SAM into endogenous and exogenous accounts. Hence, which accounts are exogenous and which are endogenous needs to be determined from the outset, as the range of shocks that can be studied depends on the choice of the exogenous accounts (Efstratoglou and Psaltopoulos, 1999). Endogenous accounts are those for which changes in the level of expenditure directly follow a change in income, while exogenous accounts are those for which we assume that expenditures are set independently of income changes. With an exogenous rest of the world account, simulations of changes in exports, households or government transfers can be performed. With an exogenous capital account, effects of investment shocks can be measured, while with an exogenous government account, changes in transfers to value added or households can be simulated. In this study, government, capital and the rest of the world (ROW) balances have been considered as one aggregated exogenous ROW account, which includes all transactions that take place outside the locality. For this project, the SAM captures the following accounts:

- (endogenous) production accounts with 17 sector types (of which 5 are agricultural types) for town and hinterland;
- (endogenous) factor accounts with 4 labour skill groups (management, non-manual, skilled manual and unskilled manual) for town and hinterland;
- (endogenous) household account, divided into quartile income groups for town and hinterland;
- (exogenous) ROW account for town and hinterland.

A detailed list can be found in Appendix 7 of this report.

Inter-regional SAMs
Most previous SAM studies have concerned the economies of single countries. However, we are interested in the relationships between smaller economic units, those of small and medium-sized towns and their hinterland so it has been necessary not only to work at a regional level, but also to create inter-regional models, where the flows of goods, services and labour can be traced between the towns, hinterlands and beyond. There has been some previous work using inter-regional SAM models, and our models are based upon the work of Round (1985). He used a similar approach to examine the rural-urban linkages in Malaysia. Roberts (1998) also used this approach for examining the rural-urban linkages in the Grampian region in Scotland. This, however, is the first time that the linkages between specific towns and their hinterlands have been examined, and the analysis is far more spatially focussed. The surveys have provided important spatially-disaggregated data for farming and non-farming households, and farming and non-farming businesses in town and hinterland. These data have been reconciled with other (secondary) data sources within the inter-regional SAM framework, based on the matrix used by Roberts (1998) for the Grampian. However, unlike previous models, far more detailed data on the transactions between town and hinterland are included, and thus these models are more sophisticated in the linkages they can show.

Procedure to construct inter-regional SAMs
The modelling involved a number of stages, the first of which was to create an regional input-output model for both the town and the hinterland, on the basis of the Generating Regional Input-Output Tables (GRIT) method. This is a kind of hybrid approach involving the application of 'non-survey' (a combination of a mechanical reduction method using employment-based Cross Industry Location Quotients (CILQs) and regional secondary data) and 'survey' techniques.

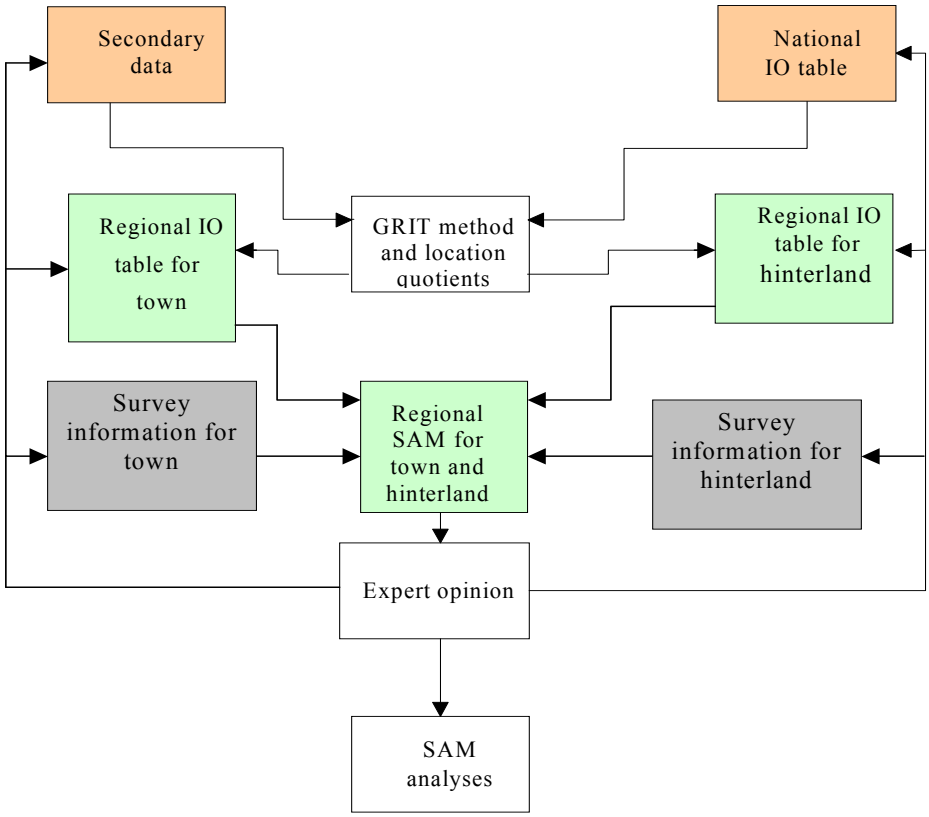
First, the national input-output coefficients were mechanically reduced with the CILQs. These quotients compare the regional and national ratio of employment in the selling industry to that in each purchasing industry. Regional and national employment data were used to calculate the CILQs for all pairs of sectors, and then these were used in the following fashion:

- if a sector *X*, which appears on national level, does not exist in a town, then the CILQ is equal to zero. Consequently, all regional requirements are

imported and the unadjusted regional intermediate demand is transferred to imports;

- if the CILQ for two sectors is equal or greater than one, it is assumed that the regional supply meets the demand of the purchasing sector to the same extent as on the national level. The figure of the unadjusted regional intermediate demand and primary inputs is accepted;
- if the CILQ is greater than zero but less than one, it is assumed that the towns production is less available than nationally to meet regional input demand and that imports are required to make up the deficit. In this case, the flows of the unadjusted regional table will overestimate the regional inter-sector transactions and must be reduced by multiplying the unadjusted flows and the relevant regional CILQ. Its results are adopted as the final regional flows, and the residuals are added to the relevant regional imports.

Figure 2.4. Procedure used to construct inter-regional SAMs



As a second step of GRIT, many of the mechanically-derived entries of these regional input-output tables were replaced with our 'superior' spatially-disaggregated survey information on household expenditures and incomes, input and output location patterns, and status, skill, salary and employee information per sector. In addition, the survey data have been used to extend the regional input-output model framework to the inter-regional SAM framework. On both the town and the hinterland level, the firm survey data have been scaled and weighted with actual employment number per firm type, and the household survey data with actual household number per income group.

So far, different data sources have been reconciled within the defined consistent inter-regional SAM framework. An important following step in the construction procedure of Figure 2.4 regards the matrix balancing, because corresponding rows (outputs) and columns (inputs) in a SAM must be equal. A pragmatic rule was followed, where the exogenous ROW account was used to balance out the matrix. Lastly, local experts were requested to verify the validity of the survey outcomes. Because the survey data serve as an important basis for the SAMs, this indirectly meant a initial validity test for our models. On the basis of this expert knowledge, the quality of several SAM entries was improved.

The constructed inter-regional SAMs in the Marketowns study contain four sub-matrices:

1. matrix elements representing transactions within the town
2. matrix elements representing transactions from town to hinterland
3. matrix elements representing transactions from hinterland to town

matrix elements representing transactions within the hinterland

Appendices 8 and 9 present the detailed framework of these SAMs and the data sources for each sub-matrix.

2.1 **2.4.4.2** Multiplier analysis for inter-regional SAMs

Multiplier analysis in general

In this section, the multiplier model for inter-regional SAMs is derived. Input-output and SAM multipliers are demand driven. Conventional input-output multipliers only investigate the impact of changes in the exogenous output demand from production sectors upon production sectors, while the SAM model can show the impact of exogenous injections on all endogenous variables like factor payments and household incomes. Thus, capturing more of the elements in the matrix inversion process will not only show how an external change will impact upon production but also on household incomes and expenditure and therefore indicate more fully the nature of the interdependencies within the local economy.

In general, multipliers are a convenient way of expressing how a change in one sector impacts upon the whole economy. Three effects can be calculated:

1. direct effects: output effects on the sector itself when its output will expand;
2. indirect effects: the increased output in one sector will have output effects among the sectors that supply inputs;
3. induced effects: additional economic activity, stimulated by increased household spending arising from extra wages, will have induced effect on outputs.

All these effects can be quantified by multipliers where:

$$\text{Type I multiplier} = \frac{\text{direct + indirect}}{\text{direct effect}}$$

$$\text{Type II multiplier} = \frac{\text{direct + indirect + induced effects}}{\text{direct effect}}$$

The multipliers generated in the SAM analysis of the Marketowns study belong to the latter type. Firstly, we have derived *output multipliers*, which show the adjustment in the towns' and hinterlands' total output that would be associated with a change of one unit of output from a particular sector. For example, a multiplier of 1.87 for dairy farming indicates that if the demand for dairy output will increase by €1 million (due to extra exports, consumption or investment), the regional output expansion will amount to €1,870 million. Additional inputs of concentrates, power, water, use of contractor etc. will generate additional production in the corresponding sectors, which will on their turn ask for additional inputs from other sectors. Alternatively, a €1 million reduction in the demand for dairy output would be associated with a €1,870 million fall in total regional output.

From an economic development point of view, income and employment coefficients and multipliers are interesting too. The direct *income coefficients* indicate the income associated with each €1 million output change. Thus, a direct income coefficient of 0.15 for dairy farming indicates that each €1 million of dairy output is associated with a direct income of €150,000. In addition, a direct, indirect and induced income coefficient of 0.377 suggests that each extra €1 million of dairy output is associated with €377,000 of income throughout the regional economy. The direct *employment coefficients* indicate the number of jobs associated with each €1 million of output, while the direct, indirect and induced employment coefficients show the total employment effect throughout the regional economy.

The *household income multipliers* reflect the impact on the regional economy of a €1 million injection of household incomes. For example, a household income multipliers of 1.64 can be interpreted that a €1 million injection to an average household income group may result in an overall increase of the regional household income of €640 thousand. The *employment multipliers* indicate the additional employment generated in the regional employment due to an initial employment increase in a particular sector.

Assuming, as we do with input-output multipliers, that the input and output structures of matrix coefficients are constant (i.e. that the average expenditure propensities from the SAM equal the marginal propensities of each account), we can derive multipliers from the inter-regional SAM to show the impact on the town and

hinterland of an external shock from outside. We can also decompose our SAM multipliers in intra-regional and inter-regional effects. *Intra-regional multipliers* represent the transaction effects within respectively town and hinterland, while *inter-regional multipliers* represent the transaction effects from respectively town to hinterland, and hinterland to town. This aides the understanding of how co-dependent the regions are.

The multipliers generated in the SAM analysis provide us with a better understanding of the potential economic growth of a region, and can help indicate whether small and medium-sized towns play a role as growth-pole for the surrounding area.

The Aggregate Matrix
Our initial inter-regional model has the form:

$$\underline{x} = G\underline{x} + \underline{f} \tag{1}$$

where

$$\begin{pmatrix} x_1 \\ x_2 \\ x_3 \\ \hline x_4 \\ x_5 \\ x_6 \end{pmatrix} = \left(\begin{array}{ccc|ccc} B_{11} & 0 & C_{11} & B_{12} & 0 & C_{12} \\ V_{11} & 0 & 0 & V_{12} & 0 & 0 \\ 0 & Y_{11} & 0 & 0 & Y_{12} & 0 \\ \hline B_{21} & 0 & C_{21} & B_{22} & 0 & C_{22} \\ V_{21} & 0 & 0 & V_{22} & 0 & 0 \\ 0 & Y_{21} & 0 & 0 & Y_{22} & 0 \end{array}\right) \begin{pmatrix} x_1 \\ x_2 \\ x_3 \\ \hline x_4 \\ x_5 \\ x_6 \end{pmatrix} + \begin{pmatrix} f_1 \\ f_2 \\ f_3 \\ \hline f_4 \\ f_5 \\ f_6 \end{pmatrix}. \tag{2}$$

For each sub-matrix (transactions from respectively town to town, town to hinterland, hinterland to town and hinterland to hinterland) we can define:

B : matrix of input-output coefficients
V : matrix of labour income coefficients
C : matrix of household expenditure coefficients
Y : matrix of coefficients representing the distribution of labour income between households
x : vector of total output
f : vector of exogenous account

Rearranging, we can write the equation in a 6 by 6 system,

$$\left(\begin{array}{ccc|ccc} I-B_{11} & 0 & -C_{11} & B_{12} & 0 & -C_{12} \\ V_{11} & I & 0 & -V_{12} & 0 & 0 \\ 0 & Y_{11} & I & 0 & -Y_{12} & 0 \\ \hline -B_{21} & 0 & -C_{21} & I-B_{22} & 0 & -C_{22} \\ -V_{21} & 0 & 0 & -V_{22} & I & 0 \\ 0 & -Y_{21} & 0 & 0 & -Y_{22} & I \end{array}\right) \begin{pmatrix} x_1 \\ x_2 \\ x_3 \\ \hline x_4 \\ x_5 \\ x_6 \end{pmatrix} = \begin{pmatrix} f_1 \\ f_2 \\ f_3 \\ \hline f_4 \\ f_5 \\ f_6 \end{pmatrix}. \tag{3}$$

Letting $A = \left(\begin{array}{ccc|ccc} I-B_{11} & 0 & -C_{11} & B_{12} & 0 & -C_{12} \\ V_{11} & I & 0 & -V_{12} & 0 & 0 \\ 0 & Y_{11} & I & 0 & -Y_{12} & 0 \\ \hline -B_{21} & 0 & -C_{21} & I-B_{22} & 0 & -C_{22} \\ -V_{21} & 0 & 0 & -V_{22} & I & 0 \\ 0 & -Y_{21} & 0 & 0 & -Y_{22} & I \end{array}\right)$ it is more simply expressed as

$$A\underline{x} = \underline{f} \qquad (4)$$

Solving for the vector $\underline{x}$ and providing that A is non-singular, we find that $\underline{x} = A^{-1}\underline{f}$. In here, A^{-1} addresses the aggregate inter-regional multiplier.

$$A^{-1} = \begin{pmatrix} a_{11} & a_{12} & a_{13} & a_{14} & a_{15} & a_{16} \\ a_{21} & a_{22} & a_{23} & a_{24} & a_{25} & a_{26} \\ a_{31} & a_{32} & a_{33} & a_{34} & a_{35} & a_{36} \\ a_{41} & a_{42} & a_{43} & a_{44} & a_{45} & a_{46} \\ a_{51} & a_{52} & a_{53} & a_{54} & a_{55} & a_{56} \\ a_{61} & a_{62} & a_{63} & a_{64} & a_{65} & a_{66} \end{pmatrix}. \qquad (5)$$

The matrix A^{-1} in equation (5) will provide output multipliers for the whole region (hinterland and town). The closer a multiplier matrix is to the identity matrix, the weaker is the particular multiplier effect. If we look at the separate accounts in A^{-1}, we can interpret the potential impact of changes in the exogenous account *f* on different sectors, production factors and income groups. The sums of the columns in the first sub-matrix a_{11} shows the impact of an exogenous change in the demand for town production sectors X_1 on the town production. The sums of the columns in a_{21} and a_{31} show the impact of a change in the demand for town's production sectors X_1 on town wages and town household incomes respectively. The column sums of a_{41} depict the impact of the change in the demand for town's production sectors X_1 on hinterland production, while a_{51} and a_{61} show their impacts on hinterland wages and hinterland household incomes respectively. Further, a_{12} addresses the impact of an exogenous injection to the town factor accounts X_2 on the town production. A_{22} and a_{23} show the impact of this change on respectively town wages themselves and on town household income, etc. Interpretation of the other sub-matrices in our system is similar to the mentioned examples.

Decomposition of the Aggregate Matrix

The first part of our analysis is based on the above interpretation of total impact within the regions of any change. However, we can also breakdown the multipliers using a method developed by Round (1989) so it can be seen how the greatest impact is generated. The multipliers are decomposed so the initial impact within the town or hinterland is separated out from the following repercussions felt in the other zone, and then again from how these repercussions then feed back into the original zone. So we are not looking in this instant where the final impact of a change is felt, but how much

is generated within the original region and how much from the cross flows from one region to another. The matrix is considered as a two by two and thus divides it into quadrants showing town-town, hinterland-hinterland, town-hinterland, and hinterland-town.

To find all of the interdependent multipliers we can express A^{-1} as the product of three matrices

$$\underline{x} = M_3 M_2 M_1 \underline{f} \qquad (6)$$

where M_1 are representing the intraregional multiplier matrix, which depicts the linkage effects between endogenous accounts wholly within the town (or hinterland).

M_2 can be interpreted as the multipliers for all the cross flows between the town and hinterland. It captures the effects from the town upon the hinterland and vice versa, accounting for all 'own region' effects.

M_3 indicates the 'closed loop' multiplier matrix. It shows the effects an injection in the town (or hinterland) has on itself through the endogenously defined linkages within the hinterland (or town), remembering that M_1 has been accounted for all the internal 'own region' links

In the following model the following letters will represent groups of elements in the input-output matrices and vectors

x_T	Vector output variable from towns.
x_H	Vector output variables from hinterland.
f_T	Vector final demand variables from town.
f_H	Vector final demand variables from hinterland.
T_T	Matrix elements representing transactions from town to town.
T_H	Matrix elements representing transactions from town to hinterland.
H_T	Matrix elements representing transactions from hinterland to town.
H_H	Matrix elements representing transactions from hinterland to hinterland.

The initial model equation is given by

$$\begin{bmatrix} x_T \\ x_H \end{bmatrix} = \begin{bmatrix} T_T & H_T \\ T_H & H_H \end{bmatrix} \begin{bmatrix} x_T \\ x_H \end{bmatrix} + \begin{bmatrix} f_T \\ f_H \end{bmatrix} \qquad (7)$$

This can of course be factorised thus

$$\begin{bmatrix} I - T_T & -H_T \\ -T_H & I - H_H \end{bmatrix} \begin{bmatrix} x_T \\ x_H \end{bmatrix} = \begin{bmatrix} f_T \\ f_H \end{bmatrix} \qquad (8)$$

and an expression for the output variables is given by finding the inverse, hence

$$\begin{bmatrix} x_T \\ x_H \end{bmatrix} = \begin{bmatrix} I - T_T & -H_T \\ -T_H & I - H_H \end{bmatrix}^{-1} \begin{bmatrix} f_T \\ f_H \end{bmatrix} \quad (9)$$

An algebraic expression for the inverse can be found in terms of the sub matrices. Starting from (7) again

$$\begin{bmatrix} I - T_T & 0 \\ 0 & I - H_H \end{bmatrix} \begin{bmatrix} x_T \\ x_H \end{bmatrix} = \begin{bmatrix} 0 & H_T \\ T_H & 0 \end{bmatrix} \begin{bmatrix} x_T \\ x_H \end{bmatrix} + \begin{bmatrix} f_T \\ f_H \end{bmatrix}$$

then multiplying by the inverse gives

$$\begin{bmatrix} x_T \\ x_H \end{bmatrix} = \begin{bmatrix} I - T_T & 0 \\ 0 & I - H_H \end{bmatrix}^{-1} \begin{bmatrix} 0 & H_T \\ T_H & 0 \end{bmatrix} \begin{bmatrix} x_T \\ x_H \end{bmatrix} + \begin{bmatrix} I - T_T & 0 \\ 0 & I - H_H \end{bmatrix}^{-1} \begin{bmatrix} f_T \\ f_H \end{bmatrix}$$

defining $\hat{T} = (I - T_T)^{-1}$ and $\hat{H} = (I - H_H)^{-1}$ we can write this equation as

$$\begin{bmatrix} x_T \\ x_H \end{bmatrix} = \begin{bmatrix} 0 & \hat{T}H_T \\ \hat{H}T_H & 0 \end{bmatrix} \begin{bmatrix} x_T \\ x_H \end{bmatrix} + \begin{bmatrix} \hat{T} & 0 \\ 0 & \hat{H} \end{bmatrix} \begin{bmatrix} f_T \\ f_H \end{bmatrix}.$$

Factorising once more gives

$$\begin{bmatrix} I & -\hat{T}H_T \\ -\hat{H}T_H & I \end{bmatrix} \begin{bmatrix} x_T \\ x_H \end{bmatrix} = \begin{bmatrix} \hat{T} & 0 \\ 0 & \hat{H} \end{bmatrix} \begin{bmatrix} f_T \\ f_H \end{bmatrix}$$

Solving to get the output vector gives

$$\begin{bmatrix} x_T \\ x_H \end{bmatrix} = \begin{bmatrix} I & -\hat{T}H_T \\ -\hat{H}T_H & I \end{bmatrix}^{-1} \begin{bmatrix} \hat{T} & 0 \\ 0 & \hat{H} \end{bmatrix} \begin{bmatrix} f_T \\ f_H \end{bmatrix}.$$

The inverse matrix can be expressed as the product of a diagonal matrix and a full matrix with identity matrices down its diagonal. Simple algebra shows that they have to be of the form,

$$\begin{bmatrix} x_T \\ x_H \end{bmatrix} = \begin{bmatrix} (I - \hat{T}H_T\hat{H}T_H)^{-1} & 0 \\ 0 & (I - \hat{H}T_H\hat{T}H_T)^{-1} \end{bmatrix} \begin{bmatrix} I & \hat{T}H_T \\ \hat{H}T_H & I \end{bmatrix} \begin{bmatrix} \hat{T} & 0 \\ 0 & \hat{H} \end{bmatrix} \begin{bmatrix} f_T \\ f_H \end{bmatrix} \quad (8)$$

or written as

$$\begin{bmatrix} x_T \\ x_H \end{bmatrix} = M_3 M_2 M_1 \begin{bmatrix} f_T \\ f_H \end{bmatrix}$$

Combining the three M matrices together gives

$$\begin{bmatrix} (I-\hat{T}H_T\hat{H}T_H)^{-1}\hat{T} & (I-\hat{T}H_T\hat{H}T_H)^{-1}\hat{T}H_T\hat{H} \\ (I-\hat{H}T_H\hat{T}H_T)^{-1}\hat{H}T_H\hat{T} & (I-\hat{H}T_H\hat{T}H_T)^{-1}\hat{H} \end{bmatrix}$$

The product of the triple matrix expression above is of course equivalent to the inverse matrix in equation (7). Calculating the above three matrices is easy to perform once the full inverse in equation (7) and the two smaller inverses $\hat{T}$ and $\hat{H}$ are found.

The diagonals in M_1 are given by $\hat{T}$ and $\hat{H}$. The off diagonal terms in M_2 are also easily calculated. The difficult diagonal term in M_3 are found using the sub-matrices on the diagonals of the full inverse matrix and multiplying by $\hat{T}^{-1}$ which of course is $(I-T_T)$.

Employment Multipliers
In addition, employment multipliers can provide important information about the different impact of changes on the employment for each sector. The employment multipliers *e* can be expressed as a combination of the output multipliers $\underline{x}$ and the direct employment coefficients *e'* (employment per sector output)

$$e' = E\,(X)^{-1} \qquad (9)$$

$$E = \hat{e}\,A^{-1} f \qquad (10)$$

in which *E* reflects the employment number in respectively town and hinterland sectors, and $\hat{e}$ is the matrix with employment coefficients on the diagonal. This model will produce employment multipliers for the whole region (hinterland and town), which can be interpreted as follows. The sums of the columns in the first sub-matrix $\hat{e}a_{11}$ show the impact of an exogenous increase in the demand for town's production sectors X_1 on the employment of town production sectors. Sub-matrix $\hat{e}a_{31}$ shows the impact of a change in the demand for production sector on the employment of town households. Further, $\hat{e}a_{12}$ reflects the impact of an exogenous injection to the town production factors X_2 on the employment of town production sectors, etc..

At last, the coefficients in the row of the exogenous ROW account of the SAM indicate the leakages from the system like induced import demands or induced government revenues. The leakages *L* can be expressed in equation (11)

$$L = Bx \qquad (11)$$

in which *B* is the (m x n) rectangular matrix of the coefficients with the exogenous account as row and the endogenous accounts as columns.

2.4.4.3 Assumptions and limitations of the models

General SAM and input-output modelling assumptions
As with all analysis based upon input-output models, some basic assumptions are being made and these must be borne in mind when considering the models and the results.

First is the existence of linear production functions. Most changes will take place at the margins, and estimates based on an average relationship will be inclined to overstate the impact on other industries. We are also assuming that all the resources are operating at full capacity anyhow, so a change within the system will have an impact on the resources needed which may not be the case, especially where there is under-utilisation of capital or labour within the system.

Second, it is assumed that the output from each industrial sector is homogenous (i.e. of the same quality and type). This becomes more of a problem the more aggregated the model. For example, if we have a change in the output of dairy farm, this will in reality have an impact on the firms that sell and buy from dairy farms, but if the dairy farms are aggregated in the model under the general term 'agriculture', then any change in this sector alone will be assumed to have repercussions in all the firms that buy and sell to agriculture, so we lose the focus of the impact.

Third, it is assumed that there is a single input structure within each industrial sector, and there will be no substitution between inputs to produce the goods.

Fourth, the marginal and average propensities of the household expenditure behaviour are assumed to be equal. As most changes in the expenditure pattern will take place at the margins, estimates based on average relationships will tend to overestimate the household income effects.

More specific limitations to our small area model
The size of the local economy models that have been built create their own problems. One of the major problems is the relatively small proportion of the total inputs and outputs from firm production that is retained within the local economy making the coefficients very small, and more prone to statistical error. Also, because the size of the local economies are so small, the classification of firms becomes more important. A food industry located within the area is less likely (simply because there will be fewer) to of the type that is impacted by a change indicated by the model. For example, a miller selling flour to a bakery will in our model sell to the 'food and drink industry'. There may be firms in the 'food and drink industry' in the zones A and B in the model, although not a bakery. If there is an impact to the local area that will affect the miller (not first round, as we have the location of first round impacts) then any repercussions will be fed into the local food and drink industry, even though the millers impacts on the bakery will be outside the model. Therefore there is a tendency for the model to overstate the nature of the multipliers. This will probably not be huge, as this will not affect the first round of the impact. The model captures, through

information from the survey, the correct location and type of firm purchasing and selling. It is only the further iterations of the model that will be affected by the aggregation problem.

Thus, we have a dilemma. The statistical error can be reduced by more aggregation, but more aggregation makes it more difficult to determine which firms are actually present and therefore what their input demands are.

Data limitations and difficulties in SAM construction.
During the procedure to construct inter-regional SAMs, several problems regarding the reconciling of the micro survey data to the macro town and hinterland level cropped up. In this section, these are divided into two groups: the assembling of secondary data, and the reconciliation of survey and secondary data into SAMs. For each issue, the assumptions that were adapted to solve the problems have been specified.

Assembling of secondary data
General issues: Apart from the UK, there was no reliable information on commuting patterns.

France
The French data are provided by National Accounts. Several national data were assembled to reconstitute a balanced national input-output table.

The agricultural data on employment and output value could not be divided into enterprise at town and hinterland level. Instead, the same distribution as that for the NUTS III region was taken.

Poland
The Statistical Office of Poland was not able to deliver a consistent national input output table due to issues like influence of black economy, delayed payments, and non-registered work. Hence, we had to work with the unbalanced table and consider its input structure as basis to deduce the regional input structures for Portuguese towns and hinterlands.

Only aggregated firm number data for manufacturing exist in official statistics in Poland. The distribution over manufacturing types was therefore assumed to be the same as the disaggregated employment information.

Firms and employment of enterprises with less than 6 employees are not included in the official publications of the Polish Statistical Office. For this reason, the difference between official and unofficial agricultural employment is two million persons. 'Official' agricultural employment means that farmers sell their products on the market, while the remaining 'unofficial' farmers produce on a subsistence level for their own consumption. The Polish partners made adjustments for the agricultural employment data in the six Polish towns on the basis of knowledge from local

authorities, tax offices and other local experts. Unfortunately, information on the smallest firms was not provided, thus actual firm numbers will be underestimated due to the removal of the smallest firms. For this reason, the employment per industrial type, rather than firm numbers, were used to scale the survey data to town and hinterland data.

Secondary data on quintile household income groups are not available. The Polish team made own estimations for quintile income groups.

Portugal

The Statistical Office of Portugal was not able to deliver a consistent national input output table. Hence, we had to work with the unbalanced table and considered its input structure as basis for calculation of the regional input structure for the Portuguese towns and hinterlands.

Only aggregate town and hinterland data for each sector were available for the Portuguese towns. We have assumed that the distribution of firms and employment over town and hinterland is the same as in the corresponding Dutch town (regarding size of town and background area).

Secondary data on employment is only available for the entire agricultural sector on national Portuguese and hinterland levels, but not for their breakdown over agricultural types.

The farm surveys have delivered information on employment for agricultural types in the hinterland, and this structure is used to divide the total country and hinterland agricultural employment number over types.

Secondary data on quintile household income groups are not available. The Portuguese team made own estimations for quintile income groups.

<u>Reconciling survey data into SAMs</u>

There were six main problems during the reconciliation of survey data into the SAM. These are explained below:

1. There is no usable response for a particular sector.
   We have inserted the secondary information from the regional input-output table.

2. Secondary data on firm numbers for a sector exist, but not on employment.
   We have assumed that employment in that sector in zone B (A) is similar to its corresponding employment per firm ratio in zone A(B).

3. There is a usable response for a particular sector according to survey, whilst secondary data show that particular sector doesn't exist in practice according to official publications. This issue arose several times in the Polish towns, which can be explained by the following reasons:

a. in the face-to-face survey, when firm owners answered the question as to what they were doing now, sometimes they mentioned different categories (i.e. petrol station and a restaurant). The interviewers choose only one category, mostly on an arbitrary basis;
b. owners of small firms in Poland very often register their businesses as import-export-production services or production-sales-services. This means that the same firm one year may produce garden chairs and the next year may operate in construction;
c. seasonal work and parallel work in few different sectors.

As we have no idea of the scaling value in these cases, we have simply assumed that the survey data best represent the town or hinterland economy level;

4. In many of the Polish and Portuguese towns, the number of 'employees per enterprise in public administration, health etc.' amounts to less than 10 or 20 persons according to the survey usable response, whilst all employees seem to be categorized as managers and professionals. However in practice, the 'employees per public enterprise' number mostly covers between 200 and 1,000 persons according to secondary data, whilst public employees often belong to different skill groups (like 'skilled non-manual' for desk workers or nurses, or 'unskilled manual' for refuse collectors). This bias is due to the focus in the survey on private firms, as a decision was taken not to include the public sector firms as they would have difficulties with the types of question in the survey. As a SAM asks for the coverage of the entire macro-economic environment in which the public sector is rather important, the scarce number of public enterprises from our survey was scaled-up with help of secondary employment data. To prevent this leading to an overestimation of the skill group 'managers', we have taken account of additional secondary data on skills in the public sector. For Portugal we used national skill data on the distribution over the five skill groups in the public sector which came from the Instituto de Gestão da Base de Dados dos Recursos Humanos da Administração Pública, 2001. As no secondary data were available for the Polish public sector, we made adjustments on the basis of the Portuguese distinction over skill types. At last, skills in the Dutch public sector were calibrated with help of data from the CBS Statline, 2001, on the distribution of education levels on province level.

5. Average expenditures per household income group did not follow the expected pattern. For example, average expenditures of the second 25%-income group are much larger than of the highest 25%-income group. This is most often due to a disproportionate distinction of *durable consumer goods* (like 'decorating, building and gardening', 'sports/camping equipment', 'furniture') over the income groups. With low usable response numbers in particular income groups, relatively large expenditures on durable goods will not be averaged out and may result in extremely large expenditures after the scale-up procedure. In such cases, it is assumed that durable consumer goods will have a 12 years life-time (a kind of

guarantee period) and we have subsequently adjusted the survey household expenditure data for this.

6. Average input expenditures per industry are biased. This can be explained by the capture of *investments* as intermediate purchases by firms, which will not be averaged out because of the low usable response for particular industry types. In such cases, it is assumed that investment goods will have a 12 years life-time (a kind of guarantee period) and we have subsequently adjusted the survey firm purchase data for this.

7. The wholesale and retail input and output values from the survey data contain trade and transport margins (TTM). In such cases, the scaling of the survey data may result in implausible overestimations of the wholesale/retail sector in the town economy (for example compared with the average inputs or outputs in national wholesale/retail). The registration and amount of TTM may differ among countries. Around 95% of sales and purchases could be allocated to TTM in the Netherlands, France and the UK (according to their national statistical offices), and hence their wholesale and retail sectors were adjusted for this percentage. Margins in Portugal and Poland are smaller: 20% for retail and 25% for wholesale in Portugal, and 17% for retail and 23% for wholesale in Poland (according to country experts).

8. Skill groups in the farm survey (farmer/family worker, farm manager, administrator, farm worker-skilled, farm worker-unskilled) differ from skill groups in the non-farm survey (managerial, skilled non-manual, partly non-manual, skilled manual, partly skilled manual). As the town and hinterland socio-economy must be regarded as a whole in the Marketowns study, we have to integrate skills for farmers and non-farmers. Hence, the following skill clusters have been arranged:

a. farm manager and managerial;
b. farmer/family worker and administrator and skilled non-manual and partly skilled non-manual;
c. farm worker skilled and skilled manual;
d. farm worker unskilled and partly skilled manual

Recommendations to improve the methodology used in the Marketowns study for use in SAM modelling:

- to ensure that there is a sufficient usable response per stratum group to balance out extremely high input purchases for a particular firm or extremely high expenditures for a particular household
- to ask households for durable consumable goods on a yearly basis ('how much did you spend on, for example, gardening decoration, furniture, electrical goods, recreational goods in the last year?').
- to ask firms to separate investments (capital goods) and intermediate purchases (in particular for the construction sector)

- to ask wholesale and retailers for their trade and distribution margins at purchases and sales.

2.5 Practitioners workshops

Following completion of the individual country reports, all findings and possible implications were presented at a number of workshops for practitioners involved in fostering local economic development. In many cases these practitioners had already been approached prior to data collection to seek endorsement (or similar) support to help achieve credible response rates to the surveys. The practitioner workshops had two overarching aims:

1) To allow research teams to identify the main differences between the practitioners' preconceptions about the local integration of the various types of firm, household and town (their working assumptions) and the survey findings. It was also anticipated that this exercise would help identify any widespread misconceptions that would need to be addressed during the dissemination phase of the project; and

2) To help the research team identify any policy implications that might be of relevance to the work of those responsible, whether directly or indirectly, for EU policy implementation at 'grassroots' level.

Partners also used the workshops to develop ideas and scenarios for the studied towns that could be incorporated into subsequent stages of the study. All workshops began with a presentation of the main findings relating to the relevant study area, followed by a discussion which centered on the possible implications of the findings for local economic development and planning policies. Local practitioners were drawn mainly from local government, parish and town councils, municipalities and other related community organisations.

3 RESULTS

3.1 Sample characteristics

3.1.1 Non-farm businesses

The survey questionnaires were invariably completed by either the owner of the business, or its manager. This proportion varied according to town and country, but was seldom lower than 60% and regularly in excess of 80%. This fact indicates that those completing the questionnaire were competent to provide accurate information.

The vast majority of businesses surveyed, describe themselves as independent, with no other business sites other than the one surveyed (see Table 3.1). As Table 3.1 shows, the proportion of businesses in this category is never lower than 62%. The lowest proportion occurs in France, where, together with the UK, this type of business is less predominant than in other study countries. This suggests greater reliance on larger, national companies and non-profit organisations (e.g. government agencies) in these two countries, in all types of town. The Netherlands appears to be the most dependent on small, single-site companies.

Table 3.1. Proportion of independent single-site business in each town and country

	Small town						Medium-sized town					
	NL	UK	PT	FR	PO		NL	UK	PT	FR	PO	
Agriculture												
Independent (%)	92	75.9	88.5	62.4	91.3		93	67	88.5	68.8	92.7	
Tourism												
Independent (%)	94	72.5	90.7	71.4	92.7		86	79.4	91.4	68	86	
Peri-urban												
Independent (%)	92	75.0	88.0	77.0	86.8		95	76.4	88.7	77.0	89.3	

There is a very low dependence on primary industries (agriculture, forestry, fisheries, quarrying etc.) in the majority of study towns, especially peri-urban towns. The exceptions to this are the two tourist towns in Portugal, where as much as 17% of all industries have this classification (see Appendix 10). On average, over all countries and types of town, about 20% of industries are in the manufacturing and construction sectors, about 36% in retail, wholesale and hospitality (hotels and catering) and about 40% in other services (transport, banking and finance, public administration and other services). These proportions are remarkably consistent across type of town and country. Some notable exceptions are, the very low incidence of manufacturing and construction industries in Poland in all types of town and the higher incidence of retail and hospitality-related businesses (and low incidence of service industries) in Portugal. It has been suggested that the sampling procedure over-represents small business (although this is demonstrably not the case in the Netherlands) because they tend to have a more local orientation and therefore a greater willingness to respond to surveys than a multi-national business. Any such issues will be corrected by the weighting procedure.

The proportion of businesses that have always been located at the current site is remarkably high across all countries and types of towns, indicating a general dependence for employment on small, single-site firms. The lowest proportions are found in the UK, the Netherlands and France, which have much more developed economies than the other study countries and greater capital and population mobility. In general, there is very little difference in this regard between medium and small towns, although peri-urban towns tend to have greater mobility and turnover of businesses than tourism and agriculture dependent towns.

Table 3.2. Proportion of businesses that have always been located at their current site

	Small town						Medium-sized town					
	NL	UK	PT	FR	PO		NL	UK	PT	FR	PO	
Agriculture												
Independent (%)	68	56.6	100	74.3	93.3		72	69.0	98.5	77.2	93.3	
Tourism												
Independent (%)	74	68.9	99.3	78.0	95.3		63	58.4	98.0	77.0	92.7	
Peri-urban												
Independent (%)	67	61.5	95.3	67.8	88.0		71	52.5	95.4	67.8	92.0	

Reflecting the predominance of single site firms, the majority of businesses in all towns in all countries, are small and have relatively few employees (see Appendix 11). In all town types, on average over all countries, 80% or more of businesses have less than 6 employees. The notable exception to this rule is Portugal, which has a greater dominance of larger firms (i.e. more than 10 employees) in all towns, but especially tourism and peri-urban towns, where 70% and more of businesses fall into this category.

3.1.2 Farm businesses

The great majority of respondents to the survey of farm businesses were the owners of the business. This percentage was commonly above 90% in all towns and countries, with the exception of the peri-urban towns in France, where the percentage was reduced to the low 70s. This should not be taken to imply that such a high percentage owned the land that they farmed, but rather the business itself.

There are, as expected, significant country differences in the average size of farms in the survey (see Appendix 12). In the UK and France farm sizes tend to be larger, with only 9% of farms less than 20ha in the UK. In the UK, farms in this size class, unless they are specialist horticulture or fruit farms, are most likely to be part-time. The smallest average farm sizes are found in Portugal, where 72% fall below 20ha. The average farm size (over all countries) varies only marginally between types of town. There is, however, a modest increase in average farm size from agricultural to tourist-based and peri-urban towns, due largely to big increases in the average farm size in the UK and France. Town size also appears to have a

modest effect on average farm size, with small increases in farm size in medium sized towns, although this effect is not seen in tourism-based towns.

Appendix 13 shows the distribution of farm types over town types in each study country. Some national differences are apparent, including the predominance of specialist livestock farms in the UK and France (where farm sizes are also larger) and the large number of permanent crop (olives and fruit) and mixed cropping farms found in Portugal. Specialist cereals farms are almost entirely absent from the agriculture and tourism dominated towns, but appear in the UK and France in peri-urban areas. The absence of such farms from tourism-based areas is understandable as mixed and livestock-based landscapes are generally held to be the most visually appealing. Horticulture tends to be more frequently present in peri-urban areas where it can cater for large urban markets. Polish agriculture appears to be dominated by small mixed farms (livestock and arable) but horticulture is frequent close to small towns.

Table 3.3. Proportion of farms where household income depends solely on agriculture

	Small town						**Medium-sized town**					
	NL	UK	PT	FR	PO		NL	UK	PT	FR	PO	
Agriculture												
Full dependence	78	54.8		72.5	82.8		87	62.6		68.3	59.3	
Tourism												
Full dependence	81	43.3		38.5	36.4		67	68.7		57.7	49.8	
Peri-urban												
Full dependence	82	47.2		72.2	86.8		81	76.6		42.1	51.5	

For France, 'Full dependence' determined as more than 95% of household income derived from agriculture.
Data for Portugal calculated in a manner that does not permit direct comparison with other countries.

Level of dependence on agriculture for household income appears to be uniformly high in the Netherlands. This level of dependence does not seem to vary overly much between town type or size. In other study countries, level of dependence on agriculture declines in small tourist areas, as other income opportunities arise, although this is not so apparent around large tourist centres, where there are likely to be more urban attractions. The lowest level of dependence on agriculture is found in the UK, where farm incomes have been hard hit in recent years by low prices and an unfavourable exchange rate.

3.1.3 Non-farm households

Those responding to the survey were overwhelmingly either the homeowner, or the current occupier. In most countries and towns this percentage was 100%. Only in France did other types of respondents feature, but never reaching more than 3%.

Trends in household sizes are pretty much as might be expected (see Appendix 14), with the largest proportions of single-person households occurring in the most developed economies (UK, France and the Netherlands), particularly the UK, where rates are as high as

31% in the small agricultural town. The largest average household sizes are found in Poland, where commonly 20-25% of households have 5 persons or more. There appear to be no significant differences in these demographics on the basis of either town size, or town type within each country.

Averaged across all countries, the largest single social class group in all three types of town are households headed by retired or unemployed individuals (see Appendix 15). The highest percentages in this class tend to occur in the UK and France, with the lowest in Portugal. Town type does appear to impact greatly on rates of retired/unemployed households, although the highest rates found in small towns, especially tourist towns. This result may be influenced by trends for holiday resorts to become retirement centres in developed economies. Rates of professional households do not vary much over town sizes and types, but rates of managerial/technical households are much higher in peri-urban areas. The proportion of households headed by low skilled or unskilled individuals varies over countries, being highest in Portugal and Poland, but also surprisingly high in the Netherlands. There is no obvious trend due to town size or type.

Average household income, measured in euros, varies considerably over the countries in the survey, as would be expected (see Appendix 16). The highest average household incomes in the survey are found in the Netherlands, where no more than 10% of households, in any type of town earn less than €16K per annum. Next comes the UK, then France, then Portugal with the lowest household incomes, by some considerable margin being found in Poland. In the UK there is less uniformity in household incomes than in the Netherlands, France and Portugal, with a greater proportion of households at the income extremes - suggesting less re-distribution of wealth within society. Across all countries there is a slight tendency for average incomes to be higher in the larger towns, but a much more significant increase in incomes is observed in peri-urban towns over the other two town types. This is the most marked in the UK and France, although the trend is reversed in Portugal.

3.1.4 Farm households

In the UK, the Netherlands and Portugal, 100% of survey questionnaires were completed by either the home owner, or current occupier. As the primary household decision-makers, these are the individuals best placed to answer the questions posed by the survey. In Poland, up to 4% of responses came from other individuals associated with the household, and in France members of this group responded in as many as 13.6% of cases - these are probably other family members.

Farm household sizes are on average larger than their non-farm counterparts. This reflects both the more 'traditional' nature of farming communities in some quarters and the employment of family labour on the farm and the issues of managerial succession. The large numbers of single person non-farm households found in the developed economies are not apparent here and there are far larger numbers of households with more than 4 persons[5]. As the farm household data are based on a smaller sample, there are more artefacts in this data

[5] Retired farm households will not be included in this group.

and this accounts for some of the zero value cells in Appendix 17. Farm household size does not appear to be affected by either type or size of town. As was the case with the non-farm households, the largest average household sizes are found in Poland, although this trend is not so apparent in the peri-urban towns.

No table is presented containing data on the social class of farm households, as variation on this dimension is very limited. In all study countries, except Poland, farm households in the main, classify themselves as managerial/technical (ranging from 70% in the UK and France, to 85% in Portugal), reflecting both the owner-occupier's management decision making and employer responsibilities and the high skill levels required for modern farm operations. Remember that it is the main household decision maker (this can be equated with farm business decision maker) generally completing the questionnaire. In Poland, respondents generally classify themselves as semi-skilled. This may be a reflection of the lower technical expertise of Polish farmers, but is more likely to be a difference in the interpretation of the classification itself and therefore, an artefact.

On average, farm household incomes are markedly lower than non-farm household incomes in almost all countries and over all types of towns (see Appendix 18). The exception to this is the UK, where average farm household incomes are larger than their non-farm counterparts. Again Polish household incomes are much lower than in other study countries, with the UK and the Netherlands showing the highest average incomes, reflecting the much larger farm sizes in the UK and the higher value products, especially from horticulture, produced in the Netherlands. France shows a much higher percentage of households in the lowest income category than in the non-farm case, especially around smaller towns. This is due to the large numbers of very small farms in the centre and south of the country. There appears to be little effect of town size or type on farm household income, other than a slight trend for higher incomes in larger agricultural towns.

3.2 Economic footprints and local integration indicators

Farm and non-farm businesses involved in this survey were asked to detail the value and location of their sales and purchases during the last complete financial year. Farm and non-farm households were similarly asked to itemise the value and location of their purchases (of both goods and services), in the four weeks prior to the survey. The spatial distributions of these sales and purchases were analysed, so that the level of integration of different household and business types with the local, regional, national and international economies could be estimated. Taken together, these measures capture the Economic Footprint of each business/household type. In total, eight geographical zones were designated (A to H) at increasing distance radii from the centre of each study town, as shown in Table 3.4.

Table 3.4. Description of geographical zones

Geographical zone	Distance radii	Equivalent NUTS Classification (where applicable)
A	Within the town boundary	
B	From town boundary to distance of 7km	
C	7 – 16km	
D	Elsewhere in the county	NUTS III
E	Elsewhere in the region	NUTS II
F	Elsewhere in the country	NUTS I
G	Elsewhere in the EU	
H	Elsewhere Worldwide	

Zones A and B, taken together, are designated as the Local Economy. For example, the value of farm households' purchases, in zones A+B, as a proportion of all purchases, is used as a measure of integration with the Local Economy and is called the Local Integration Indicator for farm household inputs, or LII^{fhi}. There are equivalent indicators for non-farm households' purchases and businesses' and farm businesses' purchases and sales (e.g. LII^{hi}, LII^{bi}, LII^{bs}, LII^{fbi} and LII^{fbs} respectively). Adding zone C to the above designates the Extended Local Economy and thus the value of purchases or sales to or from zones A+B+C, as a proportion of the whole, is called the Extended Local Integration Indicator, or ELII.

3.2.1 Non-farm businesses

3.2.1.1 Businesses' sales

Table 3.5 shows the degree of integration of sales of non-farm businesses with the local economy and wider regions in each study country. In all towns, the majority of non-farm businesses' sales are not local (i.e. to the town itself plus a radii of 7km). Averaged over all countries, a minimum of 27% is sold locally in small peri-urban towns, and a maximum of 44% in medium-sized peri-urban towns. When the distance radii is increased to 16km from the town, the proportion of sales made locally increases, and tops 50% in two instances, that of medium-sized agricultural and peri-urban towns. In general, there is greater local integration of non-farm businesses' sales in larger towns where these are peri-urban or agricultural. In contrast, local integration of sales is higher for small towns in the sample of tourist centres.

There is considerable variation in levels of local integration both between and within countries. In the case of agricultural towns, Portugal records the highest level of local integration and the UK the lowest. Where tourist towns are concerned the situation is reversed and the UK has the highest LII^{bs} and $ELII^{bs}$ scores and Portugal the lowest. Poland shows the highest level of local integration in peri-urban towns. Averaged over countries, between a third and a half of sales are made outside of the town and its hinterland, but within the country. The proportion of sales exported is surprisingly low, ranging from 4.4% to just under 20% - this last figure is inflated by a larger export figure in the Portuguese small tourist

centre. It is difficult to explain these patterns, as they are governed by the sector concentration of local business and their size. Where LII^{bs} and $ELII^{bs}$ values are high, one would expect to see a predominance of small, service oriented businesses. For example, Appendix 10 shows a high concentration of primary/extractive and manufacturing industries in the small tourist town in Portugal and here LII^{bs} and $ELII^{bs}$ values are very small and exports unusually significant.

Table 3.5. Local integration indicators for sales of non-farm businesses by country and type of town

	Small town						**Medium-sized town**					
Zone	NL	UK	PT	FR	PO	Average	NL	UK	PT	FR	PO	Average
Agriculture												
(Town+7km) LII	15.0	9.0	50.0	26.0	48.0	31.1	42.0	29.0	60.0	31.0	30.0	39.0
(Town+16km) ELII	22.0	12.0	62.0	29.0	54.0	37.6	59.0	39.0	71.0	43.0	39.0	50.7
Elsewhere in country	75.0	80.0	36.0	51.0	40.0	55.0	36.0	46.0	26.0	55.0	61.0	44.5
Elsewhere in EU	1.0	6.0	1.0	19.0	6.0	6.3	4.0	3.0	3.0	1.0	0.0	2.4
Outside EU	1.0	2.0	1.0	1.0	0.0	0.9	1.0	10.0	0.0	1.0	0.0	2.0
Tourism												
(Town+7km) LII	23.0	67.0	8.0	44.0	71.0	40.7	21.0	46.0	20.0	22.0	29.0	26.8
(Town+16km) ELII	36.0	76.0	13.0	49.0	78.0	48.6	32.0	54.0	34.0	30.0	40.0	37.4
Elsewhere in country	54.0	24.0	22.0	44.0	17.0	31.8	60.0	41.0	52.0	62.0	57.0	55.1
Elsewhere in EU	8.0	0.0	65.0	4.0	5.0	18.7	8.0	5.0	13.0	2.0	2.0	6.3
Outside EU	2.0	0.0	0.0	3.0	1.0	1.2	1.0	0.0	1.0	6.0	1.0	1.6
Peri-urban												
(Town+7km) LII	20.0	15.0	16.0	30.0	50.0	27.3	31.0	17.0	43.0	72.0	69.0	44.7
(Town+16km) ELII	25.0	17.0	21.0	38.0	57.0	32.2	65.0	37.0	56.0	77.0	85.0	60.9
Elsewhere in country	68.0	39.0	51.0	59.0	40.0	53.0	19.0	51.0	44.0	21.0	14.0	32.9
Elsewhere in EU	8.0	17.0	25.0	2.0	1.0	10.7	13.0	3.0	1.0	1.0	0.0	3.7
Outside EU	0.0	27.0	3.0	1.0	2.0	5.4	3.0	9.0	0.0	0.0	1.0	2.6

Note: Averages are weighted by number of businesses in the sample in each country

3.2.1.2 Businesses' purchases

It is apparent from Table 3.6 that a smaller proportion of businesses' purchases (averaged over all countries) are derived from the local economy than non-farm businesses' sales. This is a reasonable finding, as it might be expected that many of the purchases (aside from labour) of these businesses are products made by large-scale specialists, such as power and telecommunications suppliers, packaging firms etc., who may have a national or international reach.

Table 3.6. Local integration indicators for purchases by non-farm businesses by country and type of town

	Small town						Medium-sized town					
Zone	NL	UK	PT	FR	PO	Average	NL	UK	PT	FR	PO	Average
Agriculture												
(Town+7km) LII	20.0	6.0	18.9	55.7	17.1	22.8	22.0	5.9	31.5	43.6	24.0	25.0
(Town+16km) ELII	50.0	7.7	22.3	64.5	21.7	32.4	40.0	10.0	40.2	50.8	25.2	32.9
Elsewhere in country	44.0	58.1	45.2	35.5	77.7	53.4	52.0	73.3	49.7	49.2	72.5	59.7
Elsewhere in EU	6.0	22.1	32.5	0.0	0.4	12.0	4.0	12.0	7.6	0.0	0.4	4.7
Outside EU	0.0	12.1	0.0	0.0	0.0	2.2	3.0	6.1	2.6	0.0	2.0	2.8
Tourism												
(Town+7km) LII	11.0	7.1	4.7	53.5	17.9	16.4	9.0	5.9	18.2	28.2	15.6	15.1
(Town+16km) ELII	18.0	21.2	7.4	59.4	21.6	22.7	15.0	13.5	36.0	36.8	24.2	25.0
Elsewhere in country	72.0	78.1	44.8	39.0	74.5	62.7	59.0	69.6	55.5	63.2	67.0	62.3
Elsewhere in EU	9.0	0.7	47.8	1.6	3.0	14.2	13.0	14.7	8.5	0.0	7.2	8.9
Outside EU	2.0	0.3	0.0	0.0	1.0	0.8	13.0	0.1	0.0	0.0	1.5	3.4
Peri-urban												
(Town+7km) LII	5.0	5.8	23.9	22.2	5.4	12.2	36.0	7.6	45.3	5.5	13.2	23.3
(Town+16km) ELII	11.0	14.7	25.6	49.3	25.2	23.9	51.0	14.7	56.9	27.5	16.3	34.2
Elsewhere in country	82.0	76.0	64.8	50.6	25.6	58.8	43.0	66.2	42.5	66.1	83.0	59.4
Elsewhere in EU	5.0	3.8	8.7	0.2	44.5	14.6	4.0	9.2	0.6	6.3	0.8	3.9
Outside EU	2.0	7.4	0.9	0.0	4.9	3.0	3.0	11.1	0.0	0.1	0.0	3.0

It is interesting to note that the proportion of purchases derived from the local economy is roughly half of the rate of local sales in the tourist and peri-urban towns, but the rates are much closer in agricultural towns. This perhaps, in part, reflects the preponderance of agriculture-related service industries (not farms themselves), such as contracting firms and agricultural suppliers, servicing a local clientele.

There are some significant variations in these proportions over the countries in the survey. Most notably, the level of local integration with local economies is generally lower in the UK than other study countries. The Netherlands also demonstrates low levels of local integration of purchases, but not in the agricultural towns. Poland shows relatively low levels of local integration of purchases, perhaps a hang-over from the planned economy approach of the former Communist regime. France exhibits high levels of local integration for non-farm businesses' purchases in all areas except the large peri-urban town. Surprisingly, purchasing from the EU and beyond is not done at a much higher rate than sales, when averaged over all countries - although national purchases are.

3.2.2 Farm businesses

3.2.2.1 Sales

Table 3.7. Local integration indicators for sales by farm businesses by country and type of town

	Small town						Medium-sized town					
Zone	NL	UK	PT	FR	PO	Average	NL	UK	PT	FR	PO	Average
Agriculture												
(Town+7km) LII	35.0	2.4	52.3	65.0	36.2	40.2	10.0	10.2	68.8	11.7	51.5	35.5
(Town+16km) ELII	46.0	12.7	75.8	73.6	37.5	50.7	17.0	30.7	85.6	34.7	54.7	47.3
Elsewhere in country	53.0	87.1	24.0	26.4	62.4	49.0	73.0	69.2	14.4	65.3	45.3	50.6
Elsewhere in EU	1.0	0.3	0.2	0.1	0.0	0.3	6.0	0.0	0.0	0.0	0.0	1.3
Outside EU	0.0	0.0	0.0	0.0	0.0	0.0	4.0	0.0	0.0	0.0	0.0	0.8
Tourism												
(Town+7km) LII	22.0	2.1	41.0	70.1	19.8	27.8	25.0	18.5	20.1	10.3	23.7	21.0
(Town+16km) ELII	40.0	2.9	57.2	70.1	37.6	43.2	35.0	33.1	30.5	17.1	62.0	45.7
Elsewhere in country	58.0	97.1	42.8	29.9	62.4	56.2	64.0	66.9	64.1	82.9	37.1	52.9
Elsewhere in EU	1.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0	5.4	0.0	0.4	1.0
Outside EU	1.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.4	0.2
Peri-urban												
(Town+7km) LII	13.0	18.6	88.6	26.5	62.1	44.1	13.0	3.6	18.0	7.3	42.0	24.4
(Town+16km) ELII	18.0	28.3	95.7	43.0	89.7	59.8	23.0	25.6	32.2	30.1	61.6	40.5
Elsewhere in country	47.0	68.4	4.4	57.0	9.0	27.4	77.0	74.3	57.6	69.9	35.8	57.2
Elsewhere in EU	35.0	3.2	0.0	0.0	0.0	12.2	0.0	0.0	10.2	0.0	2.5	2.3
Outside EU	0.0	0.0	0.0	0.0	1.2	0.5	0.0	0.0	0.0	0.0	0.0	0.0

Averaged over all countries, the LII and ELII indicators for farm businesses' sales are not very different from those of non-farm businesses - some random differences aside. Integration with the town and its immediate hinterland (expressed as LII^{fbs}) is generally greater for smaller towns than larger, but this difference is not so apparent when the wider hinterland ($ELII^{fbs}$) is considered. LII for agricultural towns is larger than other town types, but as far as $ELII^{fbs}$ is concerned there appears to be only random variation over type of town. Having said that, this relative $ELII^{fbs}$ uniformity over towns does mask considerable variation between countries. Notable among these differences are the very low integration scores for UK farm sales in agriculture and tourist-related towns (and to a certain extent peri-urban towns) compared to other study countries; these are also mirrored at LII^{fbs}. The UK LII^{fbs} score for the tourist town is as low as 2%, compared with 70% for France. In the UK, it might be expected that the LII^{fbs} indicator is significantly higher in peri-urban towns, as these provide greater opportunity for direct marketing of agricultural products, especially organic products.

Agriculture outside of the UK is carried out, on average, on a much smaller scale and this may make direct and local marketing, of a smaller volume of product, more feasible. This fact must in part explain the consistency of levels of local integration of agricultural sales across towns, when these measures are averaged over countries. The highest levels of integration are seen in Portugal and France in small towns. In Poland, integration is higher in peri-urban areas. This may reflect the continued existence of large cooperative farms in more remote areas and the development of small-scale private farming and marketing around larger population centres.

Exports of agricultural products outside the country of origin are generally small, except in the case of the Netherlands for peri-urban towns. This reflects the production of high value goods, especially fruit, bulbs and vegetables, near rapid communications networks.

3.2.2.2 Purchases

Table 3.8. Local integration indicators for purchases by farm businesses by country and type of town

	Small town						**Medium-sized town**					
Zone	NL	UK	PT	FR	PO	Average	NL	UK	PT	FR	PO	Average
Agriculture												
(Town+7km) LII	34.0	18.5	81.1	55.7	62.9	55.1	42.0	34.9	67.7	43.6	60.5	52.5
(Town+16km) ELII	57.0	26.9	87.3	64.5	78.3	69.1	76.0	50.0	77.7	50.8	66.6	66.5
Elsewhere in country	37.0	71.7	12.4	35.5	16.3	27.4	22.0	49.6	18.7	49.2	33.5	32.3
Elsewhere in EU	6.0	2.3	0.2	0.0	5.4	3.5	2.0	0.4	3.6	0.0	0.0	1.2
Outside EU	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0	0.0	0.2
Tourism												
(Town+7km) LII	42.0	0.3	59.1	53.5	20.0	34.4	34.0	23.7	56.7	28.2	49.2	43.7
(Town+16km) ELII	58.0	20.6	61.3	59.4	51.4	54.6	53.0	57.0	59.0	36.8	79.0	65.5
Elsewhere in country	35.0	79.5	36.6	39.0	48.5	42.9	47.0	43.9	23.2	63.2	19.8	31.2
Elsewhere in EU	8.0	0.0	2.1	1.6	0.1	2.8	0.0	0.0	17.7	0.0	1.1	3.3
Outside EU	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Peri-urban												
(Town+7km) LII	36.0	74.7	45.6	22.2	68.7	51.5	36.0	25.2	37.9	5.5	64.6	45.1
(Town+16km) ELII	61.0	77.9	57.6	49.3	79.7	68.2	60.0	35.1	83.7	27.5	80.7	67.5
Elsewhere in country	37.0	21.9	37.8	50.6	18.0	29.5	38.0	63.9	16.2	66.1	16.7	30.2
Elsewhere in EU	0.0	0.4	4.6	0.2	2.2	1.5	1.0	0.8	0.2	6.3	2.5	1.9
Outside EU	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.1	0.0	0.0

As can be see from a comparison of Tables 3.8 and 3.6, farm-based inputs are derived from the local economy to a far greater extent than are non-farm purchases. As a rough rule of

thumb, farm LII and ELII scores are more than double those of non-farm businesses. Discounting for random fluctuations, there would appear to be very little variation in the average rate of local purchasing over towns, or town sizes. As was the case with non-farm purchases, buying from local sources occurs to a much lower extent with UK farm businesses than in other study countries. This must be a reflection of the greater scale of the average UK farm, which would be more likely to make bulk purchases of inputs from national-scale suppliers. The very high integration scores seen in the small UK peri-urban town are probably artefacts, as they are not repeated in the large peri-urban town. Averaged over all study countries, roughly a third of agricultural inputs are purchased from outside the region but still within the country. In the UK case this may be anything from 50%-70%. Over all towns, Poland has the highest integration scores for farm purchases, suggesting small-scale agriculture with an under-developed, and predominantly locally-based, agricultural supply chain.

3.2.3 Non-farm households

3.2.3.1 Low order and high order goods and services

Households in the survey of both non-farm and farm households were presented with a list of 35 goods and services and asked to indicate how much was spent on each, as a household, in the previous four weeks. Respondents were also asked to indicate where each of the purchases was made, using the zonation employed in the sections above. In order to more meaningfully estimate the economic footprints of households, in terms of the integration of their purchases with the local and region economies, each of the goods and services that were purchased has been classified into two groups, known as high order goods and low order goods. Low order goods and services represent every-day spending, on such things as groceries and laundry bills, while high order goods capture what might be described as non-essential spending, such as books and CDs. For a complete list of classified goods and services, see Appendix 19. In the analysis that follows, separate local and extended integration indices are produced for these two categories of goods and services.

In excess of 54% of high order goods are purchased by non-farm households, averaged over all countries, from the nearest town or within 7km of it (see Table 3.9) (the ELII value is 65%). There is considerable consistency in this percentage over the three town types in the study. There is far less variation between countries on this measure than is the case for businesses' purchases. The lowest LII^{hi} values occur for the UK in the peri-urban towns (17%) and the highest, at 79%, occur for Poland in the large agricultural town. The lowest ELII value is also in the UK peri-urban town (46%). UK LII^{hi} and $ELII^{hi}$ values are generally lower than other countries, probably reflecting the domination of the retail sector by the large multiples, which often have out-of-town outlets, together with the growth of internet purchasing. While most countries show high levels of local integration of high order purchases, Poland, narrowly, has the very highest rates. Surprisingly, town size does not seem to impact greatly on the extent of local purchasing of high order goods either at LII or ELII. Between a quarter and a third of high order purchases are, on average, from outside of the extended hinterland but within the nation itself - this percentage rises to as much as 50% in

several towns in the UK. Very little purchasing is done outside of the country in any circumstance.

Low order purchases (see second of row pair, Table 3.9) tend to be more local than is the case for high order, by a minimum of 18% for $ELII^{hi}$. The extent of the difference in local integration between high and low order purchases is relatively consistent, ranging from +23% in the medium size agriculture town to +57% in the small peri-urban town. Differences between rates of high and low order purchases are generally smaller and more consistent for LEII, ranging from 18% in the medium agricultural town to 26% for the medium tourist town. Agricultural towns seem to show the least difference in local purchase integration between these two classes of goods. Averaged over all countries, between 71% and 84% of low order goods are purchased at LII (83% to 87% for ELII). The UK again has the lowest levels of integration with the local economy both at LII and ELII, but this trend is not as pronounced as is the case for high order goods. Low order goods are half as likely to be purchased nationally as high order and only the most insignificant volumes are likely to be purchased from outside the nation. This statement should not be interpreted to mean that international trade in such goods is limited however. These statistics refer to the location of purchases by households and not the country of manufacture or production.

3.2.4 Farm households

Farm households purchase a greater proportion of high order goods from the LII^{fhi} and $ELII^{fhi}$ zones than do non-farm households (compare Tables 3.9 and 3.10). Averaged over all countries and towns, this rate of purchase is about 17-18% higher[6] for $ELII^{fhi}$ and LII^{fhi} respectively. This greater regional integration is probably due in part to the more conservative and traditional nature of farm households, coupled with the longer working hours experienced by farm families, making travel to more distant retails centres more difficult. The lowest levels of local integration in agricultural towns are found in France at LII^{fhi}, but especially at $ELII^{fhi}$, but in other types of town the UK has the lowest LII^{fhi} and $ELII^{fhi}$ scores. LII^{fhi} and $ELII^{fhi}$ scores are higher in general in agricultural towns, but not by a very great amount. Local integration also appears to be greater in the larger towns, but only where the extended hinterland is included; where it is not, this trend is reversed. National purchasing outside of the locale struggles to account for a quarter of purchases and purchases from outside the country are all but non-existent.

Just as was the case with non-farm households, low order goods have higher integration scores than high order purchases, averaging 13% higher for LII^{fhi} and 7% higher for LII^{fhi} over all countries and towns. This is the highest rate of local integration of any household type-goods type combination, averaging 72% for LII^{fhi} and over 87% for ELII. Again the UK shows the lowest national values, but even here $ELII^{fhi}$ scores do not dip below 68%. Local integration of low order purchases is especially high in Portugal and Poland.

[6] Estimates based on a simple arithmetic mean of row averages from Tables 3.9 and 3.10.

Table 3.9. Local integration indicators for high and low order purchases by non-farm households by country and type of town

		Small town						Medium-sized town					
Zone	Order	NL	UK	PT	FR	PO	Average	NL	UK	PT	FR	PO	Average
Agriculture													
(Town+7km) LII	High	55.0	42.7	73.5	67.4	68.1	58.3	65.0	58.4	83.6	63.9	79.1	68.3
	Low	71.0	71.8	96.5	84.0	87.0	79.7	77.0	77.4	94.7	86.6	91.9	84.1
(Town+16km) ELII	High	78.0	49.3	77.6	68.4	75.7	67.9	83.0	62.3	84.1	65.3	81.3	73.9
	Low	87.0	76.1	96.8	85.5	90.3	85.7	86.0	79.8	95.4	87.7	92.4	87.1
Elsewhere in country	High	21.0	48.7	20.8	31.5	22.6	30.8	16.0	37.3	15.8	34.1	18.7	25.6
	Low	12.0	21.0	3.1	13.9	8.9	13.0	13.0	19.4	4.2	11.4	7.6	12.2
Elsewhere in EU	High	1.0	0.7	1.6	0.0	1.4	0.9	0.0	0.4	0.2	0.5	0.0	0.2
	Low	1.0	2.2	0.0	0.1	0.6	1.0	0.0	0.4	0.5	0.0	0.0	0.2
Outside EU	High	0.0	0.8	0.0	0.1	0.4	0.3	0.0	0.5	0.0	0.0	0.0	0.1
	Low	0.0	0.4	0.0	0.5	0.1	0.2	0.0	0.1	0.0	0.9	0.0	0.2
Tourism													
(Town+7km) LII	High	57.0	40.7	52.9	59.4	62.0	52.9	53.0	28.3	46.1	58.4	71.4	48.2
	Low	70.0	62.6	84.5	77.7	82.0	73.5	77.0	55.1	87.8	78.4	80.5	73.1
(Town+16km) ELII	High	77.0	64.1	59.5	61.0	79.6	68.7	64.0	60.0	72.0	63.5	86.6	68.2
	Low	82.0	76.3	87.4	78.9	94.1	83.0	81.0	81.9	98.3	82.0	90.6	86.2
Elsewhere in country	High	24.0	26.7	39.5	37.9	19.4	28.5	37.0	40.7	27.7	36.3	12.8	32.0
	Low	17.0	19.2	11.6	19.7	4.9	14.9	17.0	17.6	1.7	17.9	8.7	13.0
Elsewhere in EU	High	0.0	8.6	1.1	1.0	1.0	2.9	0.0	0.0	0.3	0.0	0.6	0.2
	Low	0.0	0.6	0.8	1.4	1.1	0.7	1.0	1.4	0.0	0.0	0.7	0.8
Outside EU	High	0.0	0.4	0.0	0.0	0.0	0.1	0.0	0.1	0.0	0.2	0.0	0.1
	Low	0.0	0.1	0.1	0.0	0.0	0.0	0.0	0.2	0.0	0.2	0.1	0.1
Peri-urban													
(Town+7km) LII	High	52.0	17.1	70.8	29.8	60.4	42.4	61.0	38.8	64.7	35.5	72.4	54.6
	Low	73.0	56.2	92.3	62.5	57.4	66.8	74.0	54.2	80.4	58.6	94.8	71.7
(Town+16km) ELII	High	74.0	46.0	82.9	44.8	98.5	66.7	78.0	46.6	80.2	67.7	79.8	69.0
	Low	83.0	73.4	98.1	69.3	98.9	83.3	84.0	63.9	93.4	88.0	96.0	83.0
Elsewhere in country	High	26.0	53.0	17.0	54.3	1.4	32.8	22.0	50.9	18.8	31.5	20.1	30.0
	Low	16.0	23.3	1.9	30.0	1.1	15.3	13.0	32.2	6.6	12.0	4.0	15.2
Elsewhere in EU	High	0.0	0.3	0.0	0.9	0.1	0.2	1.0	1.5	1.1	0.5	0.0	0.9
	Low	1.0	2.2	0.0	0.5	0.0	1.0	3.0	1.5	0.1	0.0	0.0	1.1
Outside EU	High	0.0	0.8	0.0	0.0	0.0	0.3	0.0	0.8	0.0	0.3	0.0	0.3
	Low	0.0	1.3	0.0	0.2	0.0	0.4	1.0	2.4	0.0	0.0	0.0	0.9

Table 3.10. Local integration indicators for high and low order purchases by farm households by country and type of town

		Small town						Medium-sized town					
Zone	Order	NL	UK	PT	FR	PO	Average	NL	UK	PT	FR	PO	Average
Agriculture													
(Town+7km) LII	High	64.0	43.6	77.1	60.2	56.5	62.4	77.0	66.8	94.2	63.0	88.0	80.4
	Low	45.0	68.3	95.2	81.6	88.8	75.5	67.0	68.8	95.1	86.9	94.7	84.0
(Town+16km) ELII	High	93.0	70.1	81.0	64.9	73.0	79.1	88.0	76.4	95.0	63.4	88.0	84.4
	Low	89.0	72.8	98.5	91.8	92.4	91.0	83.0	78.2	97.7	88.3	95.0	89.6
Elsewhere in country	High	6.0	25.0	18.3	35.1	25.2	19.5	12.0	23.3	5.0	36.6	12.0	15.6
	Low	10.0	28.4	1.6	8.1	6.9	8.6	17.0	24.7	2.2	11.7	5.0	10.8
Elsewhere in EU	High	0.0	0.0	0.6	0.0	1.8	0.7	0.0	0.0	0.0	0.0	0.0	0.0
	Low	0.0	0.0	0.0	0.0	0.7	0.2	0.0	0.5	0.0	0.0	0.0	0.1
Outside EU	High	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.4	0.0	0.0	0.0	0.2
	Low	0.0	0.8	0.0	0.0	0.0	0.1	0.0	1.0	0.0	0.0	0.0	0.1
Tourism													
(Town+7km) LII	High	61.0	3.9	83.8	59.7	40.8	53.4	56.0	42.6	52.7	82.8	65.4	62.3
	Low	55.0	33.9	80.4	77.5	51.4	58.4	59.0	42.3	79.1	63.8	79.6	71.1
(Town+16km) ELII	High	79.0	26.2	87.8	60.2	62.0	69.4	77.0	83.9	76.5	90.5	89.5	85.3
	Low	67.0	68.8	87.6	77.9	80.6	76.9	72.0	78.4	94.0	78.9	95.4	88.0
Elsewhere in country	High	21.0	73.3	12.1	39.1	37.8	30.4	22.0	17.3	21.7	8.2	10.4	14.2
	Low	33.0	23.9	12.5	22.0	19.0	22.7	28.0	21.0	6.0	19.0	4.6	11.7
Elsewhere in EU	High	0.0	0.0	0.0	0.6	0.0	0.1	0.0	1.2	1.8	1.4	0.0	0.5
	Low	0.0	0.0	0.0	0.1	0.4	0.2	0.0	0.0	0.0	2.1	0.0	0.3
Outside EU	High	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Low	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.6	0.0	0.0	0.0	0.1
Peri-urban													
(Town+7km) LII	High	76.0	27.8	44.6	59.4	58.8	61.5	70.0	44.3	37.3	25.8	74.2	63.0
	Low	57.0	53.5	80.1	58.7	74.2	66.7	65.0	73.8	82.4	48.4	93.5	77.6
(Town+16km) ELII	High	92.0	53.0	56.4	77.9	91.6	84.5	86.0	57.9	84.2	74.2	82.9	81.7
	Low	77.0	71.6	90.8	70.6	99.7	87.1	79.0	79.6	98.3	85.2	99.3	89.6
Elsewhere in country	High	8.0	47.2	43.6	22.1	8.4	15.5	14.0	42.0	15.7	25.8	16.9	18.2
	Low	23.0	24.8	9.2	26.8	0.3	12.5	18.0	11.4	1.6	14.8	0.7	8.7
Elsewhere in EU	High	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Low	0.0	0.0	0.0	0.0	0.0	0.0	1.0	1.5	0.0	0.0	0.0	0.5
Outside EU	High	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Low	0.0	3.7	0.0	2.6	0.0	0.4	1.0	0.0	0.0	0.0	0.0	0.4

3.3 Economic Footprint Diagrams

The following diagrams aim to show even more clearly the difference in selling and purchasing patterns for firms and households. The town and hinterland are shown separately in the diagrams, allowing for differentiation between the two locations.

3.3.1 Non-farm businesses - sales

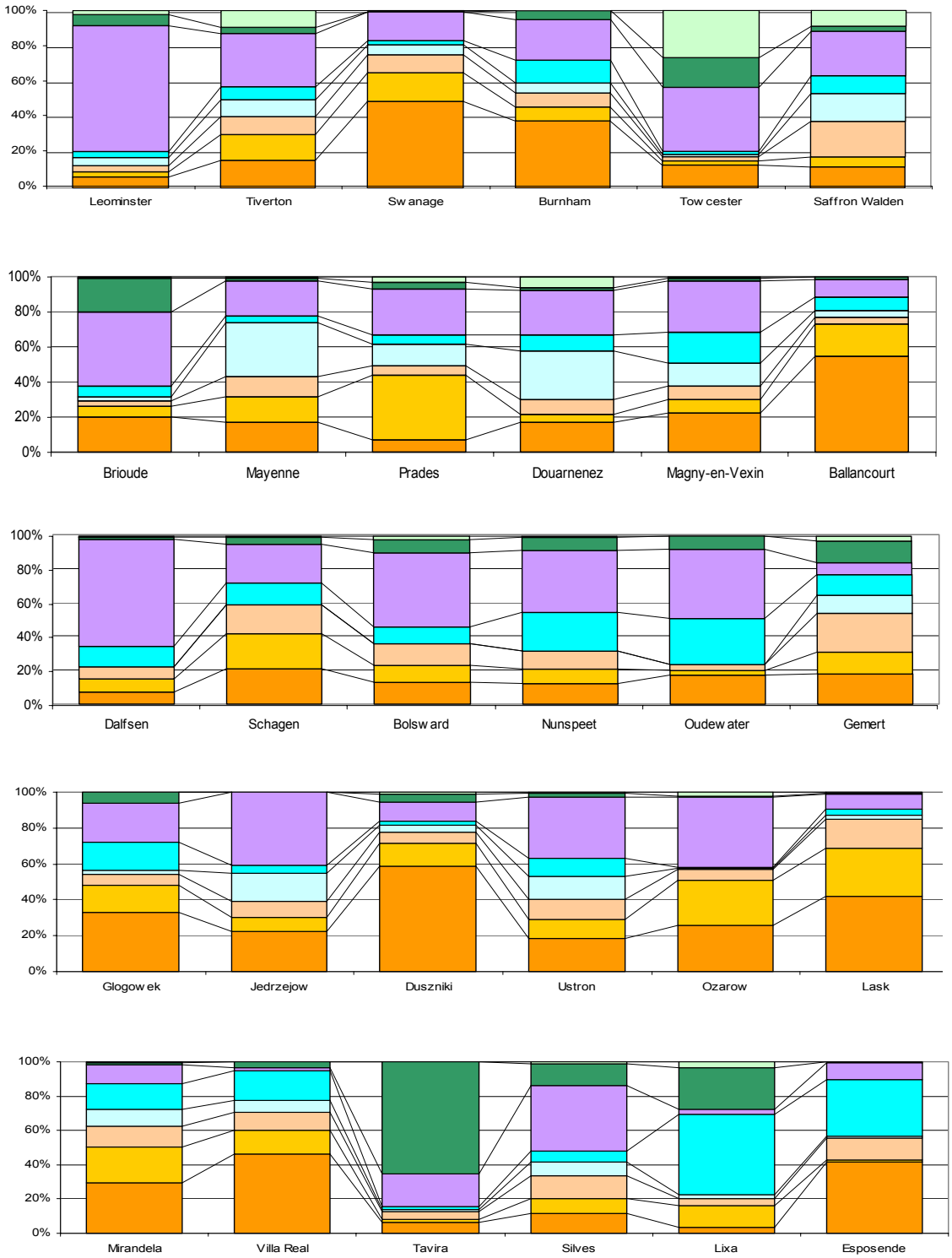
Figure 3.1 illustrates even more clearly that stronger local linkages are found in Portugal and Poland, particularly in the case of agricultural towns. The small agricultural towns in these countries (Mirandela and Glogowek) contain around 50% of all sales, rising to 60% for the larger town in Portugal (Villa Real) and falling to around 30% for the equivalent town in Poland (Jedrzejow). Small agricultural towns in the UK and the Netherlands are strongly tied to their respective national economies, although we find a more even distribution of linkages throughout the economy in the case of the medium agricultural towns (Tiverton and Schagen). Such towns thus potentially enjoy stronger town-hinterland linkages. In France, agricultural towns are also differentiated in terms of their size for whilst firms in the smaller town (Brioude) are more strongly integrated into national markets, those in the medium town (Mayenne) are more strongly tied to the hinterland and the NUTS III region.

Examining tourism areas, the most self-contained town economies in terms of sales are found in the UK and Poland, particularly in the case of the small towns (Swanage and Duszniki). In France the small tourism town (Prades) has the strongest downstream linkages to its hinterland, which accounts for around 40% of all non-farm sales, whilst the medium town (Douarenenez), like its agricultural counterpart, is more strongly tied to its NUTS III region. Small and medium tourism towns in the Netherlands (Bolsward and Nunspeet) exhibit very similar patterns in terms of downstream linkages, with the local and national economies accounting for around 20% and 40% of all sales respectively. In contrast, equivalent towns in Portugal exhibit some marked differences. Whilst the larger town (Silves) follows a pattern similar to equivalent towns in Poland and the Netherlands, the smaller town (Tavira) is reaching out to the international economy to much greater degree, with other EU countries accounting for over 60% of all sales.

Peri-urban towns exhibit some interesting downstream patterns, both with respect to town size and country. A distinct pattern is found in France, Poland and Portugal whereby firms in the medium-sized peri-urban towns (Ballencourt, Lask and Esposende) make 40% of all sales within the towns themselves.

Thus, larger peri-urban towns in these countries are able to achieve more self-contained economies with sufficient demand for local products. The potentially strongest town-hinterland linkages are found in Poland, where both per-urban towns (Ozarow and Lask) draw around 25% of sales revenue from the 7km hinterland. Following equivalent towns in the other countries, firms in the smaller town exhibit stronger downstream linkages to the national economy. Peri-urban towns in the UK and Netherlands appear to exhibit similar characteristics. The two small towns (Towcester and Oudewater) both draw around 15% of sales income from the town itself and have very weak linkages to the hinterland. Whilst firms

Figure 3.1. Illustration of economic footprints of non-farm businesses' sales for all towns



in both towns are strongly tied to their respective national economies, those in Towcester draw around 40% of sales income from the international economy, whereas those in Oudewater exhibit stronger ties to the NUTS III region. Downstream linkages in medium-sized peri-urban towns in both countries (Saffron Walden and Gemert) are more evenly distributed throughout the economy, with firms in Saffron Walden more nationally orientated compared to the more regional orientation of firms in Gemert.

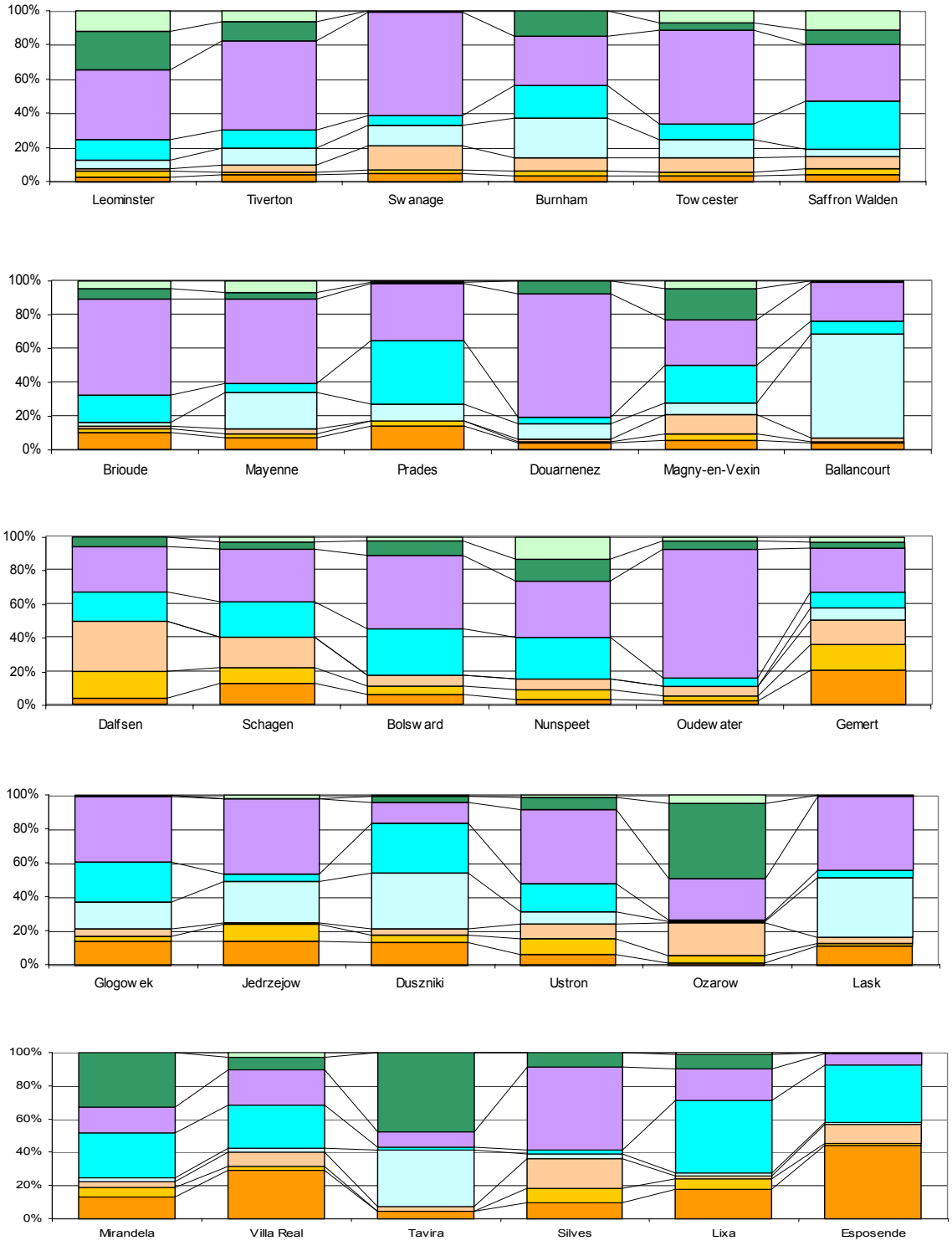
3.3.2 Non-farm businesses - purchases

Across the sample, Figure 3.2 shows that the patterns of upstream linkages appear to be more differentiated in terms of country, with some town type and size differences evident at the national level. UK firms are broadly characterised by their relatively weak local upstream linkages, with the majority of firms appearing to display national sourcing patterns. Both agricultural and peri-urban towns exhibit stronger ties to the international economy and whilst the larger tourism town (Burnham) has stronger linkages to the NUTS III economy, the equivalent peri-urban town (Saffron Walden) is more regionally orientated in terms of input sourcing. Levels of local upstream integration are only slightly higher in France but again town-hinterland linkages are weak across all case study towns. Firms in agricultural towns source around 40% of all inputs from the national economy. Whilst the smaller town (Brioude) is more strongly integrated into the regional economy, the larger town (Mayenne) has stronger upstream ties to the NUTS III region. Some distinct differences are also evident in terms of town size for tourism and per-urban towns respectively. Firms in the medium tourism town (Douarenez) source 60% of inputs from the national economy whereas those in Prades are considerably more integrated into the regional economy. In the case of the French peri-urban towns the size differences are even greater. The sourcing patterns of firms in Magny-en-Vexin are fairly evenly distributed throughout the economy whereas the majority of inputs to firms in the larger town (Ballencourt) are sourced from the NUTS III region.

In the Netherlands a substantial difference is also evident between the small and medium peri-urban towns, with firms in the larger of these (Gemert) more integrated into the local and regional economies than those in the smaller town (Oudewater). In the latter case, firms source around 75% of all inputs from the national economy, with only around 5% sourced within the local economy. Population size has less of an influence on the tourism and agricultural towns, although the two types are distinguished from each other in terms of sourcing patterns. More local sourcing is evident in the agricultural areas and a greater proportion of inputs to tourism town firms are sourced from the national economy. The agricultural and peri-urban towns in Portugal are distinguished from all other surveyed towns by having the strongest local upstream linkages, and it is the larger towns (Villa Real and Esposende) which exhibit the most self-contained local economies, with the town economies accounting for around 30% and 45% of all input sourcing respectively. The two Portuguese tourism towns, however, exhibit considerably weaker local upstream linkages, with the small town (Tavira) being more strongly tied to the NUTS III economy and the larger town (Silves) being more dependent on the national economy for its input sourcing.

In Poland the agricultural areas evidently enjoy stronger local upstream linkages than do other town types, with the weakest local linkages found in the small peri-urban town

Figure 3.2. Illustration of economic footprints of non-farm businesses' purchases for all towns



(Ozarow). As in the other countries, town size has an effect within each of the three categories, and most noticeably in the tourism and peri-urban areas. Whilst the small tourism town (Duszniki) is orientated towards the NUTS III and regional economies in terms of input sourcing, the larger town (Ustron) is more strongly tied to the national economy. Likewise, the medium peri-urban town (Lask) also reaches out to the NUTS III region, while it smaller counterpart (Ozarow) has significant links to the international economy, with firms sourcing almost half of all inputs from elsewhere in the EU.

3.3.3 Farm businesses - sales

From Figure 3.3, we can see across the sample there is a greater degree of variation between farms with respect to patterns downstream linkages in comparison to firms. Whilst one might expect farms to have stronger local linkages in agricultural areas, this is not the case in all countries. In the UK, for example, farms actually exhibit weaker downstream linkages to agricultural towns than they do to tourism and peri-urban towns. Across the UK towns, farms are shown to be reaching out most to national markets, with the NUTS III region also predominant in the two tourism towns and the larger peri-urban town (Saffron Walden). In France, farms are shown to be more strongly linked to small towns in comparison to medium towns, with small agricultural and tourism towns acting as a market for farm sales to the greatest degree. In all cases except the larger peri-urban town (Ballencourt) farms do not reach out much beyond the regional economy in terms of sales, with the NUTS III region accounting for a significant proportion of farm sales in four out of the six towns.

In the Netherlands, farms are more tied to the national economy in terms of sales in all town types, and there is less variation between towns of different sizes. Whilst agricultural towns in Portugal and Poland exhibit the strongest linkages to the town and 7km hinterland, those in Portugal are more strongly tied to the region beyond the locality, whilst Polish farms tend to reach out to the national economy. Tourism towns in these two countries exhibit comparable patterns, as do the small peri-urban towns (Ozarow and and Lixa) which have weak linkages to the town but very strong localised linkages in the hinterland. Thus in both areas, farms are selling a considerable proportion (60% and 70% respectively) within their immediate rural locality, but trading in their local town to a much lesser degree. Contrasting patterns are, however, evident in the case of the medium peri-urban towns in these countries. Farms in Lask sell around 40% of their produce within the 7km radius, with the remainder fairly evenly distributed throughout the regional and national economy, whereas those in Esposende sell over half of all produce in the NUTS III region.

3.3.4 Farm businesses - purchases

Figure 3.4 shows that farm businesses source their inputs from small and medium towns to a greater degree than other industrial sectors, a pattern which is particularly evident in the agricultural areas of France, Portugal and Poland. In the latter two countries 60% to 80% of all farm inputs are sourced within the 7km radius of agricultural towns. In France this falls to around 40%, with more inputs sourced from the regional, and in particular the national economy of such towns. The UK again exhibits the lowest degree of local integration, with the regional and national economies accounting for around half of all farm inputs. The small

Figure 3.3. Illustration of economic footprints of farm businesses' sales for all towns

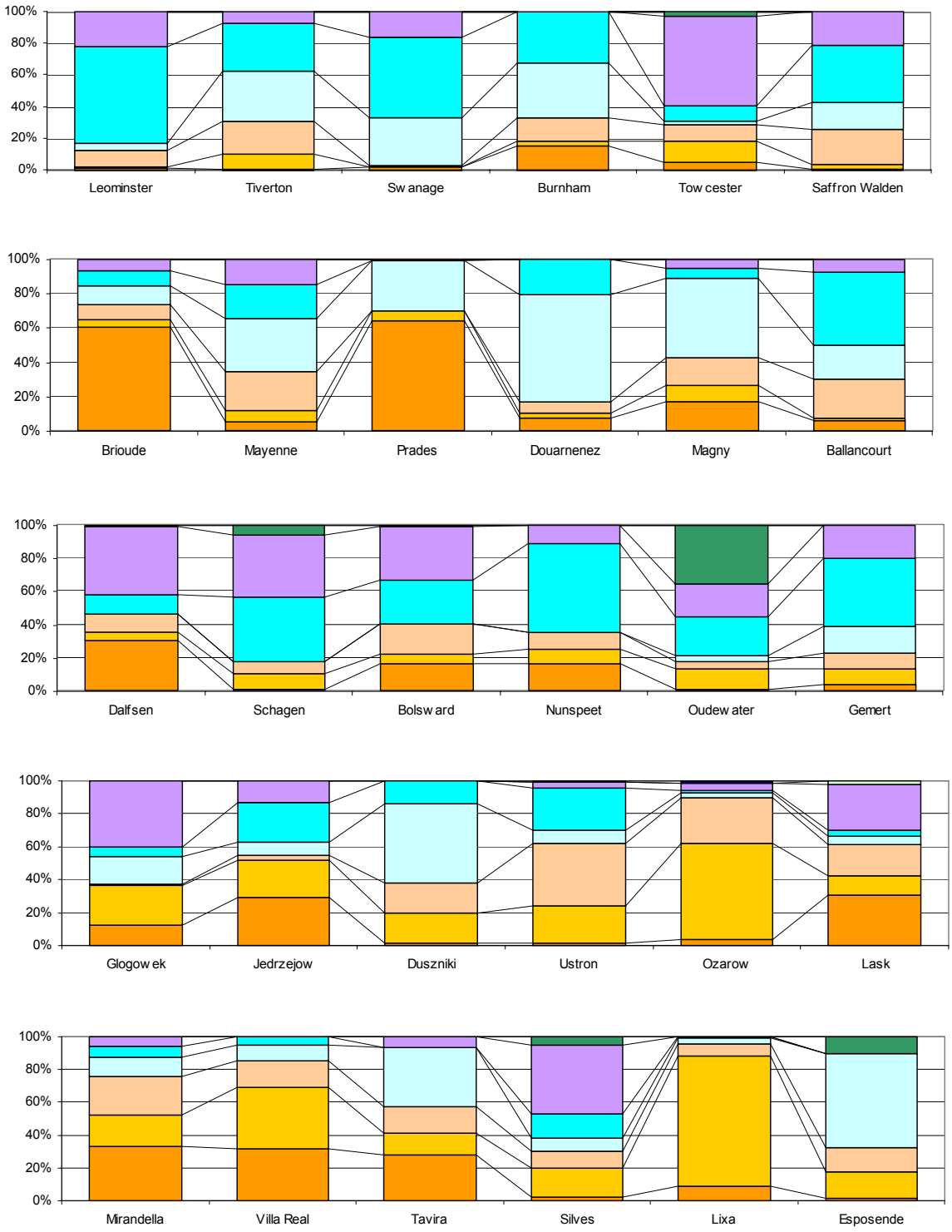
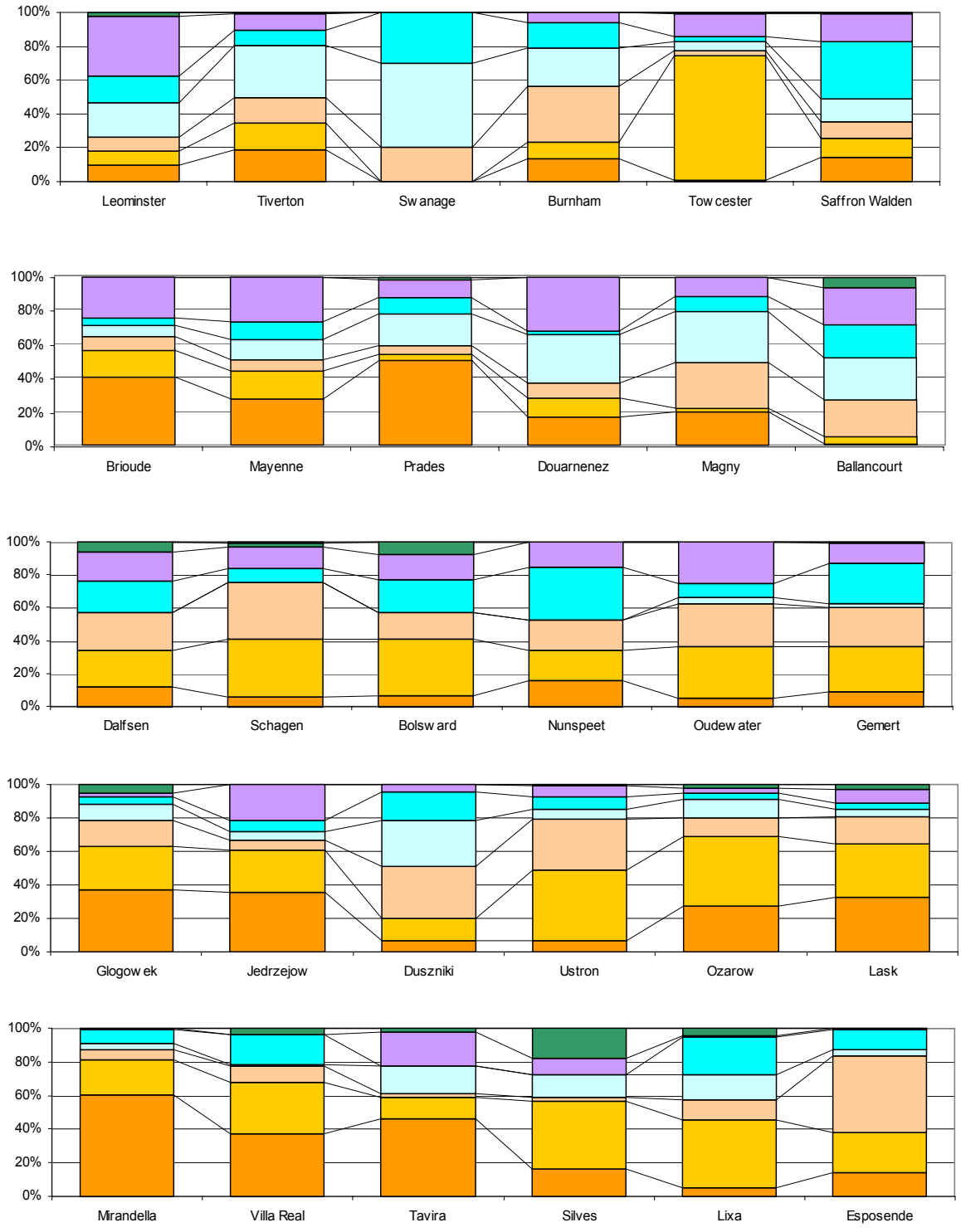


Figure 3.4. Illustration of economic footprints of farm businesses' purchases for all towns



peri-urban town (Towcester) is an interesting exception, wherby 75% of all farm inputs are sourced within the 7km hinterland of the town. Local farm inputs in the small tourism town (Swanage) are virtually negligible, with nearly all inputs sourced from the NUTS III, regional and national economy. Farm input linkages in the Netherlands follow similar patterns across all town types, with most characterised by strong localised linkages in the 7km hinterland and relatively stong input linkages in the NUTS III region. In comparison to other countries, farms around Portuguese and Polish peri-urban towns exhibit relatively strong linkages to their local town and, in particular, their immediate locality.

3.3.5 Households - low order

Figure 3.5 shows again that all surveyed towns show similar levels of low order integration, although again towns in Portugal and Poland exhibit the highest levels of self-containment, especially for agricultural towns which account for some 90% of all local household spend on low order goods and services. Spending patterns in the Portuguese peri-urban towns are, however, more on a par with equivalent towns in the other three countries, accounting for around 60% of low order spend. Peri-urban households in the UK and Netherlands exhibit similar spatial patterns with the strongest linkages to the regional and, in the UK, national economies for low order spend. This probably reflects the relative accessibility to urban centres in these countries and commuting patterns. The two French peri-urban towns provide an interesting comparison with regards low order spending patterns. Unlike the equivalent case in Poland, the larger peri-urban town (Ballencourt) accounts for less low order spend than its smaller counterpart (Magny), the difference accounted for the greater proportion of low order spend carried out in the 7km hinterland of the larger town.

3.3.6 Households - high order

The functional difference between town types is highlighted more by the data relating to high order spending patterns (Figure 3.6). Most obvious is the contrast between agricultural towns and peri-urban towns in terms of the strength of local integration. In the UK, for example, the two agricultural towns (Leominster and Tiverton) account for 40% and 50% of local high order spend respectively, compared to only 15% and 35% of equivalent spend in the two peri-urban towns. Whilst residents of the larger of the two towns (Saffron Walden) spend more in the town itself (which is logical given likely economies of scale) a similar proportion of high order goods are sourced within the NUTS IV region. Thus, residents of both towns reach out to the national economy for high order expenditure to a similar degree. In France, however, the strength of high order linkages is higher in the smaller peri-urban town (Magny), although local residents tend to reach out further – the NUTS III region - for high order shopping in comparison to those in Ballencourt, who reach out to the NUTS IV region. Towns in the Netherlands are not substantially differentiated by type or size in terms of the distribution of high order spend, thus indicating fairly uniform consumer functions. Whilst towns in Portugal and Poland again exhibit the strongest degree of economic self-containment, some interesting patterns are evident from the data. The larger tourism and peri-urban towns in Poland (Ustron and Lask) contain more high order spend than their Portuguese counterparts and whilst residents of Jedrzejow tend only to reach out to the NUTS III region for high order spending, those of Villa Real tend to reach out to the national economy.

Figure 3.5. Illustration of economic footprints of household low order purchases for all towns

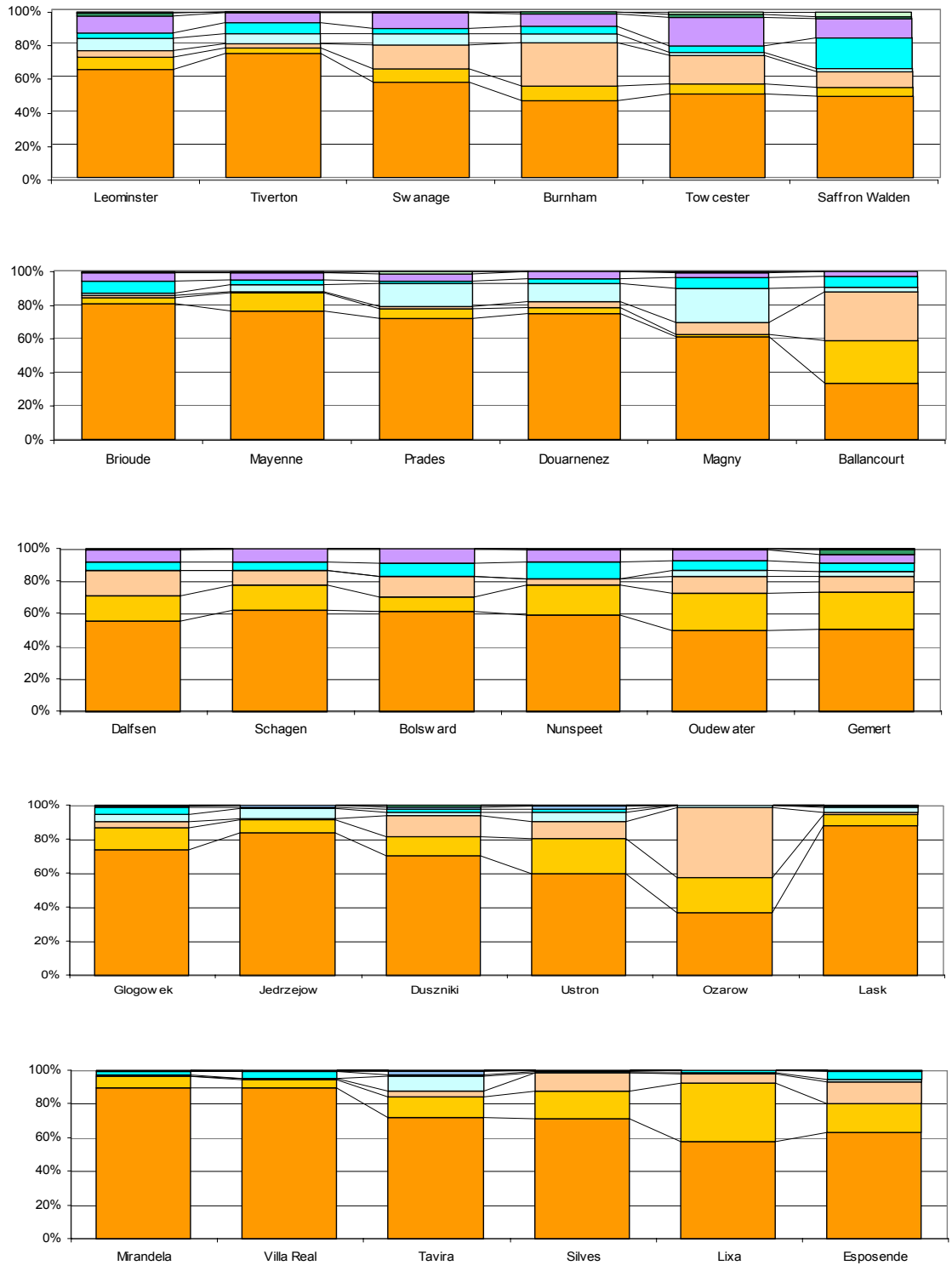
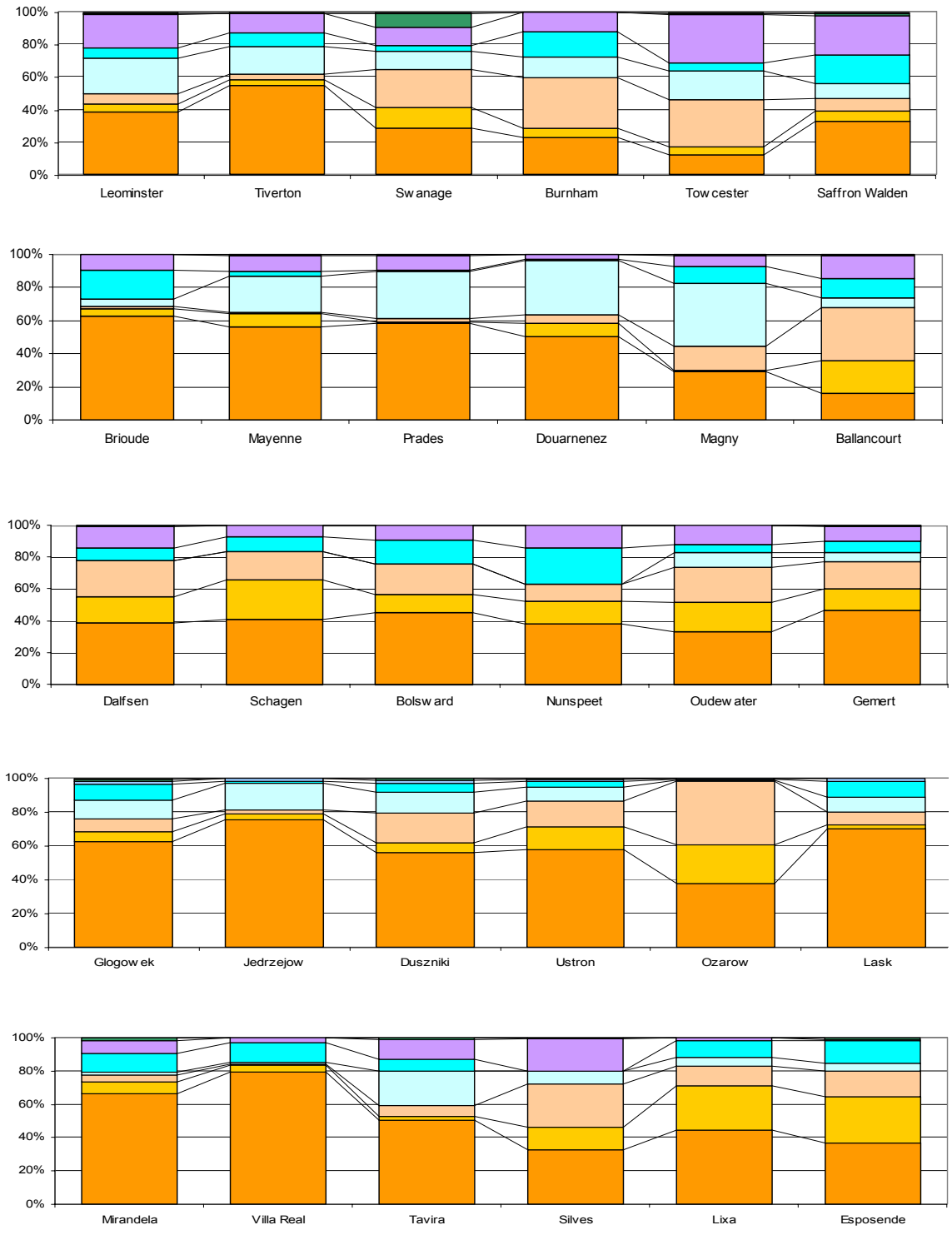


Figure 3.6. Illustration of economic footprints of household high order purchases for all towns



3.4 Employment footprints and local integration indicators

This section of the report details the spatial distribution of labour use by farm and non-farm firms in each country, by type of town. The results presented in the tables that follow represent percentage distributions of employed labour in the form of Full Time Equivalents (FTEs). Data on the distribution of salary payments were also generated, but these are not presented here as these values invariably follow the trends in FTEs very closely (i.e. to within a few percentage points).

3.4.1 Non-farm businesses

It is immediately apparent from Table 3.11, that non-farm businesses, as a rule, draw the great majority of their labour from the local market. Averaged over all countries, between 60.2% and 79.8% of all employed labour is derived from a 7km radius (LII) of the town (between 84% and 92.5% for ELII). There appears to be a size trend here, with smaller towns evincing less local integration of labour use by businesses, but this is not the case in all countries and not the case on average for tourist towns.

Table 3.11. Local integration indicators for employment by non-farm businesses by country and type of town (%)

	Small town						Medium-sized town					
Zone	NL	UK	PT	FR	PO	Average	NL	UK	PT	FR	PO	Average
Agriculture												
(Town+7km) LII	57.0	59.5	96.1	62.1	70.3	69.7	68.0	64.5	96.6	70.0	86.6	78.0
(Town+16km) ELII	81.0	77.8	98.7	89.0	89.9	87.6	88.0	85.9	98.4	86.1	95.6	91.3
Elsewhere in country	19.0	22.9	1.1	11.6	10.1	12.6	12.0	15.8	1.8	13.4	4.4	9.0
Elsewhere in EU	0.0	2.7	0.0	0.0	0.0	0.5	0.0	0.0	0.0	0.5	0.0	0.1
Outside EU	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Tourism												
(Town+7km) LII	61.0	82.9	90.1	81.9	86.5	79.8	67.0	65.8	90.2	73.2	86.0	77.4
(Town+16km) ELII	83.0	93.3	94.8	93.1	94.8	91.4	83.0	93.4	97.9	89.8	98.2	92.5
Elsewhere in country	17.0	9.1	4.0	6.9	5.3	8.7	17.0	6.7	1.7	10.1	1.8	7.4
Elsewhere in EU	0.0	0.8	0.9	0.0	0.0	0.3	0.0	0.0	0.1	0.0	0.1	0.0
Outside EU	0.0	0.0	0.4	0.0	0.0	0.1	0.0	0.0	0.2	0.0	0.0	0.0
Peri-urban												
(Town+7km) LII	59.0	50.7	73.8	52.2	58.2	60.2	72.0	60.3	78.6	53.3	93.3	73.4
(Town+16km) ELII	74.0	80.0	95.6	73.8	90.6	84.1	88.0	79.8	94.4	78.2	99.2	89.0
Elsewhere in country	26.0	22.0	4.4	26.2	9.4	16.1	12.0	20.2	5.4	21.8	0.8	11.0
Elsewhere in EU	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0	0.2	0.0	0.0	0.3
Outside EU	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

As might be expected, peri-urban towns show lower rates of local labour integration both at LII and ELII. In such towns, there will be competition for labour from the large population centres nearby, for whom the peri-urban town may be quite accessible because of good local communications. France and the UK tend to report lower levels of local labour integration, especially in the agriculture and peri-urban towns This probably reflects greater flexibility in the labour markets with good transport infrastructures encouraging more long-distance commuting. Averaged over al countries between 7% and 16% of labour employed by non-farm business is recruited from outside the region, the highest rates being in peri-urban towns, especially in the UK and France. Only in the UK is there any significant use of labour resident outside the country and this probably reflects use of teleworkers.

3.4.2 Farm businesses

Predictably, the degree of local integration for employment by agricultural firms is even greater than for non-agricultural businesses, with, averaged over countries, no town registering a degree of local integration (LII) less than 76% (small peri-urban towns); for ELII this same figure is 95%. Indeed, aside from peri-urban towns, more than 80% of employees, averaged over countries, live within 7km of their employment (see Table 3.12).

Table 3.12. Local integration indicators for employment by farm businesses by country and type of town (%)

	Small town						Medium-sized town					
Zone	NL	UK	PT	FR	PO	Average	NL	UK	PT	FR	PO	Average
Agriculture												
(Town+7km) LII	86.0	81.0	99.1	94.1	70.3	84.6	77.0	91.7	96.1	87.3	86.6	87.3
(Town+16km) ELII	98.0	88.0	99.4	99.8	89.9	95.2	99.0	100.0	98.8	99.4	95.6	98.1
Elsewhere in country	2.0	12.0	0.4	0.2	10.1	4.8	1.0	0.0	1.3	0.6	4.4	2.0
Elsewhere in EU	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Outside EU	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Tourism												
(Town+7km) LII	81.0	67.0	99.6	94.1	86.5	86.9	90.0	93.2	83.4	86.1	86.0	86.7
(Town+16km) ELII	100.0	100.0	99.8	95.7	94.8	97.2	99.0	100.0	86.3	92.3	98.2	95.8
Elsewhere in country	0.0	0.0	0.2	2.5	5.3	2.7	0.0	0.0	0.0	7.7	1.8	2.0
Elsewhere in EU	0.0	0.0	0.0	1.9	0.0	0.2	0.0	0.0	0.0	0.0	0.1	0.1
Outside EU	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.1
Peri-urban												
(Town+7km) LII	87.0	97.6	91.2	95.6	58.2	76.6	90.0	88.6	99.5	81.2	93.3	91.8
(Town+16km) ELII	100.0	98.9	98.4	97.8	90.6	95.7	96.0	98.3	100.0	94.6	99.2	97.8
Elsewhere in country	0.0	1.3	1.6	2.2	9.4	4.3	3.0	0.0	0.0	4.9	0.8	1.7
Elsewhere in EU	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.0	0.0
Outside EU	0.0	0.0	0.0	0.0	0.0	0.0	1.0	1.1	0.0	0.0	0.0	0.4

Many farm employees will be family members living close by, or other paid workers often living in tied accommodation on the farm. This trend for employment of very local workers is common across all types of towns regardless of size and across all study countries. The headline conclusion that can be drawn from this is that farm workers do not commute.

3.4.3 Non-farm households

The majority of residents in Non-farm households work in the town of residence, or within 7km of it (see Table 3.13). This phenomenon is more pronounced in agricultural and tourist towns than peri-urban, but even in peri-urban towns, on average, 47% - 57% of employed householders work in the town of residence or its immediate vicinity. There is a tendency for more local working in the larger towns, but this trend is reversed in the tourist towns, for all countries. There is some national variation in the rates of local working, with the Netherlands, France and the UK showing rather lower rates of local working than other study countries, suggesting greater levels of commuting.

Table 3.13. Extended local integration indicators showing employment in non-farm households by country and type of town (%)

	Small town						**Medium-sized town**					
Zone	NL	UK	PT	FR	PO	Average	NL	UK	PT	FR	PO	Average
Agriculture												
(Town+7km) LII	36.0	56.6	96.0	69.7	67.4	63.8	38.0	59.0	94.7	73.6	73.7	67.2
(Town+16km) ELII	72.0	71.5	96.8	79.1	75.1	77.8	74.0	74.3	97.6	78.8	84.3	80.9
Elsewhere in country	28.0	27.4	3.2	20.9	17.9	20.6	25.0	25.7	2.4	21.2	14.9	18.8
Elsewhere in EU	1.0	1.2	0.0	0.0	5.2	1.5	1.0	0.0	0.0	0.0	0.8	0.3
Outside EU	1.0	0.0	0.0	0.0	1.9	0.5	0.0	0.0	0.0	0.0	0.0	0.0
Tourism												
(Town+7km) LII	57.0	55.4	90.7	65.5	74.3	67.5	40.0	46.8	90.8	63.1	71.6	61.2
(Town+16km) ELII	79.0	76.9	93.8	73.0	90.4	82.5	57.0	71.6	97.0	72.0	90.1	77.9
Elsewhere in country	22.0	23.3	5.9	25.7	6.9	17.0	42.0	28.3	3.1	28.0	9.2	21.8
Elsewhere in EU	0.0	0.0	0.4	0.0	2.7	0.6	1.0	0.0	0.0	0.0	0.0	0.2
Outside EU	0.0	0.0	0.0	1.4	0.0	0.2	0.0	0.0	0.0	0.0	0.6	0.1
Peri-urban												
(Town+7km) LII	43.0	32.4	89.5	27.0	49.2	46.6	41.0	48.3	85.5	29.6	76.5	57.5
(Town+16km) ELII	67.0	57.5	96.5	35.0	95.4	69.6	67.0	58.1	93.0	65.5	89.0	73.7
Elsewhere in country	33.0	41.9	3.4	65.0	3.3	29.9	33.0	29.7	5.4	34.5	11.0	22.4
Elsewhere in EU	1.0	0.4	0.0	0.0	1.3	0.5	1.0	0.7	1.7	0.0	0.0	0.7
Outside EU	0.0	0.4	0.0	0.0	0.0	0.1	0.0	11.5	0.0	0.0	0.0	3.4

It can be surmised however, that the length of the commute is often less than 16km; the evidence for this is that the extended integration index (ELII) is much more uniform over study countries than is the LII. Averaged over all countries, between 17% and 29.9% of householders commute for work outside the region entirely. Looking at individual countries specifically, the Netherlands heads the pack as far as long-distance commuting is concerned, with a minimum of 22% of employed householders commuting out of the region to work.

3.4.4 Farm households

Employees living in farm households travel far smaller distances to work than their non-farm counterparts, as might be expected (see Table 3.14). Averaged over town type and country, anything between 77% and 87.6% of householders work within 7km of the town – the majority also live in the 7km radii. Rates of local working are high, even in countries like the UK, France and the Netherlands, where long-distance commuting is common. National differences are not as pronounced as for non-farm households. There are no obvious trends based on size or type of town. Such results are not unexpected.

Table 3.14. Extended local integration indicators showing employment in farm households by country and type of town (%)

	Small town						**Medium-sized town**					
Zone	NL	UK	PT	FR	PO	Average	NL	UK	PT	FR	PO	Average
Agriculture												
(Town+7km) LII	66.0	90.7	99.2	86.8	91.3	85.5	79.0	81.9	96.2	82.1	93.6	87.6
(Town+16km) ELII	93.0	97.0	100.0	94.7	95.9	96.0	97.0	87.2	97.1	95.1	95.5	95.0
Elsewhere in country	8.0	3.1	0.0	5.3	2.3	3.8	3.0	8.5	1.8	4.9	4.5	4.2
Elsewhere in EU	0.0	0.0	0.0	0.0	1.9	0.6	0.0	0.0	0.0	0.0	0.0	0.0
Outside EU	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.9	0.0	0.0	0.2
Tourism												
(Town+7km) LII	84.0	82.3	94.1	77.1	66.9	77.0	72.0	88.1	93.3	87.0	80.5	82.5
(Town+16km) ELII	92.0	100.0	94.1	77.1	89.2	89.8	85.0	90.5	97.3	94.2	93.0	92.3
Elsewhere in country	8.0	0.0	4.8	22.9	10.9	10.1	14.0	9.6	2.7	5.8	7.1	7.6
Elsewhere in EU	0.0	0.0	1.2	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0
Outside EU	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Peri-urban												
(Town+7km) LII	73.0	83.4	88.9	84.6	97.9	86.4	82.0	80.0	86.8	71.8	86.4	83.4
(Town+16km) ELII	95.0	83.4	91.1	88.5	98.4	94.8	94.0	91.4	98.1	76.9	97.6	94.6
Elsewhere in country	5.0	8.3	8.9	11.5	1.6	4.9	6.0	5.7	1.9	23.1	2.4	5.2
Elsewhere in EU	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Outside EU	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

The majority of employed people in farm households would work on the farm itself, although off-farm working is becoming more common, especially in the UK. This might lead us to expect longer travel distances in larger towns and peri-urban towns in the UK, where off-farm employment opportunities are better. Such travel trends are not apparent however and may be masked by the fact that much off-farm working is part time and that such persons may still classify themselves as farm workers.

3.5 Bivariate analysis

3.5.1 Methodology

As explained in detail in Section 2.4.2, the Bivariate analysis is designed to facilitate the identification of key characteristics of firms and households that influence the extent of their local integration. For example, are small firms (less than two employees) more locally integrated than medium or large firms)? The Bivariate analysis is carried out by means of the Kruskal-Wallis one-way analysis of variance, where the dependent variable represents the strength of local integration. Two separate dependent variables are employed: LLI and ELII, requiring that two separate Kruskal-Wallis tests be carried out, one for each of the independent variables (or descriptor variables) under study (see Table 3.15). As Table 3.15 shows, the independent variables vary according to whether firms, farms or households are under investigation.

3.5.2 Results

3.5.2.1 Non-farm businesses

Table 3.16 shows the number of times that each of the six firm characteristics under study[7] was found to be a significant determinant of level of local integration. The measure of integration employed in this and all other tables in this section is the Extended Local Integration Indicator (ELII). Results for LII are not presented here for sake of brevity. However, in view of the very high degree of correspondence between the two sets of results in all study countries, the ELII data can be interpreted as illustrating trends in both zones. Of the two sets of results ELII was selected for presentation specifically because the results are estimated over a larger sample and will therefore have greater statistical reliability. In the national reports on which this comparative report is based, three levels of significance are reported (1%, 5%, and 10%). In this report, only significance at 5% ($p<0.05$) or better is reported. The frequencies in Table 3.16 are based on the more detailed data in Appendices 20 and 21.

[7] In spite of the best efforts of the research teams, it was not possible to obtain complete correspondence in the use of variables, i.e. the characteristics of firms, farms and households, in the Kruskal-Wallis tests. Therefore, where a country did not deploy a particular variable, a missing value is recorded for that country in the data table recording the results of that set of tests.

Table 3.15. Variables used to classify firms, farms and households

Independent variables used to classify: **Firms**	Independent variables used to classify**:** **Farms**	Independent variables used to classify: **Households**
Firm size ▪ 2 FTE or less ▪ >2 – 10 FTE ▪ more than 10 FTE	**Farm size** ▪ 2 FTE or less ▪ More than 2 FTE	**Size of household** ▪ 2 persons or less ▪ >2 persons
Firm type ▪ Primary (hunting, fishing, forestry) ▪ Secondary (mining, quarrying, manufacturing, power, water & construction) ▪ Tertiary	**Farm type** ▪ Dairy ▪ Arable ▪ Horticulture ▪ Intensive livestock	**Lifecycle stage** ▪ Includes young adults (17-24 years) ▪ Family with dependent children ▪ Family of adults ▪ Elderly (retired)
Type of organisation ▪ Independent (no other sites) ▪ Other (eg, part of international company)	**Age of farmer** ▪ Less than 44 years ▪ 45 – 64 ▪ 65 or more	**Social class** ▪ Professional / managerial ▪ Skilled or partly skilled ▪ Unskilled ▪ Retired
Location of firm ▪ In town itself ▪ In the 7km radius	**Household income from farming** ▪ >50% ▪ ≤50%	**Location of household** ▪ In town itself ▪ In the 7km radius
Time at present address ▪ 5 years or less ▪ more than 5 years	**Years at present address** ▪ 5 years or less ▪ more than 5 years	**Car ownership** ▪ None ▪ 1 car ▪ 2 or more cars
Origin/how local is the manager ▪ Not local (lives more than 7km from town) ▪ Local for less than 10 years ▪ Local for more than 10 years	**Origin/how local is the manager** ▪ Not local (lives more than 7km from town) ▪ Local less than 10 years ▪ Local more than 10 years	**How local is the respondent** ▪ Local for 10 years or less ▪ Local for more than 10 years ▪ Always lived locally
		Annual gross income (Euros) ▪ <16k ▪ 16 – 30k ▪ 30 – 55k ▪ >55k
		Location of employment ▪ In town itself ▪ In the 7km radius

Table 3.16. Frequency of statistically significant relationships between non-farm business characteristics and degree of local integration of sales and purchases (based on Appendices 20 and 21).

	Sales						Purchases					
	NL	UK	PT	FR	PO	**Total**	NL	UK	PT	FR	PO	**Total**
Firm size	5	0	6	1	4	**16**	1	1	0	1	3	**6**
Firm type	2	3	5	3	6	**19**	0	0	2	1	2	**5**
Type of organisation	1	0	2	0	3	**6**	1	2	4	3	2	**12**
Location of firm	1	2	2	0	3	**8**	1	0	1	3	2	**7**
Years at this address	4	0	1	0	0	**5**	0	0	0	1	0	**1**
How local is manager	3	0	2	0	2	**7**	1	2	0	0	2	**5**

Table 3.16 shows that the most important determinants of level of local integration for sales from non-farm businesses are, by some margin, firm size and firm type. These two factors score frequencies of 16 and 19 respectively, out of a possible maximum score of 30[8]. These factors prove to be significant on multiple occasions (i.e. for multiple towns) in each study country, with the exception of firm size in the UK. It is worth pointing out that the larger the frequencies reported in this table and subsequent tables, the more reliable the result, i.e. it occurs over a greater range of circumstances and is therefore less likely to be occur by chance, or as a product of particular local conditions.

Firm size is an obvious source of influence on level of sales integration, with smaller firms more integrated with the local economy. Smaller firms are more likely to be single site businesses, especially retailers and service providers, trading in the local market. Larger firms are likely to produce a greater volume of output than can be sold in the local market and will deal in the national or international market place. Of the different firm types, manufacturers and primary energy producers, as well as minerals extractors, are likely to be the least integrated and the most integrated will be service providers and small-scale retailers, as well as hotel and catering businesses.

There would appear to be far fewer influences on degree of local integration as far as purchases by non-farm businesses are concerned. This may have much to do with the fact that inputs to non-farm businesses (excluding labour) are less locally integrated than sales in any event. The one candidate to be called a significant determinant of integration, and it is a weak one, is type of organisation. This probably reflects the tendency for single site firms to buy more of their inputs locally than multi-site firms, who are able to buy in bulk from national or even international sources.

[8] A score of 30 would indicate that a particular classification variable was found to be a significant determinant of local integration for all 6 towns in all 5 countries (6 * 5 = 30).

3.5.2.2 Farm businesses

The farm business data are not as robust as the non-farm, because the number of observations in each of the national surveys was generally fairly small (with the exceptions of Poland and Portugal). This has proved a particular problem in the UK, for example, where data for a number of towns has had to be merged in order to provide sufficient observations to permit reliable use of the Kruskal-Wallis test. A second problem, albeit more minor, is that the Netherlands survey did not investigate a number of the explanatory variables. Taken together, these problems have proved to be a significant limitation and have generally led to fewer significant results (see Table 3.17).

Table 3.17. Frequency of statistically significant relationships between farm business characteristics and degree of local integration of sales and purchases (based on Appendices 22 and 23)

	Sales						**Purchases**					
	NL	UK	PT	FR	PO	**Total**	NL	UK	PT	FR	PO	**Total**
No. of employees	0	0	1	0	0	**1**	0	0	2	0	3	**5**
Farm size	-	0	2	2	4	**8**	-	0	1	0	3	**4**
Farm type	4	0	2	0	1	**7**	4	1	2	0	3	**10**
First generation?	-	0	1	0	1	**2**	-	0	1	0	1	**1**
Age of farmer	2	0	0	1	0	**3**	1	1	2	0	0	**4**
Household inc. from farming	1	0	2	0	1	**4**	1	0	2	1	1	**5**
How local is manager	2	0	0	0	0	**2**	0	0	1	0	0	**1**
Type of business	-	0	-	4	0	**4**	-	0	-	5	0	**5**

The two explanatory variables which are most frequently significant in statistical analysis are farm size (area of the farm in hectares) and farm type (majority enterprise). These are the equivalents of the firm size and firm type variables found to be the most significant determinants of non-farm business integration. The limited sample sizes do not permit us to say with any great confidence just how important these variables are as determinants of the level of integration of farm businesses, but it seems reasonable to identify them as playing some role. Large farm businesses will produce very large volumes of agricultural commodities, often just one or two products and such volumes would be difficult to sell direct to local consumers, especially where specialist supply chains are required to handle perishable goods, or goods with demanding hygiene requirements, e.g. milk and meat. The most locally integrated farm businesses in terms of product sales would be small in scale (both in area terms and size of business), producing fruit (not grape or olive vines necessarily), vegetables, or small amounts of meat, selling direct to local consumers *via* farm shops, farmers markets, organic box schemes, or direct to local high-street shops and restaurants. It is interesting to conjure with the notion that the age of the farmer is a determinant of local integration as far as

sales are concerned. As a class, older farmers are known to be less open to new ideas and this may mean that they are less willing to diversify their farm businesses and adopt new, more locally-oriented marketing approaches.

Farm type is again likely to be the most significant determinant of level of local integration, this time for farm purchases. Why this should be so is not as apparent as for sales. Vegetable and fruit farms may buy packaging materials locally. Agricultural chemicals would almost certainly be produced by national or international firms, but may be purchased from local agricultural suppliers. However, this would not necessarily distinguish between farm types. Cereals and arable farms may use local contracting firms for farm operations. It would seem likely that dairy farms would make least use of local inputs.

3.5.2.3 Non-farm households

Table 3.18. Frequency of statistically significant relationships between non-farm household characteristics and degree of local integration of household purchases (based on Appendix 24)

	Purchases					
	NL	UK	PT	FR	PO	**Total**
Years in locality	4	5	3	2	2	**16**
Income level	3	6	5	3	6	**23**
Car ownership	1	5	2	3	6	**17**
Size of household	1	0	0	1	4	**6**
Lifecycle stage	1	1	2	3	5	**12**
Location of household	1	1	1	2	3	**8**
Location of employment	0	1	0	0	1	**2**
Social class	3	5	6	4	5	**23**
Type of purchase (high / low order)	0	-	6	-	6	**12**
Type of purchase (goods / services)	-	-	3	-	2	**5**

There are a number of factors that appear to influence the level of local integration of non-farm household purchases (see Table 3.18). Statistically significant most commonly are social class and income level. These two factors have been shown to be highly correlated in numerous other studies, although no correlation analysis has been carried out in this case. High social status and high income households will buy more high order goods, which are more likely to be manufactured and bought from outside the region. In addition, such households have higher levels of car ownership and will travel further afield to purchase goods than lower income households (It is notable that the third most statistically important factor is car ownership). The variable Years in Locality may be a proxy for the average age of household members or the respondent. Older residents will to some extent retain the purchasing patterns of the past, buying a greater proportion of goods from local outlets and

placing more emphasis on personal friendships with local proprietors. This supposition is supported to some extent by the fact that Lifestyle Stage is also seen to be a key influence on level of local integration, with older families, especially the elderly, having higher $ELII^{hi}$ scores on average than younger groups.

3.5.2.4 Farm households

As the same farms were surveyed for household information as for farm business information, the same problems with low sample numbers are experienced here. Consequently, there are relatively few factors identified as significant determinants of level of local integration for household purchases (see Table 3.19). Income level stands out as the most frequently significant factor, just as it is for non-farm households. Farm households were found to be marginally more integrated to the local economy than non-farm. Other than that, there would seem little reason to suppose that different forces would be at work here than for non-farm households. In support of this it can be reported that several countries carried out Kruskal-Wallis tests looking for differences in integration scores using household type (i.e. farm v non-farm) as a classifier. Observed differences were not generally found to be significant.

Table 3.19. Frequency of statistically significant relationships between farm household characteristics and degree of local integration of household purchases (based on Appendix 25)

	Purchases					
	NL	UK	PT	FR	PO	**Total**
Years in locality	0	0	0	1	0	**1**
Income level	1	0	3	0	4	**8**
Car ownership	0	0	1	1	4	**6**
Size of household	0	0	0	0	6	**6**
Lifecycle stage	0	1	0	0	4	**5**
Location of household	0	0	1	0	-	**1**
Location of employment	0	0	0	0	1	**1**
Social class	0	0	0	0	3	**3**
Type of purchase (high / low order)	-	-	1	-	3	**4**
Type of purchase (goods / services)	-	-	1	-	2	**3**

3.6 Practitioner workshops

3.6.1 Introduction

The results of the survey of farm and non-farm businesses and households in the five study countries were presented, at an early stage, to groups of 'practitioners' in each study country. These practitioners were representatives of those groups involved in fostering the development of local economies of, or providing civil administration in, each of the study towns. The results were presented at workshops held in each study town, at the conclusion of the survey work. These workshops had four main purposes:

1. To disseminate useful data to local practitioners which may assist them in devising better policies to achieve sustainable local economies;
2. To obtain feed-back on the results of the survey, in particular focussing on obtaining local contextual data with the aim of facilitating better interpretation of survey results, both outcomes that conform to expectation and those that seem counter-intuitive;
3. To identify any misconceptions held by local practitioners, which may be widespread among such groups, concerning the integration of households and firms with local economies; and
4. To identify any policy implications of the findings which are relevant to the work of those responsible for fostering the development of local economies.

Practitioners were invited to the workshops on the basis of the relevance of their position as likely users of the products of the research. Practitioner numbers at the workshops were limited to facilitate open, detailed discussion of the survey findings. The workshops were carried out over the dates shown in Table 3.20. Workshop formats varied to some extent from country to country, but at core, each involved an introduction to the project, a presentation of the results of the survey work and a structured discussion lasting about an hour.

3.6.2 Stakeholder reaction to survey findings

3.6.2.1 Methodological issues

At a number of the workshops, the observation was made that some of the results that ran counter to expectation could be explained by problems with the methodology of the survey. This, it was claimed, arose from a failure of the sampling technique. This problem should not be overstated, as in general stakeholders viewed the results of the surveys in the various towns as consistent with their expectations, much of which was informed by their own research on overlapping topics. When such sampling problems were assumed to explain a counter-intuitive result, this was generally associated with the presence in or near the town of a very large manufacturing business, which dominated the economic and trade data for that town. As the data for firms are not weighted by volume, the fact of including the large firm in the sample will not necessarily reflect the true significance of it. Alternatively, the sample may omit the large firm altogether. It was suggested that the data might be weighted to eliminate such problems. Where it was felt that a significant problem had been exposed, steps were

taken to remedy the problem, such as by seeking additional survey data to strengthen unrepresentative classes of respondent. While it is accepted that some methodological limitations must exist, it is also possible that stakeholders, especially those in local government positions, might react defensively when confronted with data that contradict their own understanding and might appeal to flaws in the methodology to account for these differences.

Table 3.20. Venues and dates of Practitioner workshops in each study country

Venue	Number of practitioners present	Date of workshop
UK		
Burnham	8	23 March 2004
Leominster	6	10 March 2004
Saffron Walden	2	16 March & 6 April 2004
Swanage	20	17 November 2003
Tiverton	4	25 February 2004
Towcester	6	6 January 2004
France		
Ballancourt	14	24 September 2003
Mayenne	10	30 September 2003
Douarenez	13	2 October 2003
Prades	21	9 October 2003
Brioude	6	14 October 2003
Magny		(no workshop held)
Netherlands		
Gemert	10	3 October 2003
Nenspeet	15	29 October 2003
Bolsward	13	11 November 2003
Oudewater	10	13 November 2003
Schagen	6	12 December 2003
Dalfsen	9	16 December 2003
Poland		
Głogówek	11	25 November 2003
Jędrzejów	11	28 October 2003
Duszniki Zdrój	}15	}12 January 2004
Ustroń		
Ożarów Mazowiecki	9	18 November 2003
Łask	12	7 June 2004
Portugal		
Mirandela	11	5 November 2003
Vila Real	9	11 November 2003
Tavira	12	24 November 2003
Silves	4	24 November 2003
Lixa	13	12 November 2003
Esposende	5	14 November 2003

3.6.2.2 Feedback of contextual data

A considerable amount of feedback was received from stakeholders, although some complained that the sheer volume of data made this difficult. This feedback provided contextual information, which permitted a greater understanding of some of the trends observed in the survey data. Much of the feedback was specific to particular locales and will only be of interest to other practitioners in the town concerned. However, a number of insights have more general application and these are outlined here.

It was argued by some that the high rates of integration of local farm sales might be in part attributable to the sale of products, such as livestock, at local markets. It was pointed out by the Burnham group that these sales would not necessarily lead to final consumption in the local area. The Bolsward (NL) stakeholder groups also noted that this applies also to sales of milk to local dairies.

It was pointed out that the weak integration of household purchases where higher order goods were concerned is likely due to competition for sales from larger towns with more diverse shopping facilities. Many stakeholders, in both the UK and France, for example, complained about the negative effect on local retailing of strong competition from large nearby towns. This was particularly hard felt, for example, in Towcester, due to competition from Milton Keynes and Ballancourt as a result of competition from Paris. A number of stakeholders also point out, especially in the French towns, that this problem is aggravated by the purchasing behaviour of commuters, who buy high order goods near their place of work, or at large retail centres along their line of travel.

3.6.3 Stakeholder misconceptions

Evidence of stakeholder misconceptions are few in number. By and large the impressions gained from the workshops are that stakeholders are generally well informed and that the results of the survey are consistent with their expectations. This speaks volumes for the validity of the survey design and its conduct.

Some surprise was expressed in the UK at the extent to which local business drew labour from the local area; a misconception possibly fuelled by the media coverage given to issues surrounding high levels of commuting.

Human nature being what it is, it is understandable that stakeholders would not wish to be seen to be taken by surprise by these survey findings. However, clues to possible widespread misconceptions can be gleaned by contradictions between groups in their understanding of issues and in particular in their proposals for dealing with problems. A good case in point is the proposal by some that policies should be developed to encourage higher paid workers to live in the town or its surroundings. This is understood to be a means of encouraging more local purchasing of high order goods. However, it is obvious from the survey results that high-income households have lower levels of integration for all classes of purchase than low wage households. There are some obvious reasons why this should be so, some evidenced by the survey itself, i.e. higher levels of car ownership in high income households and some

evidenced by stakeholder comment, that high wage earners are more likely to be commuters. This misconception is picked up by the Tiverton stakeholder group, who suggest that rather than attempt to attract high wage earners into the town, it might be better for the local economy to improve the earnings of established low wage households, as their levels of local integration are more favourable.

3.6.4 The policy implications of the findings

It is not an easy matter to identify new policies that might arise from the findings of this research. This is no reflection on the research, but rather reflects the fact that by and large, the research outputs reinforce the understandings already held by local stakeholders, which form the basis of policies already proposed. Even in the case cited above, where the survey provides a new understanding of the preference of improving the earnings of local low income families over importing new high wage earners, the policy implications are not profound, because policies to eliminate pockets of rural poverty are already widespread. The findings of the survey can therefore only be said to provide evidence for giving added impetus to existing policies rather that the creation of new instruments.

Likewise, the survey, in highlighting the low integration of purchases from high wage households, has prompted stakeholders to think about why this might be so and in identifying the phenomenon of commuter shopping as a likely cause, emphasis is added to existing policies that promote more local working, including teleworking, and the establishment of local business parks and other desirable commercial workspaces, including by means of conversion of redundant buildings, especially agricultural buildings. This was a notable issue in the many of the towns in the UK, France and the Netherlands, where the need to attract more high-skilled jobs to the area was recognised. In Poland the problem is not so much one of commuting, but the emigration of sections of the young working population.

Associated with the above is the need to improve local shopping facilities, which often poorly cater for high order goods. A number of stakeholders indicated that, in the light of the survey, they saw the need for greater emphasis to be placed on encouraging the diversification of local shopping facilities and of a general improvement in the fabric and appearance of the town shopping centre. Introduction of free car parking was also proposed in some of the towns in the Netherlands. In addition to this, stakeholders for example in Vila Real and Saffron Walden, also argued that policies were required to enhance the distinctiveness of towns as a means of countering competition from larger towns nearby. This might lead to a degree of specialisation in shopping outlets, as has occurred for example, at Haye on Wye in England, which has a very high concentration of shops selling second-hand books. Increasing the distinctiveness of towns also increases the potential for the development of local branding of goods.

The high local economic integration indices of tourist-related firms, such as restaurants and hotels etc. is recognised by the stakeholders in Portugal, but especially Poland, resulting in proposals for a major drive to develop such tourist attractions and services (including sports attractions in Portugal) as a means of further developing the local economy by means of environmentally friendly and labour intensive commercial activities.

In addition to lending support to some policies, for example such as would achieve the above, the research findings, by implication, support changing planning regulations that inhibit such developments. A number of stakeholders point out that while the survey supports the adoption of particular types of policy, planning policy acts as a constraint. This is a concern particularly expressed by stakeholders in the UK and the Netherlands. In France Poland and Portugal, it is seldom mentioned and stakeholders talk much more freely about the deployment of measures to open up areas with new communications networks and the building of new business parks and high quality homes to attract prosperous new residents.

Something that did seem attractive to stakeholders was the possibility of identifying the causes of the higher levels of local economic integration of households that had been longer-term residents of the area. The notion here is that if this was due to factors that were amenable to control, this might be done through policy, as a means of increasing the levels of integration of households in other socio-economic groups.

In a number of cases stakeholders indicate that the results provided by the survey for their town will prove useful in informing policy decisions and will provide supporting evidence for applications for public funding, in the UK for example, the Single Regeneration Budget and the Market and Coastal Towns Initiative. This confirms that, while the research findings themselves may not provide revolutionary new insights from the academic point of view (although it has proved informative in a local context), the methodology has itself been validated. The primary objective of the project has always been to provide a reliable tool for policy makers, a means to knowledge-based decision-making. If comments arising from the stakeholder workshops are to be relied upon, this objective has been achieved.

3.7 Multivariate analysis of local economic integration

The aim of this analysis is to identify the key characteristics of firms, farms and households associated with strong local economic integration. As before, local integration is specified in terms of the proportions of sales, purchases and consumption expenditure, by value, that is attributed to the 'local' (town plus 7 km of hinterland) and 'extended local' (town plus 16 km hinterland) economy.

3.7.1 Form of the model

Ordinary Least Squares (OLS) Regression is employed to help identify key characteristics of towns, firms, farms and households associated with strong local economic integration[9]. The basic model can be expressed as:

$$y_i = X_i \beta + u_i$$

[9] The Technical Annex to the contract stated that Logistic Regression would be used for this purpose. However, the data gathered allows a linear regression model to be fitted to the data. This is preferred to logistic regression because more information about the distribution of linkages is retained. Multinomial logistic regression (logit analysis) is used to examine variations in spatial economic behaviour, including local integration, in Section 3.4.

where i = 1, ... n, representing the number of firm, farm or household entities in the model (also serving as number of observations), y_i is the respective dependent variable (as set out in Table 3.21), X_i= is a vector of independent variables representing the relevant entity characteristics, β is a vector of parameters to be estimated, u_i is a randomly distributed error term assumed to be normal with zero mean and constant variance σ^2. The advice of Hair *et al.* (1998) and Gujarati (2002) is taken with regard to meeting and testing the suitability of data for multiple regression, including examination of residual and normal probability plots and carrying out data transformations as appropriate.

There are a total of eight dependent variables of interest within the three data sets; firms, farms and households are modeled separately. The dependent variables are specified in terms of the mean proportions of transactions (by financial value) attributed to specific geographical boundaries, or zones. Arc sin transformations are applied to all dependent variables to improve the distributions and to allow model fit using an OLS specification. This is a standard method of transformation for proportional data (Hair *et al.*, 1998). The derivation of all dependent variables is set out in Table 3.21.

Table 3.21. Derivation of dependent variables for the Phase I analysis

Data set	Linkage	Variable name	Variable definition*
Firm and farm	Local sales	salabsin	(arcsin**) % of sales in Zones A+B
	Extended local sales	sala1sin	(arcsin) % of sales in Zones A+B+C
	Local purchases	purabsin	(arcsin) % of purchases in Zones A+B
	Extended local purchases	pura1sin	(arcsin) % of purchases in Zones A+B+C
Household	Local low order spend	lowabsin	(arcsin) % of low order spend in Zones A+B
	Extended local low order spend	low2sin	(arcsin) % of low order spend in Zones A+B+C
	Local high order spend	hiabsin	(arcsin) % of high order spend in Zones A+B
	Extended local high order spend	hi2sin	(arcsin) % of high order spend in Zones A+B+C

* All dependent variables are equivalent to the Local Integration Indicators used by partners in the national bivariate analyses. They are based on the proportion of respective transactions by financial value attributed to selected zones. ** (arcsin) denotes transformation by arc sin squared (also known as the angular transformation).

The independent variables are used to compare sub-sets of firms, farms and households to examine the influence of a range of characteristics on the degree of local economic integration. See Appendix 26 for specification of all independent variables, which include both continuous and dummy variables (with values of 1). Selected continuous variables are transformed by their logarithm to improve distribution and model fit.

3.7.2 Model specification: variable selection and collinearity testing

Correlation matrices are first generated to test for potential sources of multi-collinearity between explanatory variables. This allows specific cases of collinearity to be identified and

gives an indication of where other problems of collinearity may arise in the multivariate model.

Where multicollinear variables occur, a bivariate regression is carried out to identify the stronger explanatory variables from the collinear set. These are then retained and the weaker explanatory variables dropped. For example, in the firm analysis the variables *Ind_AB* and *Ind_no* are highly correlated, which precludes the option of selecting both variables for inclusion in the multivariate model. The bivariate analysis showed that *Ind_AB* was the better explanatory variable, so this was retained. See Appendix 27 for details about all variables selected for multivariate OLS regression.

The main test for multi-collinearity in the multivariate model is the Tolerance statistic, which is computed by SPSS (equivalent to R-squared-1 for each explanatory variable as a function of all other explanatory variables in the model). A Tolerance of less than 0.2 is cause for concern and points towards the need for the removal of problem variables.

3.7.3 Results from OLS regressions I: factors explaining the local integration of rural firms, farms and households

Results of the OLS regressions for firms, farms and households are presented in Tables 3.22 to 3.24.

We first attempt to explain the level of **local integration of the sales and purchases of firms,** with three sets of explanatory variables. The first set concerns the characteristics of the local context, including country, town type (size and type) and location of the firm within the study area (i.e. in the town centre or hinterland, as previously defined). The second set describes the characteristics of the firm and owner/manager. Besides some usual characteristics (such as firm type, sector, workforce size, age etc), this set includes indigeneity of the owner/manager, i.e. the length of time that the owner/manager has resided in the study area, and where they moved in from. It also contains variables which characterise the firm's technology (proportion of unskilled workers in the workforce, labour productivity and index of intensity in intermediate goods). Finally, a set of 'firm environment' variables (see Appendix 26 for definitions) were computed. Through these, we attempt to examine the relationship between the firm (according to its own characteristics) and the integration with local markets of final and intermediate goods and labour. First, an index of local competition is devised which examines the ratio between the sales of an individual firm and those of other local firms belonging to the same sector. Second, the influence of the size of the final goods market is examined (the 'home market effect' in the economic geography framework). An index is included which compares the local household demand within the sector to which the individual firm belongs with the individual firm's sales. Likewise, we attempt to examine the potential influence of local vertical linkages on economic integration. An index of potential intensity of local vertical linkages compares the input demand from the firm for each intermediate goods sector and the local supply of its inputs. Finally, an index of potential local matching by skill on the local labour market is developed in the same way as the local vertical linkages potentiality index, this provides a ratio between the demand for skilled labour and the local supply of labour.

Table 3.22. OLS Results: firms

	Sales		Purchases	
Explanatory variables	**Local (A+B)**	**Extended-local (A+B+C)**	**Local (A+B)**	**Extended-local (A+B+C)**
Constant	**1.132*** **	**1.548*** **	**1.099*** **	**1.329*** **
	(.125)	**(.129)**	**(.114)**	**(.127)**
Local context:				
C_UK	-.0587	**-.0744****	-.007044	**.07109****
	(.036)	**(.036)**	(.031)	**(.035)**
C_NL	**-.172*** **	**-.105*** **	.01525	**.190*** **
	(.035)	**(.035)**	(.030)	**(.034)**
C_PO	**.250*** **	**.179*** **	**.158*** **	**.300*** **
	(.035)	**(.041)**	**(.035)**	**(.039)**
C_PR	**.131*** **	**.157*** **	**.149*** **	**.245*** **
	(.031)	**(.031)**	**(.026)**	**(030)**
Agri_small	.0322	.0046	.01493	**-.102*** **
	(.034)	(.033)	(.028)	**(.032)**
Agri_med	**.128*** **	**.0589***	**.126*** **	-.02257
	(.033)	**(.032)**	**(.027)**	(.031)
Tour_small		**-.0723****	.02234	**-.07677****
		(.033)	(.028)	**(.032)**
Tour_med	.0318			-.04448
	(.033)			(.030)
Peri_small	-.0355	-.0410	**-.04998***	
	(.033)	(.031)	**(.027)**	
Peri_med	-.0074	-.0250	.007931	-.02453
	(.034)	(.032)	(.028)	(.030)
Loc_hinter	**-.139*** **	**-.0908*** **	.003008	**.06626*** **
	(.020)	**(.020)**	(.017)	**(.019)**
Firm's general characteristics:				
Ty_indep			-.00408	.01030
			(.030)	(.034)
Ty_natbran	.0377	.0338		
	(.035)	(.035)		
Ty_internat	.0150	.0100	**-.09239****	**-.148*** **
	(.045)	(.045)	**(.047)**	**(.052)**
Sec_agri	.0702	.0384	.07841	**.225*** **
	(.065)	(.065)	(.056)	**(.062)**
Sec_manuf	**-.290*** **	**-.336*** **	**-.08943****	**-.08422****
	(.043)	**(.044)**	**(.037)**	**(.042)**
Sec_const	**-.107****	-.0355	**.178*** **	**.334*** **
	(.047)	(.047)	**(.04)**	**(.045)**
Sec_prodserv	**-.235*** **	**-.209*** **	**.147*** **	**.191*** **
	(.038)	**(.038)**	**(.033)**	**(.036)**
Sec_conserv	**.0675***	.0364	-.02864	.02124
	(.036)	(.036)	(.031)	(.035)
(ln)Age_firm	**.0463*** **	**.0451*** **	-.00254	.003301
	(.008)	**(.008)**	(.007)	(.008)
(ln)Workforce	**-.0959*** **	**-.109*** **	**-.0259****	**-.02916****
	(.012)	**(.012)**	**(.011)**	**(.012)**
Ind_AB	**.0868*** **	**.0686****	**.124*** **	**.131*** **
	(.027)	**(.027)**	**(.023)**	**(.026)**
Ind_CD	.0100	-.0358	.007508	.002732
	(.049)	(.049)	(.042)	(.047)
Ind_EH	-.0356	**-.113****	**.07038***	.06401
	(.044)	**(.044)**	**(.038)**	(.042)

Table 3.22. OLS Results: firms (continued)

	Sales		Purchases	
Explanatory variables	**Local (A+B)**	**Extended-local (A+B+C)**	**Local (A+B)**	**Extended-local (A+B+C)**
Technological characteristics of the firm:				
Unskilled	**.0019*** **	**.0017*** **	.0000642	.00007922
	(.000)	**(.000)**	(.000)	(.000)
IGI	-.0006	.0001	**-.003335*** **	**-.004138*** **
	(.000)	(.000)	**(.000)**	**(.000)**
Lab_prod	**-.0270** **	**-.0485*** **	**-.04926*** **	**-.06411*** **
	(.011)	**(.011)**	**(.009)**	**(.010)**
Firm's environment:				
Loc_comp	-.0072	.0062	.005304	.004634
	(.006)	(.006)	(.022)	(.006)
Lab_mark	.0050	.0004	-.0001311	**-.0005287***
	(.000)	(.000)	(.000)	**(.000)**
SLGM	-.0031	-.0088	**.01311*** **	**.02020*** **
	(.006)	(.006)	**(.063)**	**(.006)**
IPI	**-.0011*** **	**-.0008*** **	**-.002837*** **	**-.002943*** **
	(.000)	**(.000)**	**(.000)**	**(.000)**
Adj. R-squared	**0.271**	**0.239**	**.215**	**.230**
F-value	**39.278*** **	**33.362*** **	**29.156*** **	**31.801*** **
Residual *d.f*	2959	2959	2959	2959

*** sig. at 1 percent level (p<0,01) ** sig. at 5 percent level (p<0,05) * sig. at 10 percent level (p<0,1)

The R-square values obtained for the firm analysis range from .215 to .271, with included explanatory variables accounting for a slightly greater variation in the strength of local downstream linkages compared to upstream. (see Table 1 in Appendix 26 for specification of all variables).

3.7.3.1 Firms

There is very little observed variation in the local integration of firms in terms of ***downstream integration,*** apart from the case of consumer services, which are shown to be more integrated into the local (as opposed to extended local) economy in comparison to other services, although the influence of this variable ceases to be significant when the boundary is extended to include Zone C. In fact, the strength of downstream integration is influenced relatively little by town type. Only medium-sized agricultural towns are shown to have a significant influence, with the sign of the coefficient being positive at both levels of the local economy. This shows that firms located in medium sized agricultural towns are significantly more locally integrated than the others. Location of the firm within the study area is more influential: firms located within the town (Zone A) are more strongly integrated into both local and extended local sales markets than firms located in the hinterland (Zone B).

Sector, firm age, workforce size and indigeneity are all significant predictors of the strength of downstream integration. As one might expect, manufacturing firms and producer services exhibit significantly weak ties to locality (i.e. they sell their outputs outside the study area) while consumer services are strongly locally integrated. In parallel, older and smaller firms exhibit consistently stronger downstream linkages at both geographical levels (local and

extended local). Firms run by an owner/manager who has lived in the area for ten years or more are also shown to be drawing a significantly higher proportion of their sales income from the local economy while local integration tends to decrease with distance moved by firm manager from previous domicile. Firm ownership (independent vs. national branches vs. international), however, has no significant influence over the relative strength of local sales. Finally, the role of the technological characteristics of the firms seems to mean that traditional firms are more locally integrated than are others; i.e. the more unskilled the workforce, the more locally integrated the firm's sales. Also, the higher the labour productivity, the lower the level of sales integration.

A firm's local environment influences its local sales in a more surprising way. Local integration of firm sales is not related to the size of the local final demand market, neither is it related to the degree of local competition that exists between firms in the same sector. One might expect a positive effect of the first variable and a negative effect of the second. By contrast, the strength of potential vertical linkages between the firm and local firms producing the inputs it needs significantly influences the local integration of the firm's sales: the more the firm is able to source inputs locally, the more locally it sells its outputs.

There is slightly more deviation between local and extended local in terms of the relative influence of predictor variables on ***local upstream integration*****.** For instance, some town types significantly influence the degree of integration at the local level, while others play role at the extended local level. Whilst medium sized agricultural towns tend to retain more income from local sourcing, the relative effect is not significant when the boundary of the local economy is extended to include zone C. Small tourism towns have relatively weak levels of upstream integration at the extended level but this is not the case at the local level. Interestingly, firms located in a settlement's hinterland have stronger upstream ties than those located in the town, although as one might expect, the effect is only significant at the extended local level. Whilst firm age has no significant influence over the strength of upstream integration, ownership type does, with international branches and HQ's sourcing to a lesser degree than locally owned firms or national branches. Likewise, large firms, and firms with high labour productivity or intermediate goods intensive firms are less locally integrated than are others. As well as selling relatively little in the local economy, manufacturing firms also appear to contribute relatively little in the way of local sourcing, although producer services do have significantly stronger ties to locality in terms of upstream linkages. With their relatively strong export base, this makes them a potential generator of 'net income' in the local economy. Construction firms also tend to source more locally than other sectors, although consumer services do not.

The significant negative sign of the IPI (index of potential intensity of local vertical linkages) variable parameter means that when firms are able to source inputs locally, their level of local upstream integration is relatively high. Surprisingly, we should also note the relatively strong levels of local upstream integration for firms enjoying a large local final market in comparison to their production capacity, although the size of the final market does not appear to influence levels of downstream integration.

At this stage, differences between countries are examined through a series of dummy variables. In terms of both upstream and downstream integration firms in Poland and Portugal exhibit significantly stronger ties to their locality than firms surveyed in the UK, France and the Netherlands. Compared to French firms, firms in the Netherlands have relatively weak levels of sales integration at both levels (LII and ELII) of the local economy, although UK firms are not significantly different at the local level, and neither of these two countries have significant coefficients for local level purchases. The direction of observed coefficients for the four country dummies in the extended local purchases model is more surprising. Firms in all four countries have stronger upstream linkages at the extended local level than firms in France.

3.7.3.2 Farms

The equivalent **models for farms** are presented in Table 3.23. Because of the nature of agricultural firms and of the survey questionnaire used, the set of variables has been modified. We were not able to build equivalent 'firm environment' variables. Thus we focus on the local context and farm characteristics (see Table 2 in Appendix 26 for specification of all variables). Like firms, farms in Poland and Portugal are more strongly integrated into local upstream and downstream markets, whilst farms in the UK have relatively weak ties to the local and extended local economy for both sales and purchases. Farms in the Netherlands are not strongly differentiated compared to France, although they do have significantly stronger upstream linkages with the extended local economy.

Examining the effect of town type, all agricultural towns posses the more integrated local economies for both sales and purchases, as one might expect, although when the local economy is extended to include zone C, farms in small agricultural towns are no longer differentiated from other town types. The coefficients indicate that town size is more important than town type, with respect to downstream integration in the farming sector. Farms in small peri-urban and tourism towns are more strongly tied to local sales markets, whilst there is no difference between respective medium sized towns. In terms of upstream linkages the case is somewhat different; the agricultural towns are different from peri-urban and tourism towns, in fostering local sourcing to a greater degree, although it is tourism towns where the negative effects of upstream linkages in the farming sector are most strongly felt.

It is interesting to note that the included predictors help explain the greatest degree of variation in the upstream linkages of farms, whereas for firms it is downstream linkages that appear more readily influenced, i.e. by entity and local environment characteristics. This may be because upstream linkages in the agricultural sector are more widely differentiated *per se,* or it may be that the models capture a greater degree of this differentiation through the included predictors. R-square values indicate that for farms, between 35 and 40% of upstream variation is accounted for by the explanatory variables, compared to between 25 and 30% for downstream integration.

With respect to farm type, livestock farms have negative coefficients, showing that they are consistently less integrated into the locality in terms of both sales and purchases than other farm types, although the negative coefficient is not significant for purchases when the

boundary of the local economy is extended to include zone C. Cereals and mixed cropping farms are more strongly integrated into local upstream markets than are other farm types and permanent cropping appears to serve local sales markets to a greater extent than other farm types. The difference between these farm types is likely to be related to differences in the purchasing and sales networks of their respective production chains.

Table 3.23. OLS Results: farms

	Sales		**Purchases**	
Explanatory variables	**Local (A+B)**	**Extended-local (A+B+C)**	**Local (A+B)**	**Extended-local (A+B+C)**
Constant	**1.233*** **	**.955*** **	**1.096*** **	**1.075*** **
	(.175)	**(.170)**	**(.116)**	**(.100)**
C_UK	**-.357*** **	**-.205*** **	**-.179*** **	**-.07017***
	(.060)	**(.059)**	**(.048)**	**(.041)**
C_NL	-.004036	.01315	.05984	**.147*** **
	(.057)	(.056)	(.039)	**(.033)**
C_PO	**.145*** **	**.261*** **	**.158*** **	**.224*** **
	(.056)	**(.055)**	**(.038)**	**(.033)**
C_PR	**.298*** **	**.314*** **	**.204*** **	**.281*** **
	(.059)	**(.058)**	**(.039)**	**(.034)**
Agri_small	**.126*** **	.01095	**.08243*** **	.03329
	(.050)	(.046)	**(.032)**	(.027)
Agri_med	**.270*** **	**.156*** **	**.163*** **	**.06496***
	(.053)	**(.049)**	**(.035)**	**(.030)**
Tour_small	**.08617***		**-.135*** **	**-.128*** **
	(.052)		**(.035)**	**(.030)**
Tour_med	.02104	-.00742	-.02327	**-.04837***
	(.050)	(.046)	(-.019)	**(.029)**
Peri_small	**.319*** **	**.225*** **		
	(.051)	**(.050)**		
Peri_med		.05315	**-.102*** **	.009382
		(.052)	**(.035)**	(.030)
Ty_livest	**-.144*** **	**-.118*** **	**-.04943***	-.03159
	(.042)	**(.041)**	**(.028)**	(.024)
Ty_crops	-.05031	.04858	**.05942***	**.05159***
	(.048)	(.048)	**(.033)**	**(.028)**
Ty_permcro	.0443	**.09850** **	**.08412*** **	**.117*** **
	(.048)	**(.047)**	**(.032)**	**(.028)**
Ty_mixed				
(ln)Workforce	**-.177*** **	**-.153*** **		
	(.025)	**(.024)**		
(ln)Area			**-.0319*** **	**-.03661*** **
			(.010)	**(.009)**
Own_sole	.0002776	.04411	**.05056** **	**.04069** **
	(.034)	(.034)	**(.023)**	**(.020)**
(ln)Lab_prod	**-.06962*** **	**-.03964*** **	**-.02170** **	-.01235
	(.014)	**(.013)**	**(.010)**	(.009)
(ln)Land_prod	.01392	.01207	**-.02811*** **	**-.02804*** **
	(.012)	(.012)	**(.010)**	**(.009)**
IGI	.0007445	**.001292** **	**-.001769*** **	**-.001698*** **
	(.001)	**(.001)**	**(.000)**	**(.000)**
Agefarmer	.002364	.002111	**.0032*** **	**.002505*** **
	(.001)	(.001)	**(.001)**	**(.001)**

Table 3.23. OLS Results: farms (continued)

	Sales		Purchases	
Explanatory variables	**Local (A+B)**	**Extended-local (A+B+C)**	**Local (A+B)**	**Extended-local (A+B+C)**
(ln)Time	.006023 (.015)	.003252 (.015)	**.04062***** **(.010)**	**.06924***** **(.009)**
Income	**-.001555***** **(.000)**	-.0006583 (.000)	**-.001334***** **(.000)**	**-.0006304***** **(.000)**
Ind_AB	-.104 (.075)	-.5495 (.074)	**.06895**** **(.030)**	**.04299*** **(.026)**
Ind_CH				
Ind_no	-.102 (.082)	-.01702 (.081)		
Hist_ab	.0245 (.045)	.02892 (.044)		
Hist_elsew	**-.110*** **(.061)**	-.1526 (.060)	**-.08025**** **(.035)**	**-.05167*** **(.030)**
Hist_none			-.01149 (.031)	**.04605*** **(.026)**
Adj. R-squared	**.287**	**.249**	**.352**	**.397**
F-value	**29.993*****	**24.927*****	**41.825*****	**50.433*****
Residual *d.f*	1704	1704	1705	1705

*** sig. at 1 percent level (p<0,01) ** sig. at 5 percent level (p<0,05) * sig. at 10 percent level (p<0,1)

As in the case of firms, farm size has a significant negative influence on local integration, although measurement according to workforce size is only significant in terms of downstream integration. In the case of upstream integration it is farm size as measured by land area that proves to be a significant predictor of local economic integration. Likewise, the productivity level of farms negatively influences their local integration, although the land productivity has no influence on local integration at both local levels. While a strong input-intensity consistently leads to relatively low levels of local upstream integration, it implies a high level of local sales integration, albeit only at the extended local level.

Characteristics of the farmer are found only to influence the relative strength of local upstream integration. In fact, along with the productivity measures, it is these variables that are likely to help account for the variations in R-square value noted above. Age of the farmer and the length of time that the family has farmed in the area are both positively correlated with the proportion of inputs that are purchased in the local economy. Likewise, those farmers who have lived in the area for ten years or more are also found to source more locally. The results would seem to suggest that in the current economic climate farmers have less control over where they sell in comparison to where they source their inputs, although further research would be required to establish that this is in fact the case.

3.7.3.3 Households

The OLS models for **household integration** are presented in Table 3.24. (see Table 3 in Appendix 26 for specification of all variables). R-square values for the statistical models range from .18 to .25, with the strength of low order integration more readily influenced by the included predictors than high order. Examining differences between the countries, towns in Poland and Portugal have a greater proportion of local low order spend than France. Whilst

Portuguese towns also capture a relatively large proportion of high order spend, Polish towns do not. In comparison to French households, the UK has relatively weak household linkages, for both low and high order spending in both the local and extended local economy. In the Netherlands, however, it is the extended local economy that appears to be more important as a source of purchases to the residents of small and medium sized towns. The signs on the highly significant coefficients change from minus to positive when proportional spend in zone C is introduced. This may imply that, in comparison to France, zones C in the Netherlands are more likely to contain places where town households can access goods and services.

Peri-urban towns are found to have weaker household linkages in terms of low and high order spend than other towns, i.e. negatively signed coefficients, although the coefficient is not significant for high order integration in the extended local economy. Agricultural towns of both sizes are much more successful at retaining consumption expenditure locally, although interestingly the hinterland of small agricultural towns appears to be smaller; when the boundary of the local economy is extended to include zone C, the sign on both coefficients is reversed. Town size also has an impact in tourism towns. Small tourism towns mirror small peri-urban towns in their relative inability to retain income locally, although the immediate locality of medium sized tourism towns accounts for a relatively higher proportion of low order spend.

Examining household type, it is interesting to note that farm households are more tied to their local economy in terms of high order consumption expenditure than are non-farm households, but less tied in terms of low order spend in the local economy. As might be expected, households residing in the town have stronger linkages to their local economy than do hinterland residents.

There is a clear correlation between household income level and the proportion of income that is spent locally, with higher income groups spending proportionally less in both the local and extended local economy. Likewise, when the household head is a professional, manager, skilled non-manual or skilled manual, the local integration of low and high order purchases is lower than when they are an unskilled worker. The income effect is explored further by examining the effect of a savings proxy (the ratio of income to total purchases). Those households that save a greater proportion of their income are found to spend proportionally more of their disposable income in the local area. However, whereas those residents that spend proportionally more on high order goods and services are more strongly tied to locality in terms of low order spend, they exhibit weaker local linkages in terms of high order spend.

The models also consider the influence of family stage, car ownership, workplace and indigeneity on household integration. Families without dependants have consistently weaker ties to their locality in terms of low and high order spends. As might be expected there is a direct correlation between the number of cars per person and the proportion of household income that is spent locally, with fewer cars associated with a high rate of local expenditure. This implies a combination of income and mobility effect on local economic integration.

Although having work inside the local economy for all[10] members of households helps to retain low order spend within it, the effect is not significant when considered in terms of high order integration. This would imply that the journey to work is more likely to be combined with low order consumption expenditure as opposed to high order. In fact, the coefficients on other workplace variables in the model indicate that distance travelled to work is also an important consideration. In comparison to the households where one member works in the local economy and the other works elsewhere, those where both adults work beyond zone C have consistently weaker ties to their local and extended local economy in terms of both low and high order spend.

Table 3.24. OLS Results: households

	Low order		**High order**	
Explanatory variables	**Local (A+B)**	**Extended-local (A+B+C)**	**Local (A+B)**	**Extended-local (A+B+C)**
Constant	**1.946*** **	**2.012*** **	**2.842*** **	**2.621*** **
	(.121)	**(.098)**	**(.176)**	**(.161)**
C_UK	**-.06653*** **	**-.02882** **	**-.250*** **	**-.143*** **
	(.015)	**(.012)**	**(.022)**	**(.019)**
C_NL	**-.05657*** **	**.03816*** **	**-.0673*** **	**.09573*** **
	(.017)	**(.014)**	**(.025)**	**(.022)**
C_PO	**.06371*** **	**.114*** **	**-.150*** **	.01225
	(.020)	**(.017)**	**(.030)**	(.027)
C_PR	**.212*** **	**.225*** **	**.05686** **	**.107*** **
	(.017)	**(.014)**	**(.025)**	**(.022)**
Agri_small	**.113*** **	-.01495	**.08309*** **	**-.03754***
	(.016)	(.013)	**(.022)**	**(.021)**
Agri_med	**.189*** **	.02022	**.194*** **	**.03476***
	(.016)	(.013)	**(.022)**	**(.021)**
Tour_small	**-.03089***	**-.109*** **	**-.06073** **	**-.146*** **
	(.018)	**(.015)**	**(.025)**	**(.024)**
Tour_med	**.03923** **	**-.02897** **		-.01343
	(.016)	**(.013)**		(.021)
Peri_small	**-.046*** **	**-.04682*** **	**-.118*** **	-.03085
	(.017)	**(.014)**	**(.023)**	(.022)
Peri_med			-.03689	
			(.024)	
Loc_hinter	**-.09123*** **	**-.02336*** **	**-.05307*** **	.001949
	(.010)	**(.008)**	**(.015)**	(.013)
(ln)Serv	**.02185***	.002586	-.01043	.003001
	(.012)	(.009)	(.017)	(.015)
Farm	**-.03798*** **	.001986	**.03776***	**.07522*** **
	(.014)	(.011)	**(.020)**	**(.018)**
Fam_ret	-.008337	-.007286	.003026	.02009
	(.018)	(.015)	(.027)	(.029)
Fam_chl12				.03111
				(.023)
Fam_chm12	.001549	.005052	**-.05002** **	
	(.017)	(.005)	**(.025)**	
Fam_adult	**-.01856***	**-.01878** **	**-.04996*** **	-.02312
	(.011)	**(.009)**	**(.016)**	(.022)

[10] The survey recorded a maximum of two employed people per household.

Table 3.24. OLS Results: households (continued)

	Low order		**High order**	
Explanatory variables	**Local (A+B)**	**Extended-local (A+B+C)**	**Local (A+B)**	**Extended-local (A+B+C)**
Ind_ab	**.03301****	**.05425*****	**.06548*****	.02515
	(.016)	**(.013)**	**(.024)**	(.028)
Ind_cd15	**-.08992*****	.0001429	**-.218*****	**-.135*****
	(.028)	(.022)	**(.040)**	**(.040)**
Ind_cdm5	-.0278	**.03411***	-.0122	
	(.025)	**(.020)**	(.036)	
Ind_othl5	**-.06598*****	**-.03949****	**-.142*****	**-.150*****
	(.023)	**(.019)**	**(.034)**	**(.035)**
Ind_othm5				**-.05898***
				(.032)
Soc_manag	**-.07686*****	**-.07189*****	**-.110*****	**-.124*****
	(.016)	**(.013)**	**(.023)**	**(.021)**
Soc_ski_noman	**-.03836*****	**-.04425*****	**-.09099*****	**-.0953*****
	(.013)	**(.011)**	**(.019)**	**(.017)**
Soc_ski_man	**-.05763*****	**-.06127*****	**-.101*****	**-.09931*****
	(.014)	**(.011)**	**(.020)**	**(.018)**
(ln)Income	**-.09936*****	**-.07712*****	**-.162*****	**-.136*****
	(.010)	**(.008)**	**(.015)**	**(.013)**
Highpurch	**.000882 ***	**.000481****	**-.002809*****	**-.002587*****
	(.000)	**(.000)**	**(.000)**	**(.000)**
Purchead	.000004775	-.000001324	**.00003633*****	**.00002791*****
	(.000)	(000)	**(.000)**	**(.000)**
Saving	**.09018*****	**.06465*****	**.08173*****	**.06544*****
	(.010)	**(.008)**	**(.015)**	**(.013)**
Car_person	**-.04793*****	**-.04894*****	**-.05983*****	**-.03176***
	(.014)	**(.011)**	**(.020)**	**(.018)**
WP_ab	**.06078*****	**.01884****	.01665	.003647
	(.010)	**(.008)**	(.015)	(.014)
Wp_abelse				
Wp_c	**-.168*****	**.100*****	**-.162*****	**.09967****
	(.031)	**(.026)**	**(.046)**	**(.041)**
Wp_celse	-.05294	.001064	-.04958	.03781
	(.034)	(.027)	(.049)	(.044)
Wp_else	**-.07316*****	**-.138*****	**-.09512****	**-.192*****
	(.028)	**(.022)**	**(.041)**	**(.036)**
Adj. R-squared	**.252**	**.243**	**.218**	**.182**
F-value	57.747***	55.049***	47.897***	38.341
Residual *d.f*	5180	5180	5180	5180

*** sig. at 1 percent level (p<0,01) ** sig. at 5 percent level (p<0,05) * sig. at 10 percent level (p<0,1)

In cases where both adults work within zone C, the sign on the coefficients would indicate that a greater proportion of low and high order shopping is carried out within zone C as opposed to zones A and B. Those residents who have always lived in the local area access local (low and high order) goods and services to a greater degree. Other coefficients indicate that distance from previous domicile has a greater influence on local integration than the length of time that households have resided in the area, although this may be related to the chosen five-year cut-off point. The key message is that those residents who have moved into the area from zones C and D have stronger ties to the extended local economy for low order consumption expenditure than those coming from further afield.

A final variable [*(ln)Serv*] examines the relative influence of the size of the retail market for goods and services in the study area (using data from the business survey). A larger size of local goods and personal services market consistently implies a stronger level of local integration with respect to low order purchases. However, this effect is limited to the local level and ceases at the extended local level, and for the high order purchases.

The above models allow country variations to be examined using dummy variables. However, before going on to interpret the above findings further, or begin to draw out their implications for rural policy, it is important to test for possible structural differences between the five countries, which may unduly influence the parameter stability of the resulting models. The OLS models with country dummies assume that the slope coefficients remain the same for each of the five data sets, i.e. that there is no structural differences between them. If there are structural differences then it is wise to draw policy implications from separate-country models as opposed to the pooled regressions presented above. We can test for structural differences using the Chow test.

3.7.4 Results of Chow tests

Chow tests are computed[11] to formally test for structural differences between each of the five countries in turn and the remainder of the data set (i.e. UK=1, [FR+NL+PO+PL]=0; FR=1, [UK+NL+PO+PL]=0 and so on). The method of computing the Chow test is provided by Gujarati (2002). If the resulting F-value is statistically significant we can reject the hypothesis of parameter stability and conclude that the slope of the regressions are different. The F values for all Chow tests are given in Table 3.25.

Table 3.25. Results of Chow tests

Data set	Country				
	UK	**France**	**Netherlands**	**Portugal**	**Poland**
Firms	**F-value** ($H_{o:}$ Parameter stability)				
Sales F(26, 2937)[1]	4.3128***	4.5750***	5.8880***	6.3487***	7.2695***
Purchases F(26, 2937)	2.0251***	4.2987***	2.2757***	7.2531***	4.2313***
Farm	**F-value** ($H_{o:}$ Parameter stability)				
Sales F(21, 1687)	6.4299***	3.1897***	2.2494***	6.0094***	7.3193***
Purchases F(20, 2937)	5.6861***	6.6103***	7.3152***	9.500***	11.1737***
Households	**F-value** ($H_{o:}$ Parameter stability)				
Low order F(28, 5156)	3.3408***	6.5270***	5.5786***	9.1248***	3.5532***
High order F(28, 5156)	7.2637***	5.9995***	2.4880***	5.0614***	3.7451***

*** sig. at 1 percent level (p<0.01) ** sig. at 5 percent level (p<0.05) * sig. at 10 percent level (p<0.1)

[1]Distribution of test statistic F(k, N_1+N_2-2*k)

[11] Given observed similarities between local and extended local models, Chow tests are only computed for local models

All computed Chow tests are statistically significant at the 1% level, therefore indicating that there are structural differences between the countries. This suggests that more reliable parameters will be derived from fitting separate-country models.

3.7.5 Results from OLS regressions II: differences by country

Results from the separate country OLS regressions for firms, farms and households are given in Tables 3.26 to 3.31. At this stage, we restrict our analysis of local economic integration into the local economy (Zones A+B). A broader analyses of spatial economic behaviour, which takes account of the extended local economy (and the regional, national and international economy) is provided in Sections 3.4 and 3.5. Of course, each designated analysis of local economic integration will have its own unique set of implications for rural policy, and these will be addressed during the latter stages of the study.

The results indicate some interesting differences between the five countries in terms of the factors which influence local integration of firms, farms and households in the study areas. The accompanying discussion focuses both on these differences and on the most consistent results across the five countries. The second column of each table of results contains the relevant all-country model, these are reproduced from Tables 3.22 - 3.24 respectively.

A summary of the findings is presented Section 3.7.5.7.

3.7.5.1 Firms - downstream

The series of **models for local sales by firms** in each of the five countries is given in Table 3.26. UK and Poland exhibit the greatest variation in the proportion of local sales explained by included predictors, with R-square values of .383 and .402 respectively. Equivalent values for the French and Dutch models are considerably lower, which may imply a difficulty in influencing local sales at this geographical level.[12]

The influence of location within the study area, firm sector type (manufacturing firms, producer services), firm age, workforce size, proportion of unskilled workers within the workforce and firm's labour productivity are the parameters that most consistently influence local integration across the five countries. In all cases the directional influence of these variables is also consistent - i.e. across the countries and when compared with previous studies. Manufacturing firms and producer services have a relatively strong export base[13] in all countries apart from Poland and the UK respectively, where consumer services show a relatively strong degree of integration into the local economy. The agricultural sector (outside farming) has relatively weak ties to small and medium-sized towns in France and the Netherlands. In all five countries firms located in the town have stronger downstream linkages

[12] As already mentioned, analysis of the extended local economy may indeed prove more fruitful in this respect. This is picked up in the analysis of spatial behaviour contained in Section 3.8.

[13] In other words they sell relatively little in the local economy in comparison to other sectors and export more of their goods and services out of the local area. (The term should not be confused with the export of goods and services between countries).

than those located in the hinterland, and in all, apart from the UK, it is older and smaller firms that draw a greater proportion of their sales revenue from the local economy. The *Unskilled* variable parameters indicate that in the UK, France and the Netherlands firms that employ a higher proportion of partly or unskilled employees tend to have stronger downstream linkages. This pattern is reversed in Portugal and Poland, although the resulting coefficients are not statistically significant. In the UK, Netherlands and Portugal there is an inverse relationship between labour productivity and local downstream integration, with more productive[14] firms tending to draw in more income from outside the local economy.

Table 3.26. Firms: Local Sales[15]

	All countries	**Country**				
Explanatory variables		**UK**	**France**	**NL**	**Portugal**	**Poland**
Constant	1.132*** (.125)	2.583*** (.438)	.754** (.334)	1.22*** (.298)	1.481*** (.229)	.704*** (.195)
C_UK	-.0587 (.036)	-	-	-	-	-
C_NL	-.172*** (.035)	-	-	-	-	-
C_PO	.250*** (.035)	-	-	-	-	-
C_PR	.131*** (.031)	-	-	-	-	-
Agri_small	.0322 (.034)	-.247** (.100)	.04757 (.080)	.09824 (.088)	.07332 (.118)	.07678 (.074)
Agri_med	.128*** (.033)	-.145 (.103)	.133 (.082)	.07469 (.083)	.137** (.055)	.228*** (.068)
Tour_small						
Tour_med	.0318 (.033)	-.268*** (.097)	.276*** (.082)	.03975 (.082)	-.07865 (.053)	.122* (.070)
Peri_small	-.0355 (.033)	-.187* (.101)	-.214** (.086)	.02935 (.091)	.141** (.059)	-.02832 (.067)
Peri_med	-.0074 (.034)	-.351*** (.109)	.225** (.090)	.07459 (.084)	.0459 (.056)	-.02109 (.067)
Loc_hinter	-.139*** (.020)	-.167*** (.060)	-.117** (.051)	-.108** (.050)	-.04862 (.033)	-.148*** (.036)
Ty_indep						
Ty_natbran	.0377 (.035)	.242** (.101)	.02686 (.068)	.174 (.139)	-.118* (.065)	.04117 (.071)
Ty_internat	.0150 (.045)	-.05261 (.126)	.118 (.349)	.09090 (.149)	.0284 (.070)	-.167** (.078)
Sec_agri	.0702 (.065)	.814** (.368)	-.289* (.153)	-.979* (.520)	.03996 (.085)	.253 (.290)
Sec_manuf	-.290*** (.043)	-.302*** (.115)	-.262** (.104)	-.395*** (.134)	-.257*** (.078)	-.136 (.090)
Sec_const	-.107** (.047)	.143 (.125)	-.09937 (.096)	-.06632 (.138)	.08195 (.105)	-.227** (.091)
Sec_prodserv	-.235*** (.038)	-.0868 (.102)	-.165** (.079)	-.215** (.109)	-.140* (.083)	-.181** (.075)
Sec_conserv	.0675* (.036)	.232** (.102)	.009557 (.084)	-.143 (.111)	-.00005689 (.075)	.199*** (.069)

[14] Measured as Sales-Purchases/workforce. See Appendix 26 for full details of variable definitions.
[15] Empty cells in Tables 3.26 – 3.31 are the result of the variable selection process, which is described in Section 3.7.2.

Table 3.26. Firms: Local Sales (continued)

	All countries	Country				
Explanatory variables		**UK**	**France**	**NL**	**Portugal**	**Poland**
(ln)Age_firm	.0463***	.01238	.07322***	.02882*	.03377**	.05027***
	(.008)	(.023)	(.018)	(.017)	(.015)	(.019)
(ln)Workforce	-.0959***	.01029	-.0808**	-.09940***	-.202***	-.05609**
	(.012)	(.041)	(.032)	(.033)	(.023)	(.026)
Ind_AB	.0868***	-.03519	-.03806	.180***	.143***	.106**
	(.027)	(.076)	(.067)	(.067)	(.047)	(.052)
Ind_CD	.0100	-.03756	.04811	.160	-.05339	-.08798
	(.049)	(.115)	(.097)	(.160)	(.092)	(.106)
Ind_EH	-.0356	-.116	-.08925	.199**	.3566	-.473***
	(.044)	(.099)	(.103)	(.096)	(.076)	(.137)
Unskilled	.0019***	.00353***	.002345**	.004085***	-.0001725	.001487
	(.000)	(.001)	(.001)	(.001)	(.001)	(.002)
IGI	-.0006	-.001308	.001014	.0006137	-.0001845	-.00009797
	(.000)	(.001)	(.001)	(.001)	(.001)	(.001)
Lab_prod	-.0270**	-.172***	-.01536	-.05502**	-.03757**	.007558
	(.011)	(.037)	(.030)	(.025)	(.019)	(.020)
Loc_comp	-.0072	.00427	.02583	.03049*	.01981	-.0461***
	(.006)	(.019)	(.018)	(.018)	(.013)	(.013)
Lab_mark	.0050	-.00216**	.001755*	-.001214*	-.001631***	.005553***
	(.000)	(.001)	(.001)	(.001)	(.001)	(.001)
SLGM	-.0031	.01289	.01247	-.0317**	.006459	-.02112*
	(.006)	(.018)	(.016)	(.015)	(.011)	(.011)
IPI	-.0011***	.0008036	.0007082	-.001815**	-.001634***	-.001093
	(.000)	(.001)	(.001)	(.001)	(.001)	(.001)
Adj. R-squared	**0.271**	**.383**	**.155**	**.156**	**.263**	**.402**
F-value	**39.278*** **	**9.288**	**4.849**	**4.338**	**13.667**	**22.093**
Residual *d.f*	**2959**	**309**	**501**	**426**	**864**	**760**

*** sig. at 1 percent level (p<0.01) ** sig. at 5 percent level (p<0.05) * sig. at 1 percent level (p<0.1)

Examining town types, agricultural and tourism towns in the UK are unique in having relatively weak downstream linkages and peri-urban towns in the Netherlands and Portugal are unique in having relatively strong downstream linkages. The results suggest that fostering local economic growth in areas where agricultural employment is above average is likely to prove more fruitful in medium sized towns in Portugal and Poland. In France there appears to be a significant difference between small and medium towns in peri-urban areas, with medium-sized towns retaining more local sales revenue than other town types.

Coefficients for the individual firm environment variables show some interesting relationships between firm location and technological parameters and local economic integration. The results also add depth to the understanding of how the respective local economies operate in the five countries. First, the relationship between the local labour market and local economic integration appears to vary between the countries. In the UK, Netherlands and Portugal there is an inverse relationship between the local tensions between the firm's demand for skilled workers and the local supply of skilled labour and local sales integration. This indicates that where firms employ a greater proportion of skilled labour than is available in the local labour market, they also tend to export out of the local area to a greater degree. In France and Poland the situation is reversed; here it is those firms which are not utilising the availability of skilled labour that are selling less locally. While the size of the final market and local competition within the sector do not influence the local integration of

sales in UK, French and Portuguese firms, the effects of these variables in the Netherlands and Poland are a little surprising. Indeed, in these latter cases, a greater size of final market decreases the level of local firm integration and stronger local competition positively influences the local integration of firms in the Netherlands. The expected inverse relationship between local competition and local integration is obtained only for Poland. The only countries where local vertical linkages influence the strength of local sales integration are the Netherlands and Portugal. In these cases, the higher the local supply of inputs (compared to the firm demand), the more they sell their outputs outside the study area.

3.7.5.2 Firms - upstream

Turning now to the **upstream models**, which examine the role of potential predictors of local purchasing in the five countries, we find that the strength of local integration is more readily influenced by included predictor variables in the UK and Portugal, with French and Dutch models again achieving the lowest R-square values. This may suggest that there is less scope for generating local economic growth through very local multipliers in towns in these countries, although further analysis contained in this report will shed more light on this observation.

Examining the effects of town type and size on local input markets, we again find that local linkages are stronger in and around larger towns in areas of high agricultural employment in Poland and Portugal. A similar pattern is observed in the UK, although in France it is the smaller towns in such areas that enjoy a greater degree of local sourcing. In areas where tourism employment dominates, there is also variation across the countries. Whilst such towns in France and Portugal enjoy relatively strong local input linkages, those in the Netherlands and Poland exhibit relatively weak linkages. In comparison to the tourism medium-sized towns, the effect of urban proximity on local sourcing patterns is surprisingly weak. Only medium peri-urban towns in the Netherlands suffer from relatively weak levels of local integration and in fact such towns in Poland tend to foster local sourcing to a greater degree than other town types.

Table 3.27. Firms: Local purchases

	All countries	**Country**				
Explanatory variables		**UK**	**France**	**NL**	**Portugal**	**Poland**
Constant	1.099*** (.114)	1.055*** (.352)	.374 (.256)	1.351*** (.273)	.821*** (.244)	1.16*** (.201)
C_UK	-.007044 (.031)	-	-	-	-	-
C_NL	.01525 (.030)	-	-	-	-	-
C_PO	.158*** (.035)	-	-	-	-	-
C_PR	.149*** (.026)	-	-	-	-	-
Agri_small	.01493 (.028)	.03241 (.076)	.294*** (.062)	-.194*** (.069)	-.02323 (.054)	-.06822 (.058)

Table 3.27. Firms: Local purchases (continued)

	All countries	Country				
Explanatory variables		**UK**	**France**	**NL**	**Portugal**	**Poland**
Agri_med	.126***	.142*	.02712	-.02445	.191***	.192***
	(.027)	(.079)	(.060)	(.066)	(.056)	(.055)
Tour_small	.02234	.03253	.170***	-.186***	.119**	-.108*
	(.028)	(.073)	(.060)	(.069)	(.054)	(.063)
Tour_med						
Peri_small	-.04998*	-.103	-.05143	-.01239	.01001	-.06449
	(.027)	(.073)	(.064)	(.073)	(.056)	(.049)
Peri_med	.007931	.113	-.0331	-.162**	-.05584	.185***
	(.028)	(.077)	(.066)	(.068)	(.055)	(.053)
Loc_hinter	.003008	.03674	-.02007	-.006871	.0202	.007199
	(.017)	(.046)	(.038)	(.042)	(.033)	(.033)
Ty_indep	-.00408	-.02109	-.007545	-.009772	.116*	.009612
	(.030)	(.076)	(.050)	(.116)	(.066)	(.065)
Ty_natbran						
Ty_internat	-.09239**	.01821	-.01561	-.0627	-.08716	-.107
	(.047)	(.114)	(.100)	(.165)	(.094)	(.092)
Sec_agri	.07841	1.040***	.210*	-.241	-.0808	.803***
	(.056)	(.277)	(.113)	(.437)	(.086)	(.264)
Sec_manuf	-.08943**	-.146*	-.118	.05598	-.08191	.113
	(.037)	(.087)	(.077)	(.112)	(.079)	(.082)
Sec_const	.178***	.307***	.144**	.379***	.325***	.175**
	(.04)	(.094)	(.071)	(.116)	(.107)	(.083)
Sec_prodserv	.147***	-.0009629	-.02535	.134	.454***	.333***
	(.033)	(.077)	(.059)	(.091)	(.084)	(.068)
Sec_conserv	-.02864	-.04161	-.06529	.06457	.01291	.03866
	(.031)	(.077)	(.062)	(.093)	(.076)	(.063)
(ln)Age_firm	-.00254	.02455	-.01877	-.01613	.01838	-.02607
	(.007)	(.017)	(.014)	(.014)	(.015)	(.018)
(ln)Workforce	-.0259**	.01944	.009539	-.01043	-.01985	-.03756
	(.011)	(.031)	(.024)	(.028)	(.023)	(.023)
Ind_AB	.124***	.08143	.115**	.142**	.0856*	.118**
	(.023)	(.057)	(.050)	(.057)	(.047)	(.047)
Ind_CD	.007508	-.003737	.01063	-.106	-.01643	.06806
	(.042)	(.087)	(.072)	(.134)	(.094)	(.097)
Ind_EH	.07038*	.125*	-.03085	.138*	.03154	-.314**
	(.038)	(.074)	(.076)	(.081)	(.077)	(.125)
Unskilled	.0000642	-.001131	.0006379	-.00006703	-.00004422	.001229
	(.000)	(.001)	(.001)	(.001)	(.001)	(.001)
IGI	-.003335***	-.0040***	-.0009448	-.002795***	-.003792***	-.003371***
	(.000)	(.001)	(.001)	(.001)	(.001)	(.001)
Lab_prod	-.04926***	-.05308*	.0002107	-.07681***	-.02084	-.05214***
	(.009)	(.028)	(.022)	(.021)	(.019)	(.018)
Loc_comp	.005304	-.01402	-.01245	.03877**	.006352	-.03142***
	(.022)	(.014)	(.013)	(.015)	(.013)	(.012)
Lab_mark	-.0001311	-.00133**	.0001453	.0006672	-.0004478	.001412**
	(.000)	(.001)	(.001)	(.001)	(.001)	(.001)
SLGM	.01311***	.03719***	.04579***	.02274*	.04502***	-.02927***
	(.063)	(.013)	(.012)	(.012)	(.011)	(.010)
IPI	-.00284***	-.00168**	-.0005306	-.002232***	-.004081***	-.002483***
	(.000)	(.001)	(.001)	(.001)	(.001)	(.001)
Adj. R-squared	**.215**	**.343**	**.178**	**.169**	**.326**	**.255**
F-value	**29.156*** **	**6.447**	**5.562**	**4.679**	**18.190**	**11.725**
Residual *d.f*	**2959**	**309**	**501**	**426**	**864**	**760**

*** sig. at 1 percent level (p<0.01) ** sig. at 5 percent level (p<0.05) * sig. at 10 percent level (p<0.1)

Unlike downstream integration, workforce size and firm age, as well as the proportion of unskilled workers within the workforce, has no significant influence on the strength of local integration; likewise, location within the study area also ceases to be important with respect to input markets at this geographical level. The most consistent finding in terms of sectoral influences is the propensity of construction firms to source locally. In comparison to other sectors such firms are found to purchase a greater proportion of inputs (by value) in the local economies of all five countries, a finding which must be of potential interest to both European and national policy makers. Interestingly, producer services, which have an export base role in all five countries, appear to have a potential role as net income generators only in Poland and Portugal where such firms have relatively strong local input linkages, in comparison to other sectors. Agricultural firms (outside farming) are found to have relatively strong input linkages in the UK, France and Poland.

Whilst firm ownership is not a strong predictor of the strength of local upstream integration, the indigeneity of the owner/manager is. Firms where the owner/manager has lived within the study area for ten years or more (*Ind_AB*), are found to source a greater proportion of their inputs within the same area. Although this variable is not significant in the UK model, we find a significant coefficient for *Ind_EH* in this country as well as in the Netherlands. This indicates that, in comparison to firms where the owner/manager has never lived within the study area, a greater propensity to source locally is found amongst owner/managers who have moved into the study area from outside the county (NUTS II and beyond). This compares to the negative coefficient obtained in Poland for this type of firm. This pattern might suggest that those owner/managers who have moved into the area from further away continue to utilise their existing supply chain networks.

Finally, the technological and firm environment parameters again help to explain patterns of local sourcing in and around small and medium sized towns. The most consistent influencing parameters across the five countries concern the role of the individual intermediate goods intensity (IGI), of the local final market size and of the potential intensity of local vertical linkages. The first interesting result is the negative coefficients for *IGI* in all five models, although the coefficient for France is not statistically significant. These suggest that where the technological process is intensive in intermediate goods (i.e. where the value of total purchases is closer to the value of total sales), the proportion of inputs sourced within the local economy is consistently lower. Firms with high labour productivity tend to source outside the study area in most of the countries (France and Portugal are the exceptions). The *IPI* negative parameters (except in UK where the parameter is not significant) indicate that, firms where the demand for inputs can be met by local supply, have a high level of local upstream integration. Likewise, the positive effect of the output market size in all the five models suggests that where a firm's size is small compared to the local final demand, its expenditure on local inputs is proportionally higher.

3.7.5.3 Farms - downstream

The discussion now turns to the predictors of **local downstream integration for farms.** The first question to address is, are farms more integrated into sales markets in areas where employment in agriculture is above the national average? In France, the answer is yes,

particularly in and around smaller towns; in Portugal and Poland farms are also strongly integrated into such economies, but only in and around medium sized towns. In smaller towns the opposite is the case, in fact Polish and Portuguese farms sell more locally in small peri-urban towns than small agricultural towns. Patterns of farm sales are not influenced by town type in the UK, and the coefficients for France suggest that the economy of medium-sized peri-urban towns support farms very little, with all other town types - particularly small towns - having favourable levels of integration compared to the reference category.

The Dutch model explains very little variation in the strength of local downstream integration of farms. The only significant predictor in the model is the measure of intermediate goods intensity (crude measure of gross profit), indicating that it is the input intensive farms that tend to source within the local economy to a greater degree**.** The other four models have comparable R-square values, with included predictors explaining between 26% and 30% of the variation in local integration.

Table 3.28. Farms: Local sales

	All countries	**Country**				
Explanatory variables		**UK**	**France**	**NL**	**Portugal**	**Poland**
Constant	1.233*** (.175)	1.109 (.748)	.922 (.566)	1.628** (.721)	1.867*** (.399)	1.066*** (.381)
C_UK	-.357*** (.060)	-	-	-	-	-
C_NL	-.004036 (.057)	-	-	-	-	-
C_PO	.145** (.056)	-	-	-	-	-
C_PR	.298*** (.059)	-	-	-	-	-
Agri_small	.126** (.050)	.167 (.128)	.660*** (.160)	.226 (.153)	-.232** (.117)	-.198** (.089)
Agri_med	.270*** (.053)	.007864 (.138)	.311* (.176)	-.03923 (.184)	.271*** (.098)	.341*** (.086)
Tour_small	.08617* (.052)	-.121 (.151)	.883*** (.187)	.04977 (.153)	-.106 (.099)	-.286*** (.100)
Tour_med	.02104 (.050)	.140 (.154)	.309* (.168)	.149 (.148)	.0635 (.101)	-.355*** (.087)
Peri_small	.319*** (.051)	.143 (.133)	.369** (.156)	-.06985 (.196)	.332*** (.089)	.554*** (.123)
Peri_med						
Ty_livest	-.144*** (.042)	.01717 (.067)	-.433*** (.105)	-.01142 (.117)	-.143 (.107)	.07115 (.124)
Ty_crops	-.05031 (.048)	-.278** (.126)	-.329** (.126)	.137 (.210)	.0707 (.085)	-.127 (.122)
Ty_permcro	.0443 (.048)		-.06381 (.189)	.154 (.966)	.128 (.093)	.160 (.115)
Ty_mixed						
(ln)Workforce	-.177*** (.025)	-.148*** (.044)	-.133** (.059)	.0122 (.097)	-.210*** (.047)	-.183*** (.060)
(ln)Area						
Own_sole	.0002776 (.034)	.04264 (.068)	-.0816 (.082)	-.03583 (.084)	-.03247 (.254)	-.02102 (.054)

Table 3.28. Farms: Local sales (continued)

	All countries	Country				
Explanatory variables		**UK**	**France**	**NL**	**Portugal**	**Poland**
(ln)Lab_prod	-.06962*** (.014)	-.06567 (.064)	-.02916 (.044)	-.08351 (.058)	.01043 (.027)	-.06675* (.035)
(ln)Land_prod	.01392 (.012)	.06398*** (.020)	-.06425** (.032)	-.04828 (.040)	-.09504*** (.033)	.02296 (.040)
IGI	.0007445 (.001)	-.0003909 (.003)	.001469 (.002)	-.003842* (.002)	.001519 (.001)	.001125 (.001)
Agefarmer	.002364 (.001)	.0007772 (.004)	-.001895 (.004)	-.0004401 (.004)	-.003404 (.003)	.00416 (.003)
(ln)Time	.006023 (.015)	-.01048 (.033)	.07371** (.036)	.0521 (.044)	-.06589** (.031)	-.006913 (.036)
Income	-.001555*** (.000)	-.0001*** (.001)	.001462*** (.001)	-.001314*** (.001)	-.001782*** (.001)	-.004132*** (.001)
Ind_AB	-.104 (.075)	-.437*** (.159)	-.112 (.129)	.129 (.245)	.05395 (.122)	.440 (.288)
Ind_CH						
Ind_no	-.102 (.082)	-.178 (.219)	.0003184 (.140)	.170 (.324)	.117 (.133)	-.532 (.398)
Hist_ab	.0245 (.045)	-.09302 (.074)	.01284 (.076)	.04558 (.143)	.199* (.110)	-.129 (.142)
Hist_elsew	-.110* (.061)	-.240** (.120)	-.0851 (.111)	-.09828 (.156)	.167 (.181)	-.07603 (.185)
Hist_none						
Adj. R-squared	**.287**	**.267**	**.299**	**.037**	**.249**	**.277**
F-value	**29.993*** **	**5.759**	**6.795**	**1.473**	**8.298**	**10.941**
Residual *d.f*	**1704**	**230**	**252**	**225**	**421**	**498**

*** sig. at 1 percent level (p<0.01) ** sig. at 5 percent level (p<0.05) * sig. at 10 percent level (p<0.1)

The most consistent predictor in all four models is workforce size, the negative sign on all coefficients indicating that smaller farms tend to serve local agricultural markets to a greater degree. Farm type only has a significant influence in the UK and France. In the former, arable farms are the least integrated into local sales markets and in the latter the coefficients indicate that both livestock and arable farms serve local markets to a lesser degree than do mixed and permanent cropping farms. Perhaps surprisingly, farmer age and ownership type have no significant influence on local sales integration. Farming history, indigeneity and agricultural income do have an effect to varying degrees across the countries. In France the coefficient for *(ln)Time* indicates a positive correlation between the length of time the family has farmed and the proportion of sales revenue derived locally. However, in Portugal the sign on the respective coefficients is reversed; families who have farmed the longest in these countries appear to sell produce locally to a lesser degree. In the UK we find that it is those families who have not always farmed in the study area and, surprisingly, those where the farmer has lived in the study area for 10 years or more that are less integrated into local sales markets. Thus, the results suggest that indigeneity does not have the same effect on sales patterns in the farming sector as it does outside the sector, and that farming history is a more meaningful predictor of economic behaviour.

The variable measuring the proportion of farm household income that is derived from agriculture is negatively correlated with the proportion of sales derived from the local economy in all countries. The results thus indicate that it is those farms that are reliant on

non-agricultural income (which could either be income earned off the farm or income derived from diversification activities) that tend to sell locally to a greater extent.

Finally, some technological parameters were also included in the farm models, examining the influence of labour productivity, land productivity and intermediate goods intensity on local downstream integration. The latter is only significant in the Dutch model, and as already explained, is the only variable found to influence local farm sales integration in this country. Unlike the case of firms, labour productivity has only a marginal affect on downstream integration, and only in Poland. The negative sign on the coefficient indicates that more productive farms (in terms of labour) tend to be less tied to local agricultural markets. Land productivity has an in-consistent effect on local sales integration across the countries. In UK farms there is a positive correlation between land productivity and the proportion of sales revenue that is derived locally, but in France and Portugal the sign on the respective coefficient is reversed, indicating that the less productive farms tend to sell a higher proportion of their produce in the local economy**.**

3.7.5.4 Farms – upstream

Moving on to examine the predictors of **local upstream integration in the farming sector**, the first observation to note is that farm and local context characteristics help account for a greater proportion of the variation in inputs that are purchased locally than they do sales. In particular, the strength of local upstream integration is considerably more influenced by entity characteristics than that of the non-farming sector and over half of all variation in the strength of upstream integration is explained by included predictors in the UK model. The R-square for the Dutch model is again the lowest, nevertheless the model explains around 23% of the variation in upstream integration, considerably more than its downstream counterpart.

Table 3.29. Farms: Local purchases

	All countries	**Country**				
Explanatory variables		**UK**	**France**	**NL**	**Portugal**	**Poland**
Constant	**1.096*** **	.06638	1.666***	.887**	1.522***	1.923***
	(.116)	(.516)	(.307)	(.399)	(.254)	(.225)
C_UK	**-.179*** **	-	-	-	-	-
	(.048)					
C_NL	.05984	-	-	-	-	-
	(.039)					
C_PO	**.158*** **	-	-	-	-	-
	(.038)					
C_PR	**.204*** **	-	-	-	-	-
	(.039)					
Agri_small	**.08243** **	.09645*	.483***	-.02996	.410***	-.09662
	(.032)	(.054)	(.074)	(.098)	(.068)	(.086)
Agri_med	**.163*** **	.04146	.555***	.009625	.201***	.168**
	(.035)	(.059)	(.086)	(.120)	(.059)	(.085)
Tour_small	**-.135*** **	-.736***	.352***	.07678	.163***	-.648***
	(.035)	(.072)	(.098)	(.096)	(.058)	(.095)
Tour_med	-.02327	-.127*	.410***	.06484	.282***	-.252***
	(-.019)	(.075)	(.078)	(.096)	(.059)	(.086)
Peri_small						

Table 3.29. Farms: Local purchases (continued)

	All countries	Country				
Explanatory variables		**UK**	**France**	**NL**	**Portugal**	**Poland**
Peri_med	**-.102*** **	-.205**	-.297***	.142	.05767	-.08952
	(.035)	(.087)	(.088)	(.113)	(.058)	(.081)
Ty_livest	**-.04943***	.170***	-.197***	.009756	.215***	-.119
	(.028)	(.044)	(.060)	(.066)	(.070)	(.082)
Ty_crops	**.05942***	-.09613	-.100	-.02545	.412***	-.08342
	(.033)	(.080)	(.071)	(.121)	(.055)	(.080)
Ty_permcro	**.08412*** **		-.115	.422	.457***	-.08825
	(.032)		(.109)	(.562)	(.060)	(.076)
Ty_mixed						
(ln)Area	**-.0319*** **	.06526***	.03011	.118***	-.06573***	-.195***
	(.010)	(.018)	(.028)	(.044)	(.019)	(.031)
Own_sole	**.05056** **	.154***	.001743	.05113	-.598***	.0118
	(.023)	(.043)	(.046)	(.047)	(.163)	(.036)
(ln)Lab_prod	**-.02170** **	.01166	-.108***	-.05315	-.04851**	.09517***
	(.010)	(.040)	(.034)	(.041)	(.020)	(.032)
(ln)Land_prod	**-.02811*** **	.02953**	-.002707	-.02753	.1728	-.179***
	(.010)	(.014)	(.027)	(.040)	(.025)	(.037)
IGI	**-.001769*** **	.0005742	-.001607*	-.003272**	-.0004593	-.004071***
	(.000)	(.002)	(.001)	(.001)	(.001)	(.001)
Agefarmer	**.0032*** **	-.002482	.00001252	.002972	.002721	.001436
	(.001)	(.002)	(.002)	(.002)	(.002)	(.002)
(ln)Time	**.04062*** **	-.03679*	-.00589	.04884*	-.008124	-.02641
	(.010)	(.021)	(.020)	(.026)	(.020)	(.024)
Income	**-.001334*** **	-.0002894	-.0004206	.0003826	-.001879***	-.0012**
	(.000)	(.001)	(.001)	(.001)	(.000)	(.001)
Ind_AB	**.06895** **	.04371	-.02621	.002343	.138***	.548***
	(.030)	(.068)	(.048)	(.099)	(.045)	(.132)
Ind_CH						
Ind_no						
Hist_ab						
Hist_elsew	**-.08025** **	-.342***	-.08237	-.0139	-.08602	.0901
	(.035)	(.071)	(.070)	(.052)	(.096)	(.096)
Hist_none	-.01149	-.09404*	.04144	.07004	-.03582	.114
	(.031)	(.048)	(.043)	(.083)	(.070)	(.093)
Adj. R-squared	**.352**	**.539**	**.409**	**.232**	**.369**	**.364**
F-value	**41.825*** **	**17.128**	**10.891**	**4.894**	**14.565**	**16.602**
Residual *d.f*	**1705**	**231**	**253**	**226**	**422**	**499**

*** sig. at 1 percent level (p<0.01) ** sig. at 5 percent level (p<0.05) * sig. at 10 percent level (p<0.1)

Examining the coefficients for town type, we again find that French farms do not operate locally in the peri-urban medium-sized areas (i.e. Ballancourt in comparison to Magny-en-Vexin); in addition to their lack of integration in sales markets they source few farm inputs locally. An identical pattern is evident for Portuguese farms, but only with respect to the purchasing of farm inputs. In the UK and Poland, local sourcing in the farming sector is supported to a greater degree in areas where agricultural employment is above average, although town size has an important influence; in the UK small towns tend to serve the farming sector to a greater extent and in Poland it is medium sized towns. In both countries relatively low levels of local sourcing is found in areas dominated by tourism, an indication that the function of such towns has changed markedly in these areas. Town type has no relative influence over upstream integration in the Netherlands farming sector.

Farm size is again the most consistent predictor of upstream integration across the five countries, although in this case the measure used is land area as opposed to workforce size. There is also variation in the sign of the resulting coefficients, indicating that larger farms tend to source more locally in the UK, whereas in Portugal and Poland it is smaller farms that are more strongly tied to local agricultural markets. Farm type has no significant influence on local sourcing patterns in the Netherlands or Portugal and has varying influence in the other three countries. In the UK, livestock farms are found to source more locally than arable farms, although in France livestock farms tend to source locally to a lesser degree than mixed farms. Coefficients in the Portuguese model indicate that all farm types source more locally than do mixed farms.

In the case of upstream linkages, farm ownership does appear to correlate with local integration. In the UK sole ownership farms source a greater proportion of their inputs locally; in Portugal such farms source a lesser proportion of inputs locally. Whilst age of the farmer bears little relation to local purchasing patterns, farming history and indigeneity does. In the UK there is an inverse correlation between the length of time that the family has farmed and the extent to which inputs are purchased locally, where as in the Netherlands the sign on the respective coefficient is reversed. Indigeneity is a significant predictor of local upstream integration in Portugal and Poland, with respective coefficients showing that farmers tend to source a greater proportion of inputs in the local economy in cases where they have lived there all their lives. The UK is the only country where farming history has a significant influence on local sourcing; families who have always farmed in the local area being more strongly tied to the locality in terms of purchasing.

The final set of variables show some interesting relationships between technological parameters and local economic integration in the farming sector. Intermediate goods intensity is a significant predictor of local integration in all countries bar the UK and Portugal. In all three cases, the correlation indicates that more inputs intensive farms tend to source a lesser proportion of their inputs locally. When looking at labour productivity, more productive farms are found to source locally to a greater extent in Poland. However, when measured in terms of land productivity this relationship is reversed. In both France and Portugal it is the least productive farms (in terms of labour) that source a greater proportion of their inputs from the local economy and in the UK farms which make more efficient use of their land are associated with a greater degree of local sourcing.

3.7.5.5 Household - low order purchases

The final two tables in this section contain the **household models**, which examine the relative contribution of socio-economic and household environmental factors on the propensity to shop locally in the five countries. Table 3.30 examines the drivers of **low order integration**. R-square values indicate that between 13% and 27% of the variation in the proportion of low order spend that is attributed to locality is explained by the included predictors, with the lowest values for the UK and Dutch models.

Starting with town type we find some interesting similarities between the countries. In the UK, Netherlands and Poland it is medium-sized agricultural towns (i.e. respectively, Tiverton,

Schagen and Jędrzejów) which support local low order spend to the greatest degree. In Portugal both agricultural and tourism towns foster a higher degree of local expenditure compared to towns in peri-urban areas. In France, larger towns in peri-urban areas which fail to retain income through low order consumption expenditure (indicated by the positive sign on the coefficients for all other town type variables). Whilst households residing in the town spend consistently more in the local economy of all countries compared to those residing in the hinterland, only in the Netherlands do we find a significant difference between farm and non-farm households in this respect; farm households tend to spend less in the town and its surrounding hinterland.

As noted above, there is a strong negative correlation between household income and the propensity to purchase low order goods and services locally. In all countries households on lower incomes tend to use their local town for convenience purchases to a greater extent than those on higher incomes[16]. Related variables examine the relationship between types of spending and the proportion of all disposable income that is saved. The coefficients indicate that, for a given level of income, as the proportion of household income saved rises the proportion of low order expenditure that is attributed to the town and surrounding hinterland also rises. Whilst total expenditure per household member is not strongly correlated with low order integration, the high order expenditure ratio is significant in the UK model as in the whole-sample model. This shows a surprising positive correlation between the proportion of all monthly expenditure on high order goods and services and the proportion of all low order expenditure retained within the local economy.

Table 3.30. Households - low order

	All countries	**Country**				
Explanatory variables		**UK**	**France**	**NL**	**Portugal**	**Poland**
Constant	1.946*** (.121)	2.538*** (.248)	6.646 (7.159)	1.538*** (.334)	4.846*** (.338)	2.538*** (.322)
C_UK	-.06653*** (.015)	-	-	-	-	-
C_NL	-.05657*** (.017)	-	-	-	-	-
C_PO	.06371*** (.020)	-	-	-	-	-
C_PR	.212*** (.017)	-	-	-	-	-
Agri_small	.113*** (.016)	.04704 (.042)	.638 (.449)		.205*** (.024)	-.110*** (.039)
Agri_med	.189*** (.016)	.07142* (.043)	.730 (.492)	.08616** (.035)		.006295 (.039)
Tour_small	-.03089* (.018)	-.09297** (.046)	1.276 (1.514)	-.09914** (.047)	.301*** (.048)	-.290*** (.048)
Tour_med	.03923** (.016)	-.06952 (.047)	.459 (.343)	.04404 (.036)	.213*** (.036)	-.186*** (.044)
Peri_small	-.046*** (.017)	-.121*** (.042)	.501 (.601)	-.09842* (.053)	-.117*** (.025)	-.330*** (.046)
Loc_hinter	-.09123*** (.010)	-.0832*** (.028)	-.112*** (.018)	-.09716*** (.029)	-.03654** (.016)	-.116*** (.030)

[16] Of course, higher income households may spend more in total, but as a proportion of their total spend, the local economy accounts for a higher proportion of lower income spending budgets.

Table 3.30. Households - low order (continued)

	All countries	Country				
Explanatory variables		**UK**	**France**	**NL**	**Portugal**	**Poland**
(ln)Serv	.02185* (.012)		-.824 (1.153)	.06944** (.032)	-.503*** (.051)	
Farm	-.03798*** (.014)	-.07304 (.054)	-.001014 (.028)	-.141*** (.037)	-.0364 (.027)	.02161 (.031)
Fam_ret	-.008337 (.018)	-.06906 (.047)	.01591 (.034)	-.05079 (.043)	.06364* (.039)	.03642 (.060)
Fam_chm12	.001549 (.017)	-.01795 (.054)	.01257 (.036)	.04151 (.050)	.03952 (.027)	-.02506 (.034)
Fam_adult	-.01856* (.011)	-.03937 (.035)	-.0189 (.023)	-.02842 (.031)	-.008732 (.017)	.003578 (.026)
Ind_ab	.03301** (.016)	.05689 (.047)	.04571 (.036)	.0508* (.028)	-.01056 (.036)	-.124 (.114)
Ind_cd15	-.08992*** (.028)	-.05208 (.072)	-.06705 (.048)	.04234 (.080)	-.152** (.064)	-.206 (.136)
Ind_cdm5	-.0278 (.025)	-.05105 (.085)	-.008446 (.053)	-.01296 (.039)	-.01009 (.057)	-.140 (.147)
Ind_othl5	-.06598*** (.023)	-.03817 (.057)	-.05923 (.044)	-.05075 (.055)	-.08445* (.048)	-.04837 (.171)
Soc_manag	-.07686*** (.016)	-.02807 (.042)	-.01896 (.041)	-.0582 (.045)	-.08186*** (.025)	-.133*** (.039)
Soc_ski_noman	-.03836*** (.013)	-.03202 (.040)	-.03805 (.026)	-.0499 (.040)	-.04908** (.025)	-.5817 (.066)
Soc_ski_man	-.05763*** (.014)	-.008828 (.045)	-.04413* (.026)	-.05751 (.035)	-.03177 (.023)	-.0966*** (.034)
(ln)Income	-.09936*** (.010)	-.149*** (.026)	-.05681*** (.021)	-.09303*** (.027)	-.05993*** (.018)	-.09699*** (.034)
Highpurch	.0008815*** (.000)	.001467** (.001)	.0005415 (.001)	.0008935 (.001)	-.0003509 (.001)	.0007062 (.001)
Purchead	.000004775 (.000)	-.00000094 (.000)	.00000995 (.000)	-.000001371 (.000)	.000006171 (.000)	-.00007731 (.000)
Saving	.09018*** (.010)	.115*** (.026)	.05224** (.022)	.113*** (.024)	.03584* (.019)	.05727* (.032)
Car_person	-.04793*** (.014)	-.04288 (.035)	-.05691** (.025)	-.0295 (.035)	-.04646* (.024)	-.07171 (.057)
WP_ab	.06078*** (.010)	.06512** (.030)	.01542 (.019)	.06549** (.028)	.105*** (.021)	.05272** (.023)
Wp_c	-.168*** (.031)	.03817 (.102)	-.04751 (.058)	-.193*** (.056)	.434** (.176)	-.400*** (.077)
Wp_celse	-.05294 (.034)	.005291 (.065)	-.08086 (.069)	-.01864 (.064)		-.294*** (.112)
Wp_else	-.07316*** (.028)	.068 (.058)	-.175*** (.042)	-.02183 (.073)	-.764*** (.248)	-.193* (.107)
Adj. R-squared	**.252**	**.160**	**.236**	**.131**	**.226**	**.257**
F-value	**57.747*** **	**7.307*** **	**16.982*** **	**6.433*** **	**14.952*** **	**11.758*** **
Residual *d.f*	**5180**	**835**	**1373**	**913**	**1172**	**784**

*** sig. at 1 percent level (p<0.01) ** sig. at 5 percent level (p<0.05) * sig. at 10 percent level (p<0.1)

Two common socio-economic variables - family stage and social class - have only marginal effects on the propensity to spend locally, although the latter exhibited a strong influence through the whole sample. In Portugal, retired households tend to use their local town more than other life stage groups. Higher occupational groups, including managerial and other non-manual workers, tend to spend less in their local area. As one might expect, car

ownership proves to be a more useful predictor of spending patterns. Increasing levels of car ownership (measured in terms of cars per person in the household) results in a decreasing level of low order spend, although the variable is only statistically significant in the French and Portuguese models. The influence of commuting on low order spending patterns is evident in the five countries, with coefficients revealing some interesting patterns in this regard. In all countries, those households where all employed adults work within the study area are found to spend proportionally more on low order goods and services in the area, although the coefficient is not significant in the French model. In the Netherlands, where one or both adults work in the district outside the local economy (zone C) low order spend in zones A and B is significantly reduced, another clear indication of journey chaining, whereby shopping is combined with the journey to work. However, beyond this zone coefficients lose their statistical significance, implying that the effect is not so strong when the distance travelled to work increases. In Poland, however, this effect is equally strong. Regardless of distance travelled to work, commuting has a negative influence on the retention of local consumption expenditure.

Unlike the pooled sample results, indigeneity is not such a useful predictor of low order integration, having no significant influence in the UK, France or Poland. In the Netherlands, those households that have always resided in the study area are found to spend proportionally more on low order goods and services within the local economy. In Portugal, wider effects of in-migration are evident, whereby residents who have moved to the study area from elsewhere within the last five years spend proportionally less in their local town. Beyond five years, however, the effect fails to have a significant effect. One could speculate that this is because old shopping habits are retained for a period of time following the move, perhaps due to loyalty, trust or social and kinship networks.

Finally, it is interesting to note that the size of the retail market for goods and services in the study area is only significant in the Dutch and Portuguese models[17]. In the Netherlands the directional influence is as expected: as the size of the local supply of goods and services increases so does the proportional spend within that market. In Portugal, however, an inverse relationship between market size and local demand is evident.

3.7.5.6 Household - high order purchases

The final set of models in Table 3.31 examines predictors of **local high order integration** in the five countries. As with low order expenditure, it is areas of above average agricultural employment that appear to foster high order spend to the greatest degree. In Portugal it is the smaller agricultural town (Mirandella), in Poland it is larger towns and in the UK town size is not a significant issue. Conversely, small towns in peri-urban areas do not perform such a strong high order function, although medium sized towns in the UK (Saffron Walden) and in Poland (Lask) do. In the UK this is likely to be because the supply of high order goods and services is higher in larger towns where the range of retail functions is broader. Tourism towns are only significantly different from other town types in Portugal and Poland. In the

[17] The variable (ln)Serv falls out of the UK and Polish models due to multi-collinearity.

former they are shown to foster a greater proportion of local high order spend and in Poland they are associated with weaker levels of local integration.

Despite the influence of agricultural towns on high order integration, only in France do we find a significant difference between farm and non-farm households, with the former tending to access high order goods and services in the town to a greater degree. However, on aggregate, hinterland households spend proportionally less on high order goods and services in the local economy than those residing in French towns. This mirrors the patterns also found in the Netherlands and Poland.

Table 3.31. Households - high order

	All countries	**Country**				
Explanatory variables		**UK**	**France**	**NL**	**Portugal**	**Poland**
Constant	2.842*** (.176)	.2317*** (.349)	-.926 (10.253)	1.887*** (.558)	5.854*** (.442)	2.845*** (.519)
C_UK	-.250*** (.022)	-	-	-	-	-
C_NL	-.0673*** (.025)	-	-	-	-	-
C_PO	-.150*** (.030)	-	-	-	-	-
C_PR	.05686** (.025)	-	-	-	-	-
Agri_small	.08309*** (.022)	.123** (.062)	.009298 (.149)		.136*** (.035)	.08012 (.054)
Agri_med	.194*** (.022)	.243*** (.064)	.04382 (.206)	.0382 (.055)		.301*** (.062)
Tour_small	-.06073** (.025)	.08489 (.069)	-.721 (1.602)	-.118 (.078)	.185*** (.055)	-.139* (.071)
Peri_small	-.118*** (.023)	-.144** (.066)	-.417 (.354)	-.172* (.097)	-.220*** (.043)	-.103 (.068)
Peri_med	-.03689 (.024)	.157** (.068)	-.115 (.469)	-.09698 (.075)	-.06782* (.040)	.122* (.072)
Loc_hinter	-.05307*** (.015)	.00232 (.040)	-.06388** (.025)	-.07255* (.039)	-.01728 (.028)	-.139*** (.047)
(ln)Serv	-.01043 (.017)		.590 (1.575)	.06501 (.062)	-.518*** (.056)	
Farm	.03776* (.020)	.08631 (.077)	.135*** (.038)	.05198 (.050)	.01317 (.046)	-.008434 (.050)
Fam_ret	.003026 (.027)	.01645 (.067)	.02835 (.046)	.02747 (.059)	-.03453 (.066)	.006068 (.096)
Fam_chm12	-.05002** (.025)	-.06982 (.077)	-.03792 (.049)	-.02331 (.067)	-.04352 (.047)	-.03972 (.055)
Fam_adult	-.04996*** (.016)	-.008623 (.049)	-.006013 (.032)	-.07381* (.041)	-.104*** (.030)	-.04087 (.042)
Ind_ab	.06548*** (.024)	.02116 (.066)	.06962 (.050)	.08336** (.038)	.01893 (.062)	-.238 (.184)
Ind_cd15	-.218*** (.040)	-.06991 (.102)	-.221*** (.065)	-.132 (.109)	-.323*** (.110)	-.548** (.219)
Ind_cdm5	-.0122 (.036)	.01439 (.121)	-.01546 (.072)	.009952 (.053)	-.076 (.098)	-.312 (.237)
Ind_othl5	-.142*** (.034)	-.04205 (.081)	-.158*** (.060)	-.139* (.075)	-.234*** (.084)	-.227 (.275)

Table 3.31. Households - high order (continued)

	All countries	Country				
Explanatory variables		**UK**	**France**	**NL**	**Portugal**	**Poland**
Soc_manag	-.110*** (.023)	-.02125 (.060)	-.02262 (.056)	-.06247 (.061)	-.211*** (.043)	-.169*** (.063)
Soc_ski_noman	-.09099*** (.019)	-.04397 (.057)	-.173*** (.035)	-.01338 (.054)	-.110** (.042)	-.211** (.107)
Soc_ski_man	-.101*** (.020)	.01519 (.064)	-.0964*** (.035)	-.051516 (.048)	-.140*** (.040)	-.174*** (.055)
(ln)Income	-.162*** (.015)	-.152*** (.037)	-.163*** (.029)	-.133*** (.037)	-.142*** (.031)	-.159*** (.055)
Highpurch	-.002809*** (.000)	-.002411** (.001)	-.0032*** (.001)	-.001897* (.001)	-.003477*** (.001)	-.001758 (.001)
Purchead	.0000363*** (.000)	-.000004842 (.000)	.000006 (.000)	.00005137** (.000)	.00004195*** (.000)	.0001156 (.000)
Saving	.08173*** (.015)	.03885 (.037)	.08295*** (.029)	.06903** (.033)	.07867** (.033)	.139*** (.052)
Car_person	-.05983*** (.020)	-.07302 (.050)	-.8728** (.034)	-.006487 (.048)	-.02332 (.041)	-.05787 (.091)
WP_ab	.01665 (.015)	.0095 (.043)	-.02668 (.026)	.03183 (.038)	-.02139 (.036)	.03705 (.037)
Wp_c	-.162*** (.046)	-.138 (.146)	-.0001893 (.079)	-.126 (.076)	-.366 (.304)	-.399*** (.125)
Wp_celse	-.04958 (.049)	-.0112 (.093)	.02162 (.094)	-.07009 (.086)		-.144 (.181)
Wp_else	-.09512** (.041)	-.001743 (.083)	-.164*** (.057)	.04861 (.099)	-.902** (.428)	-.180 (.172)
Adj. R-squared	**.218**	**.152**	**.303**	**.062**	**.240**	**.184**
F-value	**47.897*** **	**6.931*** **	**23.520*** **	**3.392*** **	**16.093*** **	**8.035*** **
Residual *d.f*	**5180**	**835**	**1373**	**913**	**1172**	**784**

*** sig. at 1 percent level (p<0.01) ** sig. at 5 percent level (p<0.05) * sig. at 10 percent level (p<0.1)

As in the case of low order integration, there is a consistent inverse correlation between household income and the proportion of high order expenditure attributed to the local economy in all countries. The income effect is also consistent with the high order expenditure ratio (i.e. the proportion of household expenditure that is on high order goods and services). In all countries, except in Poland, households which spend proportionally more on high order goods and services source proportionally less of them within the locality. The savings proxy is positively correlated with high order integration, indicating that a higher amount of household savings is associated with a higher proportion of local high order spend. Of course this variable is picking up actual, as opposed to proportional, spending behaviour and one might expect higher income groups to spend more in their local area than lower income groups despite the fact that they spend proportionally less.

Although car ownership levels are inversely correlated with the proportion of local high order spend as one might expect, the effect is only statistically significant in the French model. It is also evident that, in general, high order shopping is combined with the work journey to a lesser extent than is low order shopping. There are, however, some patterns to report. In Poland, households where members work in the adjacent zone (zone C) spend proportionally less on high order goods and services in the local economy. Likewise, in France and Portugal there is an equivalent effect where both employed adults work elsewhere in the country (i.e. beyond zone C).

Indigeneity has a more significant influence over high order purchasing patterns in comparison to low order. The effect of these variables in the Netherlands and Portugal mirrors that of low order integration. In the Netherlands it is those households that have resided in the study area all of their lives that are found to spend proportionally more on high order goods and services within the local area and in Portugal it is those residents who moved to the study area from zone C during the last five years that spend proportionally less in their local town. An equivalent pattern is also found in France with respect to high order purchasing and in all three countries the significant influence of in-migration is extended to those residents who have moved from all other zones within the last five years.

3.7.5.7 Summary of OLS results

A summary of the results from the three sets of OLS regression analyses is presented in Tables 3.32 to 3.34. For each country the relevant entity and environment characteristics associated with strong and weak local economic integration is given. Presenting the findings in this way allows some of the main patterns to be identified. Further discussion and explanation of the findings is given in Section 4.2.

Examining the local economic integration of firms, we find that town locations, along with older, smaller, less productive firms using a higher proportion of unskilled labour and having a local manager are consistently associated with relatively strong local downstream linkages. Conversely, manufacturing firms and producer services stand out as sectors which are widely associated with weak downstream integration. The lack of influence of the firm's environment characteristics on the sales integration is more surprising. Neither the size of the local final demand for the firm's produce, nor the local competition between firms belonging to the same sector, have any influence on the local firm's sales. The only characteristic of the economic firm's environment that plays a positive role on sales integration is the potential market size of the inputs needed by the firm. In the case of both firm and farm activity patterns, Portugal and Poland share some unique characteristics with respect to predictors of local integration. Indeed, it follows that there should be certain similarities between the two countries as both are distinguished from the other three countries as having relatively strong degrees of local economic integration in and around small and medium-sized towns. In addition to the attributes described above, strong downstream linkages in Portugal and Poland are also fostered in medium sized agricultural towns and by owner managers who are indigenous to the local area.

Across the five countries a high degree of local sourcing by non-agricultural firms is most consistently associated with towns in areas of above average agricultural employment, firms in the construction sector, less productive and low input-intensive firms with owner/managers who are indigenous to the local area. In addition, local market size plays a consistent role: a larger size of the required input and larger final demand markets tends to increase the local integration of firm purchases. In Portugal and Poland, producer services are also found to foster relatively strong local upstream linkages in comparison to other sectors. Thus, such firms are identified as potential generators of net income (selling widely, purchasing locally) in these countries.

Table 3.32. Summary of OLS regression results for local economic integration: firms

UK	France	Netherlands	Portugal	Poland
Strong integration (Sales):	**Strong integration (Sales):**	**Strong integration (Sales):**	**Strong integration (Sales):**	**Strong integration (Sales):**
Town locations National branches Agricultural firms Consumer services Lower labour productivity Local supply of skilled labour exceeds demand	Medium tourism and peri-urban towns Town locations Older firms Smaller firms Demand for skilled labour exceeds local supply	Town locations Older firms Smaller firms Indigenous owner/managers Lower labour productivity Weak local competition Local supply of skilled labour exceeds demand Smaller local goods market Local input supply exceeds demand	Medium agricultural towns Small peri-urban towns Older firms Smaller firms Indigenous owner/managers Lower labour productivity Local supply of skilled labour exceeds demand Local input supply exceeds demand	Medium agricultural towns Town locations Consumer services Older firms Smaller firms Indigenous owner/managers Strong local competition Demand for skilled labour exceeds local supply Smaller local goods market
Weak integration (Sales):	**Weak integration (Sales):**	**Weak integration (Sales):**	**Weak integration (Sales):**	**Weak integration (Sales):**
Small agricultural towns Medium tourism towns Peri-urban towns Hinterland locations Manufacturing firms Higher labour productivity Demand for skilled labour exceeds local supply	Small peri-urban towns Hinterland locations Agricultural firms Manufacturing firms Producer services Younger firms Larger firms Local supply of skilled labour exceeds demand	Hinterland locations Agricultural firms Manufacturing firms Producer services Younger firms Larger firms Higher labour productivity Strong local competition Demand for skilled labour exceeds local supply Larger final goods market Input demand exceeds local supply	National branches Manufacturing firms Producer services Younger firms Larger firms Higher labour productivity Demand for skilled labour exceeds local supply Input demand exceeds local supply	Hinterland locations International branches Construction firms Producer services Younger firms Larger firms Weak local competition Local supply of skilled labour exceeds demand Larger final goods market

Table 3.32. Summary of OLS regression results for local economic integration: firms (continued)

Strong integration (Purchases):	**Strong integration (Purchases):**	**Strong integration (Purchases):**	**Strong integration (Purchases):**	**Strong integration (Purchases):**
Medium agricultural towns Agricultural firms Construction firms Low intermediate goods intensity Lower labour productivity Local supply of skilled labour exceeds demand Larger final goods market Local input supply exceeds demand	Small agricultural and tourism towns Agricultural firms Construction firms Indigenous owner/managers Larger final goods market Local input supply exceeds demand	Construction firms Indigenous owner/managers Low intermediate go pods intensity Lower labour productivity Weak local competition Larger final goods market Local input supply exceeds demand	Medium agricultural towns Small tourism towns Independent local firms Construction firms Producer services Indigenous owner/managers Low intermediate goods intensity Larger final goods market Local input supply exceeds demand	Medium agricultural and peri-urban towns Agricultural firms Construction firms Producer services Indigenous owner/managers Low intermediate goods intensity Lower labour productivity Strong local competition Demand for skilled labour exceeds local supply Smaller final goods market Local input supply exceeds demand
Weak integration (Purchases):	**Weak integration (Purchases):**	**Weak integration (Purchases):**	**Weak integration (Purchases):**	**Weak integration (Purchases):**
Manufacturing firms High intermediate goods intensity Higher labour productivity Demand for skilled labour exceeds local supply Smaller final goods market Input demand exceeds local supply	Smaller final goods market Input demand exceeds local supply	Small agricultural and tourism towns Medium peri-urban towns High intermediate goods intensity Higher labour productivity Strong local competition Smaller final goods market Input demand exceeds local supply	High intermediate goods intensity Smaller final goods market Input demand exceeds local supply	Small tourism towns High intermediate goods intensity Higher labour productivity Weak local competition Local supply of skilled labour exceeds demand Larger final goods market Input demand exceeds local supply

Table 3.33. Summary of OLS regression results for local economic integration: farms

UK	France	Netherlands	Portugal	Poland
Strong integration (Sales):	**Strong integration (Sales):**	**Strong integration (Sales):**	**Strong integration (Sales):**	**Strong integration (Sales):**
Smaller farms (labour) In-migrant farmers High land productivity	Smaller farms (labour) Longer farming generations Low land productivity	Low intermediate goods intensity	Medium agricultural towns Small peri-urban towns Smaller farms (labour) Shorter farming generations Smaller proportions of agricultural income Low land productivity	Medium agricultural towns Small peri-urban towns Smaller farms (labour) Smaller proportions of agricultural income Low labour productivity
Weak integration (Sales):	**Weak integration (Sales):**	**Weak integration (Sales):**	**Weak integration (Sales):**	**Weak integration (Sales):**
Cereals and mixed cropping farms Larger farms (labour) Low land productivity	Medium peri-urban towns Livestock farms Cereals and mixed cropping farms Shorter farming generations High land productivity	High intermediate goods intensity	Small agricultural towns Larger farms (labour) Longer farming generations Greater proportions of agricultural income High land productivity	Small agricultural towns Tourism towns Larger farms (labour) Greater proportions of agricultural income High labour productivity
Strong integration (Purchases)	**Strong integration (Purchases)**	**Strong integration (Purchases)**	**Strong integration (Purchases)**	**Strong integration (Purchases)**
Small agricultural towns Livestock farms Permanent crop farms Larger farms (area) Sole ownership farms Shorter farming generations Higher land productivity	Agricultural and tourism towns Lower labour productivity Low intermediate goods intensity	Larger farms (area) Longer farming generations Low intermediate goods intensity	Agricultural and tourism towns Livestock farms Cereal, mixed and permanent cropping farms Smaller farms (area) Indigenous farmers Smaller proportions of agricultural income Lower labour productivity	Medium agricultural towns Smaller farms (area) Indigenous farmers Smaller proportions of agricultural income Higher labour productivity Lower land productivity Low intermediate goods intensity
Weak integration (Purchases)	**Weak integration (Purchases)**	**Weak integration (Purchases)**	**Weak integration (Purchases)**	**Weak integration (Purchases)**
Tourism towns Medium peri-urban towns Smaller farms (area) Longer farming generations Lower land productivity	Medium per-urban towns Livestock farms Higher labour productivity High intermediate goods intensity	Smaller farms (area) Shorter farming generations High intermediate goods intensity	Larger farms (area) Sole ownership farms Greater proportions of agricultural income Higher labour productivity	Tourism towns Larger farms (area) Greater proportions of agricultural income Lower labour productivity Higher land productivity High intermediate goods intensity

Table 3.34. Summary of OLS regression results for local economic integration: households

UK	France	Netherlands	Portugal	Poland
Strong integration (Low order):	**Strong integration (Low order):**	**Strong integration (Low order):**	**Strong integration (Low order):**	**Strong integration (Low order):**
Medium agricultural towns Town locations Lower incomes Local workplace	Town locations Lower incomes Lower car ownership Unskilled occupational groups	Medium agricultural towns Town locations Non-farm households Indigenous residents Lower incomes Local work place	Small agricultural towns Tourism towns Town locations Retired households Lower occupational groups Lower incomes Local/extended local workplace	Town locations Unskilled occupational groups Lower incomes Local workplace
Weak integration (Low order):	**Weak integration (Low order):**	**Weak integration (Low order):**	**Weak integration (Low order):**	**Weak integration (Low order):**
Small tourism towns Small peri-urban towns Hinterland locations Higher incomes Commuters	Hinterland locations Higher incomes Higher car ownership Commuters	Small tourism towns Small peri-urban towns Hinterland locations Farm households Higher incomes Commuters	Peri-urban towns Hinterland locations Recent in-migrants Higher occupational groups Higher incomes Commuters	Hinterland locations Skilled occupational groups Commuters
Strong integration (High order)	**Strong integration (High order)**	**Strong integration (High order)**	**Strong integration (High order)**	**Strong integration (High order)**
Agricultural towns Medium peri-urban towns Lower incomes	Town locations Farm households Unskilled occupational groups Lower incomes Lower car ownership	Town locations Indigenous residents Lower incomes	Small agricultural towns Small tourism towns Unskilled occupational groups Lower incomes	Medium agricultural towns Medium peri-urban towns Town locations Unskilled occupations Lower incomes
Weak integration (High order)	**Weak integration (High order)**	**Weak integration (High order)**	**Weak integration (High order)**	**Weak integration (High order)**
Small peri-urban towns Higher incomes	Hinterland locations Non-farm households Recent in-migrants Higher incomes Higher car ownership Commuters	Small peri-urban towns Hinterland locations Adults without dependants Recent in-migrants Higher incomes	Peri-urban towns Adults without dependants Recent in-migrants Higher incomes Commuters	Hinterland locations Recent in-migrants Extended local workplace

Moving onto the farming sector, it is workforce size that most consistently predicts the degree to which farms sell their produce locally. In all cases, smaller farms are significantly more integrated than are larger farms. In Portugal and Poland, strong downstream linkages in the farming sector are also fostered to a greater degree in medium-sized agricultural towns and in peri-urban towns. A further characteristic unique to these two countries is the reliance on agricultural income. With respect to both sales and purchases, it is those farms which derive a greater proportion of their income from non-agricultural sources that are most strongly integrated into their locality. This could either be income derived from off-farm sources or from diversification projects on the farm. Further characteristics associated with strong local sourcing in Portugal and Poland are smaller land areas, indigenous farmers and towns in agricultural areas. In the remaining three countries it is only the latter which is consistently associated with strong local upstream integration.

In terms of household activity patterns, Poland and Portugal are not so distinct from the other three countries. A stronger degree of local low order consumption expenditure is fostered by households which have town locations, are on lower incomes, work within the local area and, to a lesser degree, live in areas of relatively high agricultural employment. In all cases it is evident that people who commute outside of their local area tend to combine the work journey with their low order shop and, as one might expect, peri-urban towns tend to suffer a higher degree of income leakage than do other town types. Income level is also the most important predictor of high order integration across the countries, although commuting plays a lesser role in predicting the location of high order shopping. In-migration, however, is found to be an important driver of high order spending patterns. In four out of the five countries in-migrants who have moved into the local area within the last five years are found to spend proportionally less on high order goods and services in their local area. A possible explanation is that newcomers retain their previous lifestyles and shopping habits for a period of time, in this case we can suggest for at least five years.

The following section broadens the analysis of economic integration to include not only the local economy but also the regional, national and international economy. It also combines the various types of transaction to examine the relationship between, for example, sales, purchases and employment, across the various geographic zones. Having identified the key characteristics of firms, farms and households that are associated with local integration in the five countries, we can now move on answer further questions that may be of interest to policy makers. For example, what types of firm draw in external income from exports but also help to generate income through local sourcing and employment? Or, what types of household work locally but spend their income outside of the local area?

3.8 Multivariate analysis of spatial behaviours[18]

Analysis of spatial behaviour differs from the analysis of local economic integration in two main respects. First, it takes account of the spatial distribution of transactions throughout the entire economy (Zones A-H); and second, it attempts to classify firms according to their

[18] This work was not planned in the Technical Annex of the Marketowns study. It should be considered as an attempt to add additional value to the analysis.

spatial behaviour in different markets at the same time. In the case of firms and farms, it combines sales, purchases and unemployment and then takes into account the firm's relationships in their inputs, outputs and labour markets. In the case of households, it combines low order purchases, high order purchases and employment. Firms and farms are combined to allow a direct comparison between the spatial behaviour of the two entities.

After creation of variables to represent appropriate distributions and combinations of spatial economic behaviour, the analysis comprises the following two stages:

1. Factor and cluster analysis to identify the main dimensions of spatial economic activity throughout the local, regional, national and international economy and to classify entities according to common traits of spatial economic behaviour;
2. Logit analysis to identify the key characteristics of entities associated with the various classifications of spatial economic behaviour (cluster membership).

3.8.1 Choice of spatial levels for analysing spatial behaviours

Firms and farms can be classified according to different combinations of purchasing, sales and employment behaviour. The aim is to identify new variables based on the proportions of purchases, sales and employment across the eight zones (A-H). Thus, a maximum of 24 variables could be assembled for subsequent analysis (eight relating to purchases, sales and employment respectively).

For logical and technical reasons, we chose to distinguish four spatial levels for analysing spatial behaviours of the local economic agents. The local economy combines Zones A, B and C (the so-called extended local level); the regional economy is formed by the Zones D and E (i.e. county and region); the national economy comprises Zone F and the two last Zones (G for European level and H for the other countries) form the international economy. While these four categories were used for analysing firm sales and purchasing behaviour, the distinction between the national and international level is obviously not useful for analysing the employment behaviour of the firms. Likewise, household (low and high order) purchasing behaviour was also analysed by merging national and international economies. Finally, employment behaviour of households was based on only two categories: extended local level and other levels (i.e. combining regional, national and international economies).

3.8.2 Firm and farm spatial behaviours: factor and cluster analyses

The 11 variables devised for inclusion in this analysis are summarised in Table 3.35. They are used in a Principal Component Analysis (PCA) including both firms and farms. The main factors resulting from this PCA are then used in a cluster analysis to distinguish some main spatial behaviours of farming and non-farming firms.

Table 3.35. Variables devised for inclusion in subsequent analysis

Variable name	Definition	Description
Ach_abc	Purchases in zones A, B and C	Local purchases
Ach_de	Purchases in zones D and E	Regional purchases
Ach_f	Purchases in zone F	National purchases
Ach_gh	Purchases in zones G and H	International purchases
Vent_abc	Sales in zones A, B and C	Local sales
Vent_de	Sales in zones D and E	Regional sales
Vent_f	Sales in zone F	National sales
Vent_gh	Sales in zones G and H	International sales
Empl_abc	Employment in zones A, B and C	Local labour
Empl_de	Employment in zones D and E	Regional labour
Empl_fgh	Employment in zones F, G and H	National and international labour

The above variables are entered into a Principal Component Analysis, the results of which are given in Table 3.36. Five distinct dimensions of firm/farm spatial economic behaviour explain 75% of the variance in the data set. The first factor, which explains 24% of the total variance, is characterised by a correlation between local sales and regional employment. Factor 2, which explains 15% of the total information, captures another type of firm, which are characterised by local sales and local (as opposed to regional) employment. Factor 3, which explains the same variance as the previous one, focuses on purchasing activity at the local level. Firms scoring highly on this factor would tend to source a relatively high proportion of their inputs locally, as opposed to elsewhere in the region. Factor 4 shows an inverse correlation between national purchasing and regional sales. Finally, Factor 5 tends to isolate firms with a strong level of international integration.

Table 3.36. Results of the Principal Component Analysis for firm and farm spatial behaviours

EigenValue	**1**	**2**	**3**	**4**	**5**
Value	2.599	1.628	1.538	1.382	1.157
% variability	0.2363	0.1480	0.1398	0.1256	0.1052
% cumulate	0.2363	0.3842	0.5241	0.6497	0.7549
	factor 1	**factor 2**	**factor 3**	**factor 4**	**factor 5**
achat_Abc	-0.45841	0.23077	0.76193	-0.35929	-0.09129
achat_de	-0.01788	-0.38233	-0.69156	-0.38395	0.29627
achat_f	0.38307	-0.01564	-0.22600	0.71031	-0.48552
achat_gh	0.35656	0.23436	0.00631	0.19812	0.58396
vent_Abc	-0.70916	-0.60171	0.12265	0.30862	0.09954
vent_de	0.29780	0.24428	-0.32186	-0.63503	-0.35983
vent_f	0.55837	0.43356	0.09645	0.10944	-0.12548
vent_gh	0.31333	0.34864	0.07304	0.11584	0.57345
emploi_abc	-0.74195	0.55613	-0.34679	0.13606	-0.00636
emploi_de	0.64450	-0.55615	0.20054	-0.12433	0.00820
emploi_fgh	0.38393	-0.15196	0.36665	-0.05901	-0.00168

A hierarchical cluster analysis was then performed to classify firms and farms in several groups according to their respective contributions to the five dimensions of spatial economic activity identified by the PCA (i.e. factor scores were entered into a hierarchical cluster

analysis). An iteration process helps to identify a seven-cluster solution as being optimal in terms of homogeneity.

The seven groups are first examined in terms of their contribution to each of the previously defined factors; this shows a sufficient level of differentiation between the groups in terms of spatial patterns of sales, purchases and employment activity. This differentiation is examined more closely in Table 3.37, which, for each of the seven clusters, shows the mean proportions of sales, purchases and employment across the various geographical divisions. The most influential proportions for each cluster are highlighted. Standard deviations are shown in italics.

Table 3.37. Classification results for the seven clusters of firms and farms

		Purchases (%)				**Sales (%)**				**Employment (%)**		
Cluster	(N)	ABC	DE	F	GH	ABC	DE	F	GH	ABC	DE	FGH
I	1235	95,39	3,51	0,63	0,47	96,98	1,86	0,74	0,42	98,53	0,86	0,61
		8,82	*7,20*	*2,73*	*3,64*	*7,97*	*5,43*	*4,03*	*2,97*	*6,70*	*4,97*	*4,37*
II	870	29,88	56,28	12,32	1,52	95,39	2,85	1,42	0,34	99,45	0,54	0,01
		25,64	*31,94*	*18,24*	*6,67*	*9,54*	*6,56*	*6,01*	*2,47*	*2,93*	*2,92*	*0,30*
III	513	44,43	42,38	10,24	2,95	17,36	70,60	9,30	2,74	99,57	0,43	0,00
		34,87	*33,20*	*20,17*	*11,55*	*21,82*	*30,98*	*20,12*	*9,52*	*2,17*	*2,17*	*0,00*
IV	546	9,96	7,24	80,26	2,54	64,65	11,97	20,49	2,89	93,99	4,94	1,07
		12,62	*11,39*	*18,36*	*7,42*	*38,32*	*19,14*	*32,11*	*10,35*	*13,24*	*11,79*	*5,94*
V	285	80,69	10,57	8,11	0,62	26,42	21,12	51,59	0,87	97,39	1,58	1,04
		19,96	*14,34*	*14,29*	*3,50*	*24,73*	*21,93*	*38,74*	*3,49*	*7,88*	*5,90*	*5,42*
VI	217	33,05	8,72	13,37	44,87	23,42	5,93	24,22	46,43	87,33	9,18	3,49
		37,94	*16,95*	*22,14*	*39,61*	*34,97*	*12,37*	*31,48*	*39,04*	*23,82*	*20,55*	*12,22*
VII	217	31,64	39,55	26,00	2,81	46,38	25,44	26,43	1,75	40,73	43,04	16,22
		34,84	*35,71*	*33,10*	*10,73*	*43,02*	*33,33*	*37,17*	*7,15*	*24,71*	*31,88*	*28,18*
Total	3883	52,42	24,21	19,24	4,14	68,48	15,39	12,21	3,92	94,04	4,37	1,59
		39,83	*31,77*	*31,30*	*15,70*	*39,79*	*28,10*	*26,78*	*15,56*	*17,42*	*14,73*	*9,10*

This classification enables us to differentiate these seven groups according to the characteristics of their spatial behaviours. Thus, we can define these seven cluster groups in terms of their integration into local, regional, national and international markets for sales, purchases and employment. A summary of this information is given in Table 3.38.

Firms in group I have a local behaviour in terms of sales, purchases and employment while firms in group II differ by having more regional purchases. Firms in group III have a regional behaviour (except in terms of employment), while firms in group IV combine national purchases with local sales and employment. Firms in group V exhibit an inverse behavioural pattern by combining national sales with local purchases and employment. Group VI comprises internationally integrated firms with international sales and purchases, whilst retaining local employment. Finally, group VI assembles firms that are sourcing a significant part of their workforce from the regional labour market.

As one might expect, the most populous categories are groups I and II, which are mostly locally integrated. A substantial proportion of firms and farms (32%) are classified as having

entirely local spatial behaviours, although the distribution is skewed towards farms. Whilst 52% of farms are classified in this category only 23% of firms are locally integrated in terms of sales, purchases and employment.

Table 3.38. Summary of classification results: integration by firms and farms into local, regional, national and international markets for the seven cluster groups

Group	n Firms and Farms	n Firms	n Farms	Purchases	Sales	Employ-ment
I = Local behaviour	1235	620	615	Local	Local	Local
II = Local behaviour with regional purchases	870	761	109	Regional	Local	Local
III = Regional sales and purchases	513	257	256	Regional	Regional	Local
IV = Local behaviour with national purchases	546	526	20	National	Local	Local
V = Local behaviour with national sales	285	155	130	Local	National	Local
VI = International behaviour	217	190	27	Inter-national	Inter-national	Local
VII = Regional labour market	217	179	38	Varied	Varied	Regional
Total	3883	2688	1195			

Those entities exhibiting local sales and employment combined with regional or national purchasing comprise mostly the firms: 30% of them belong to the first category (group II) while 20% belong to the second (group IV). Conversely, the regional selling and purchasing group (group III) as well as the national selling group (group V) comprise mainly farms: 21% of farms (against 10% of firms) are regionally oriented for both sales and purchases, while 11% of farms (and only 6% of firms) sell their produce in national markets. Finally, the last two categories are made up of some firms and only a few farms. Those having an international behaviour (group VI) make up 7% of firms and 2% of farms and those employing a regional workforce (group VII), comprise 7% of firms and 3% of farms.

3.8.3 Factors explaining differences in spatial behaviours of firms and farms: a multinomial logit analysis

The aim of the logit analysis is to identify the characteristics of entity and local environment associated with the various forms of spatial economic behaviour identified by the factor and cluster analyses. Two separate logit analyses are carried out; one containing firms and one containing farms. A division between firms and farms is made because the exploratory variables devised to differentiate between their characteristics are unique to the two data sets.
Apart from dealing with spatial economic behaviour across the entire economy, and not just the local economy, the logit analysis mainly differs from the OLS regression by the nature of the dependent variable. This is categorical because it is based on the groups derived from the cluster analysis, thus it is necessary to use a multinomial logit model utilising the Maximum Likelihood estimation method. Furthermore, although the two methods utilise the same set of predictor variables, all exploratory variables are now categorical, which poses a unique set of

problems with respect of multi-collinearity. It is therefore necessary to screen all exploratory variables and select them on the basis of their degree of collinearity with other categorical variables; thus not all variables are incorporated into the analyses. All variables derived and selected for logit analysis following this initial screening are given in Appendices 28 and 29. In each case, one category of an explanatory variable is defined as the reference category; the effect of all other categories are then compared to the reference category.

Results of the logit analysis for firms are presented in Table 3.39. These results nearly always confirm the results obtained by the OLS regression concerning the predictors of local integration and they also allow identification of the factors associated with wider forms of spatial economic behaviour.

Examining the geographical components, it appears that the effect of study area size and type on the spatial behaviour of the firms is relatively weak. Firms located in medium-sized towns are less often internationally or nationally oriented in terms of purchases. Firms in tourism study areas are more internationally oriented while those in peri-urban areas are more often locally integrated. The proximity to urban areas allows access to larger markets, and it follows that firms located in tourism areas are more able to develop links with international markets. Compared to French firms located in small and medium-sized towns and their hinterland, Portuguese and Polish firms are more locally integrated, as are their households, while English and Dutch firms are less regionally oriented. However, due to historical development, Dutch firms appear to be more internationally integrated.

Compared to independent firms (the large majority in the sample), national branch plants tend to have a nationally orientated purchasing behaviour. They also make more use of the regional labour market. As one might expect, local branches of international firms tend to access international output and input markets and to make greater use of regional or national input markets. Firm size influences their spatial behaviour in a similar way. Whilst previous results have shown a negative correlation between work force size and the strength of local integration, further exploration of the data reveals that only the largest firms have access to national or international markets. In the same way, whilst results of the OLS regression revealed that low labour productivity is associated with local purchasing and selling behaviour, the present analysis shows that firms with intermediate labour productivity tend to buy their inputs on the national markets, or to adopt an international behaviour in terms of both sales and purchases. In addition, when the labour productivity is very high, firms tend to adopt all behaviours except the entirely local one. Consistent with previous results, firm intensity in intermediate goods tends to favour regional and national purchasing behaviours as well as regional and international behaviours in terms of both sales and purchases; as one might expect it does not favour national sales combined with local purchases and labour.

Table 3.39. Results of the spatial behaviour analysis for firms

		Dependent variables						
Independent variables	**N**	**Local behaviour**	**Local behaviour with regional purchases**	**Regional behaviour**	**Local behaviour with national purchases**	**Local behaviour with national sales**	**Inter-national behaviour**	**Regional labour behaviour**
N	**2688**	**620**	**761**	**257**	**526**	**155**	**190**	**179**
Intercept		Ref	-1.9261	-0.8009	-2.3850***	-1.3289	-5.5674***	-2.7774*
			(0.000)	(0.7843)	(0.6081)	(1.2179)	(1.8181)	(1.4394)
Town size (reference: Small town, 1321 firms)								
Medium-sized town	1367	Ref	-0.1121	0.0280	-0.2406**	0.2620	-0.5389***	-0.1696
			(0.6700)	(0.1542)	(0.1155)	(0.1966)	(0.1834)	(0.1971)
Study area type (reference: Agricultural area, 882 firms)								
Tourism town	898	Ref	-0.0850	0.2168	-0.0637	-0.0906	0.6440***	-0.0646
			(0.1522)	(0.1932)	(0.1417)	(0.2615)	(0.2469)	(0.2373)
Peri-urban town	908	Ref	-0.6422***	-0.0313	-0.8918***	-0.5753***	-0.1186	-0.2897
			(0.1370)	(0.1723)	(0.1373)	(0.2178)	(0.2027)	(0.2141)
Country (reference: France, 345 firms)								
United Kingdom	227	Ref	-0.4776	-0.7892**	0.3511	0.000560	0.5991	-0.6671**
			(0.3268)	(0.3115)	(0.2290)	(0.3987)	(0.4435)	(0.3233)
Netherlands	532	Ref	-0.8035***	-0.6693***	0.2906*	-0.0382	0.6837**	-0.1694
			(0.2459)	(0.2361)	(0.1765)	(0.3086)	(0.2705)	(0.2464)
Poland	730	Ref	-1.2308***	-1.8714***	-0.7289***	-1.5408***	-0.9054***	-1.6873***
			(0.2523)	(0.2835)	(0.2286)	(0.3831)	(0.3338)	(0.3620)
Portugal	854	Ref	-0.9401***	-1.5438***	-1.2117***	-1.1537***	-0.0225	-2.4237***
			(0.1484)	(0.1826)	(0.1457)	(0.2483)	(0.2004)	(0.2852)
Location (reference: Zone B, i.e. hinterland, 1034 firms)								
In town centre	1654	Ref	0.1716	0.1069	0.4083***	-0.2003	0.0944	-0.0458
			(0.1218)	(0.1517)	(0.1242)	(0.1873)	(0.1803)	(0.1982)
Firm type (reference: independent firms, 2365 firms)								
Branch of national firms	204	Ref	0.0430	-0.3710	0.4044*	-0.4744	-0.0661	0.8715***
			(0.2600)	(0.3536)	(0.2104)	(0.5213)	(0.3822)	(0.2465)
Branch of international firms	119	Ref	0.9061**	1.0377**	1.1457***	-0.2982	1.9873***	1.6453***
			(0.4494)	(0.4062)	(0.2647)	(0.8691)	(0.2752)	(0.3234)
Sector of activity (reference: businesses services, 413 firms)								
Agriculture	78	Ref	0.3147	-0.8934	0.0138	-19.480***	0.7272	-1.4079
			(0.3623)	(0.6005)	(0.4135)	(0.0945)	(0.5104)	(1.2160)
Manufacturing sectors	263	Ref	1.5009***	1.4464***	1.6319***	0.5740	1.3131***	0.6800**
			(0.3193)	(0.2811)	(0.2280)	(0.3642)	(0.3076)	(0.3428)
Construction	274	Ref	-0.5582**	-0.6721***	-1.7929***	-1.1241***	-2.0599***	-1.0204***
			(0.2444)	(0.2432)	(0.2577)	(0.3092)	(0.3899)	(0.3003)
Retailers and wholesalers	1203	Ref	0.9070***	-0.0274	0.2785*	-0.6441***	0.1744	-0.7817***
			(0.1523)	(0.1726)	(0.1434)	(0.2491)	(0.1966)	(0.2309)
Personal services	457	Ref	0.9202***	-0.2892	0.2288	-0.5726*	-0.8844*	0.2126
			(0.1589)	(0.2293)	(0.1837)	(0.2994)	(0.4547)	(0.2503)
Age at this address (reference: More than 15 years, 1138 firms)								
less than 5 years	934	Ref	-0.1224	0.2086	0.0796	0.0382	0.4913**	0.5471***
			(0.1405)	(0.1791)	(0.1376)	(0.2288)	(0.2150)	(0.2028)
between 5 and 10 years	616	Ref	-0.0490	0.2174	0.1557	0.2987	0.5724***	0.1792
			(0.1425)	(0.1760)	(0.1348)	(0.2115)	(0.1966)	(0.2267)
Indigeneity of the owner (reference: always lived in AB, 1990 firms)								
Moved to AB from CD	119	Ref	0.0870	0.7104**	-0.0474	-0.2669	0.0723	0.5608
			(0.3089)	(0.2811)	(0.2857)	(0.4995)	(0.4572)	(0.4220)
Moved to AB from EH	163	Ref	0.1490	0.2448	0.4425**	0.5000	1.0061***	0.6560*
			(0.2989)	(0.3051)	(0.2221)	(0.3085)	(0.2802)	(0.3656)
Don't lived in zone AB	416	Ref	0.3726*	0.0488	0.5140***	0.3969	1.2821***	2.1974***
			(0.1985)	(0.2494)	(0.1604)	(0.2899)	(0.2017)	(0.1762)
Workforce, number of employees (reference: less than 1, 118 firms)								
1-2 employees	911	Ref	0.6038**	-0.5220*	-0.2770	0.3196	0.0462	-0.1146
			(0.2734)	(0.3003)	(0.2828)	(0.4148)	(0.5120)	(0.4697)
3-4 employees	976	Ref	0.6899***	-0.8574***	-0.3010**	0.2545	0.4980**	0.7603***
			(0.1389)	(0.1980)	(0.1441)	(0.2304)	(0.2412)	(0.2511)
more than 5 employees	683	Ref	1.1112***	0.0221	0.3679**	1.2647***	1.6772***	1.5429***
			(0.1808)	(0.2072)	(0.1482)	(0.2309)	(0.2220)	(0.2037)

Table 3.39. Results of the spatial behaviour analysis for firms (continued)

Index of intensity in intermediate goods, purchases/sales (reference: Less than 35 €, 651 firms)								
35-57 €	675	Ref	0.4467***	0.3338*	0.5734***	-0.2525	0.6013**	0.3206
			(0.1649)	(0.1940)	(0.1641)	(0.2392)	(0.2339)	(0.2434)
57-76 €	687	Ref	0.6573***	0.4238**	1.1897***	-0.0926	0.8932***	0.8050***
			(0.1456)	(0.1904)	(0.1372)	(0.2493)	(0.2057)	(0.2131)
More than 76 €	675	Ref	0.9728***	0.6482***	1.5759***	-0.2885	1.3009***	0.8269***
			(0.1522)	(0.1958)	(0.1457)	(0.3044)	(0.2217)	(0.2403)
Labour productivity (reference: < 3,953 € per worker, 674 firms)								
3,953-13,406 € per worker	670	Ref	0.0954	0.2016	0.9101***	0.008384	0.4740*	0.1526
			(0.1502)	(0.2093)	(0.1718)	(0.2719)	(0.2724)	(0.2776)
13,406-35,072 € per worker	672	Ref	0.001671	0.1472	1.4040***	-0.0867	0.6628***	0.1781
			(0.1471)	(0.1804)	(0.1388)	(0.2424)	(0.2232)	(0.2327)
>35,072 € per worker	672	Ref	0.5808***	0.5624***	2.1438***	0.7485***	1.7996***	1.1012***
			(0.1880)	(0.1734)	(0.1302)	(0.1999)	(0.1919)	(0.1910)
Local competition index (reference: I < 0.6, 670 firms)								
0.6 < I < 2.6	673	Ref	0.2442	0.0481	0.0397	-0.2811	-0.4582*	0.0984
			(0.1562)	(0.2086)	(0.1596)	(0.2482)	(0.2721)	(0.2876)
2.6 < I < 11.0	651	Ref	0.0303	0.0650	-0.3728**	-0.2792	-0.4258**	0.2280
			(0.1407)	(0.1824)	(0.1478)	(0.2245)	(0.2152)	(0.2183)
I > 11.0	694	Ref	0.0638	0.3163*	-0.1025	-0.2207	-0.0438	0.1785
			(0.1491)	(0.1641)	(0.1232)	(0.2140)	(0.1818)	(0.1776)
Index of final goods market size (reference: I<0.8, 1025 firms)								
0.8 < I < 1.3	186	Ref	0.1406	-0.004125	-0.4947**	0.000112	-0.0251	0.4972
			(0.2572)	(0.3014)	(0.2383)	(0.4056)	(0.3465)	(0.3082)
1.3 < I < 10.0	826	Ref	-0.0890	0.0824	-0.2923**	0.0309	-0.4697**	0.2853
			(0.1412)	(0.1724)	(0.1292)	(0.2077)	(0.1964)	(0.1926)
I > 10.0	651	Ref	-0.4044***	-0.3783**	-0.8770***	-0.3091	-0.6270***	-0.1779
			(0.1269)	(0.1645)	(0.1447)	(0.1976)	(0.2174)	(0.2187)
Index of potential intensity of local vertical linkages (reference: I < 1.0, 175 firms)								
1.0 < I < 40.0	1003	Ref	0.6425***	0.4713**	0.0868	0.4259	0.6503*	-0.3887
			(0.1988)	(0.2352)	(0.1941)	(0.3001)	(0.3406)	(0.2823)
40.0 < I < 75.0	862	Ref	0.8867***	0.6940***	0.7827***	0.5365***	0.9227***	0.4071**
			(0.1316)	(0.1620)	(0.1300)	(0.1994)	(0.2073)	(0.1837)
I > 75.0	648	Ref	1.0841***	0.7497***	1.0896***	0.6710***	1.4284***	0.3845**
			(0.1466)	(0.1712)	(0.1213)	(0.2103)	(0.1726)	(0.1957)
Index of potential skilled matching on the local labour market (reference: I < -50, 139 firms)								
-50 < I > 0	746	Ref	0.2052*	0.3002**	0.7042***	0.4399***	0.8919***	0.5377***
			(0.1132)	(0.1463)	(0.1138)	(0.1654)	(0.1569)	(0.1426)
0 < I < 50	984	Ref	0.6561***	0.4499***	0.9495***	0.6355***	1.7170***	0.7231***
			(0.1013)	(0.1162)	(0.0900)	(0.1505)	(0.1247)	(0.1462)
> 50	819	Ref	0.6665***	0.0619	0.3831***	0.7499***	1.4466***	0.4306**
			(0.0940)	(0.1558)	(0.1133)	(0.1662)	(0.1834)	(0.1883)

In summary, increasing firm size, labour productivity and intensity in intermediate goods appear to favour non-local economic behavioural patterns. This implies that the largest, most productive and most intensive firms have the least potential to stimulate rural development through local multipliers.

As seen above, industrial sector also plays an important role in a firm's spatial behaviour. Compared to business services, manufacturing firms are more connected to the wider economy; their purchases come more frequently from regional or national input markets, they often sell their outputs in the regional or international economy and their workforce is often recruited at the regional level. In contrast, construction firms are very locally integrated. Retailers and personal services, whilst selling locally and employing local labour, tend to purchase their inputs from regional, or even national, markets.

Whilst firm age plays a relatively weak role in explaining spatial behaviour (although the results do suggest that recently established firms tend to adopt a more international behaviour), indigeneity of the owner/manager does have an influence. Firms managed by non-residents and those managed by in-migrants who have moved from zones E to H are more nationally or internationally oriented and access regional labour markets more frequently.

The results of the logit analysis provide further evidence that local competition and size of the local final demand market have no influence on the spatial distribution of firm sales and have only a relatively weak influence on local purchasing. Indeed, no significant parameter value is obtained for the local competition index (the weight of the firm sales compared to those of its local competitors). The influence of the local final market size is, however, a little more marked. Existence of a larger output market disfavours a pattern of national purchasing combined with local sales and employment. Only when this local market is very large compared to the volume of firm sales do all non-local behaviours tend to be disfavoured: signs become significantly negative for regional and international behaviours in terms of both sales and purchases and for national and regional purchasing behaviours.

Finally, the environment variable that has the clearest effect on the spatial economic behaviour is the one that evaluates the gap between demand for inputs and the local supply of such inputs. Indeed, the greater the gap between local supply and firm demand for inputs, the more regional or national the firm purchases, and this can even affect sales. When local input markets are relatively small and firms have a high demand for particular inputs, they seek them in non-local markets. However, it is more surprising to observe that this also affects their sales behaviour, which also becomes regionally and nationally orientated.

In summary, when a firm's demand for inputs or supply of outputs exceeds the respective local market size, two points can be noted. First, the firm sources its inputs from the regional, and then national, economy; second, it adopts an entirely regional or international behavioural pattern with respect to both sales and purchases.

Results of the logit analysis for farms are presented in Table 3.40. In order to ensure that there were a sufficient number of farms in each category of the dependent variable, it was necessary to group farms that exhibited similar spatial behaviors. Thus, groups II and IV were merged, as these exhibited similar patterns in terms of regional and national purchasing behaviour. Likewise, groups V and VI were also merged, as these provided comparable behaviors with respect to national and international sales. The mergers produced the following five groups, or categories:

- Local behaviour (group I)
- Regional behaviours (group III)
- Local behaviours with regional [or national] purchases (merged groups II and IV)
- National [or international] sales (merged groups V and VI)
- Regional labour (group VII)

It is worth noting that very few parameter estimates are significantly different from zero. This implies that, unlike the OLS results for farms, or the previous logit analysis for firms, the

model used to explain the spatial behaviour of farms (beyond their local integration) does not contain such a robust set of variables. In particular, local context variables and some variables representing individual characteristics of farms and farmers are not suitably robust to allow explanation of behavioural differences.

Table 3.40. Results of the spatial behaviour analysis for farms

		Dependent variables				
Independent variables	**N**	**Local behaviour**	**Regional behaviour**	**Local behaviours with regional [or national] purchases**	**National [or international] sales**	**Regional labour**
N	**1195**	**615**	**256**	**129**	**157**	**38**
Intercept		Ref	0.1881 (0.000)	-2.8459 (9.2659)	-2.0545 (35.4221)	-3.9904*** (0.2318)
Town size (reference: Small towns, 605 farms)						
Medium-sized towns	590	Ref	0.2300 (0.000)	-0.3969 (0.4174)	-0.9312** (0.3902)	-0.2510 (11.8290)
Study area type (reference: Agricultural area, 468 farms)						
Tourism town	332	Ref	0.6183 (0.7685)	1.1359** (0.5105)	-0.2928 (0.3203)	-0.5089 (0.000)
Peri-urban town	377	Ref	-0.5571 (5.1274)	0.5847* (0.3426)	-0.7220 (1.0323)	1.3395 (8.3040)
Country (reference: France, 63 farms)						
United Kingdom	148	Ref	-1.0210 (2.1626)	-1.7241** (0.7856)	-2.2805 (5.3497)	-2.3549 (0.000)
Netherlands	289	Ref	-2.0948 (1.4137)	-2.3507*** (0.7326)	-0.8142 (1.9022)	0.3870 (0.000)
Poland	510	Ref	-1.6489*** (0.3203)	-1.6250*** (0.4198)	-1.5778 (1.0967)	-1.2749 (0.000)
Portugal	185	Ref	-2.0746*** (0.1919)	-2.1929*** (0.5710)	-2.6737*** (0.7744)	-0.1096 (0.000)
Ownership (Reference: Sole ownership, 768 farms)						
Other ownership	427	Ref	0.0278 (0.5000)	-0.3513 (0.5497)	-0.3219 (0.4932)	-0.3590 (0.6359)
Farmer's history (reference: always farmed in zone A + B, 907 farms)						
Previously farmed in zone C - H	137	Ref	0.2916 (0.7397)	0.0102 (0.3925)	0.3542 (0.3989)	0.1536 (1.6428)
Previously did not farm	151	Ref	-0.4093 (0.3257)	-0.4982 (0.3514)	-0.1382 (1.0770)	0.7050 (0.000)
Farm type (reference: Specialist livestock, mixed livestock, pigs & poultry, 459 farms)						
Cereals and mixed cropping	189	Ref	0.0136 (0.3721)	0.004263 (0.4368)	0.4528 (0.5559)	-0.3738 (0.000)
permanent crops	312	Ref	-0.6781* (0.3727)	-0.3315 (0.6500)	0.3866 (0.5086)	-0.8355 (0.000)
Mixed livestock & arable, horticulture & others	235	Ref	-0.2530 (0.9828)	0.6360* (0.3308)	0.4684 (0.6728)	0.6720 (1.7340)
Time farming (reference: family has farmed < 33 years, 296 farms)						
family has farmed > 33 years	282	Ref	-0.0597 (0.3639)	0.0389 (0.6705)	-0.1996 (0.8622)	-0.8360 (0.000)
family has farmed > 70 years	135	Ref	-0.3723 (0.5995)	-0.2964 (0.3918)	0.2903 (0.3530)	-0.8380 (0.000)
family has farmed > 100 years	482	Ref	-0.6069 (0.4152)	-0.6349 (0.5229)	0.0367 (0.3516)	-0.0902 (0.7640)
Age of farmer (reference: Young farmer < 33 years old, 166 farms)						
farmer aged between 35 and 44 years old	356	Ref	-0.0439 (0.2691)	0.2225 (1.1015)	0.007364 (1.0524)	-1.2408 (2.7873)
farmer aged between 45 and 54 years old	420	Ref	-0.2848 (0.000)	0.2208 (0.2560)	-0.2268 (0.5555)	-0.8898 (0.8139)
farmer aged between 55 and 64 years old	253	Ref	-0.3069 (0.5503)	0.2151 (0.2707)	0.2693 (0.4389)	-1.0545 (0.000)

Table 3.40. Results of the spatial behaviour analysis for farms (continued)

Indigeneity of farmer (reference: Always lived in AB, 1052 farms)						
Moved to AB from CD	22	Ref	-0.6986	1.7501	-0.2983	1.5338
			(1.6712)	(1.2137)	(6.5187)	(0.000)
Moved to AB from EH	15	Ref	1.0928	2.4368***	-16.6401***	-14.4600***
			(1.4315)	(0.7146)	(0.1604)	(0.6375)
Don't lived in zone AB	106	Ref	0.0997	0.9332**	-0.4319	-1.0602
			(0.6372)	(0.4181)	(1.0850)	(0.000)
Workforce (reference: < 1.25 full time workers, 261 farms)						
1.25 to 2.0 full time workers	195	Ref	-0.0648	1.0586	0.0214	1.3837
			(0.4018)	(1.1532)	(1.1728)	(0.000)
2.05to 2.5 full time workers	375	Ref	-0.1823	0.4079	0.0621	0.1972
			(0.2947)	(0.3359)	(0.3725)	(1.3494)
> 2.5 full time workers	364	Ref	-0.2009	0.5729**	-0.0733	-0.8698
			(0.6430)	(0.2901)	(0.2874)	(1.9736)
Index of intensity in intermediate goods, purchases/sales (reference: < 41 €, 267 farms)						
41-59 €	277	Ref	0.5104*	0.5194	0.3629	0.4425
			(0.2970)	(0.4392)	(1.5148)	(0.000)
59-85 €	302	Ref	0.1697	0.5946	0.3496	-0.7995
			(0.1972)	(0.5670)	(1.6007)	(0.000)
> 85 €	349	Ref	-0.4665**	0.8145***	-0.1644	0.0232
			(0.1963)	(0.2989)	(2.1841)	(0.4088)
Land productivity (reference: < 120 €/ha, 388 farms)						
120-876 €/ha	356	Ref	-0.1267	0.5983	0.1540	0.1466
			(0.2849)	(0.7770)	(1.8131)	(0.000)
876-2,620 €/ha	237	Ref	-0.5493	0.6206	-0.6674	0.0533
			(0.5046)	(0.6383)	(1.4908)	(0.000)
> 2,620 €/ha	214	Ref	-0.0420	0.4486	0.5439	0.5035
			(0.8513)	(0.3467)	(0.9645)	(0.000)
Land area (reference: < 5 ha, 257 farms)						
5-14 ha	291	Ref	-0.2560	0.4886	0.1050	0.0920
			(0.2844)	(0.2994)	(2.3571)	(0.000)
14-36 ha	332	Ref	0.1850	0.6018*	-0.1006	0.1526
			(0.3989)	(0.3408)	(0.5395)	(0.000)
> 36 ha	315	Ref	-0.4206*	0.1383	-0.4386	-0.1789
			(0.2161)	(0.7252)	(0.2764)	(0.000)
Total purchases (reference: < 2,920 €, 272 farms)						
2,920-13,274 €	305	Ref	0.6877**	-0.0156	2.0286	0.9546
			(0.3241)	(0.3759)	(5.3929)	(0.000)
13,274-61,903 €	310	Ref	1.6237*	0.9529	2.5149**	2.2933
			(0.8587)	(0.6959)	(1.1473)	(0.000)
> 61,903 €	308	Ref	2.3852***	1.1740***	3.1079***	2.3922***
			(0.8070)	(0.4562)	(0.2793)	(0.6491)
Share of farm income in the farm household income (reference: < 25%, 233 farms)						
25%-80%	306	Ref	0.2865	0.5469	0.5252	0.2243
			(0.2988)	(0.4203)	(1.2588)	(2.1533)
80%-100%	135	Ref	0.3639	0.6238	0.6391*	0.3636
			(0.7102)	(0.4167)	(0.3565)	(6.8109)
100%	521	Ref	0.1352	0.5638**	0.4497	-0.2010
			(0.5497)	(0.2483)	(0.6345)	(1.2205)

The usefulness of the farm logit model is therefore limited, although it does highlight some factors of interest. French farms tend to source inputs from regional (and sometimes national) markets and to sell their outputs locally, while Polish and Portuguese farms remain the most local. Consistently, very input-intensive farms purchase on regional (or national) markets while they tend to avoid regional spatial behaviour. When the total amount of farm purchases increases, farm behaviour tends to be more regional in terms of purchases, then also in terms of sales and finally national in terms of both purchases and sales. Farmers who moved from zones E-H to the study areas (zones A and B) tend to source their inputs from regional markets and avoid national, as well as regional, labour markets.

3.8.4 Household spatial behaviours: factor and cluster analysis

The 9 variables devised for inclusion in the household analysis are summarised in Table 3.41. For consistency with the data, an additional variable is computed to represent households that have no workplace.

Table 3.41. Variables devised for inclusion in subsequent analysis

Variable name	Definition	Description
servsup_abc	High order purchases in zones A, B and C	Local high order purchases
servsup_de	High order purchases in zones D and E	Regional high order purchases
servsup_fgh	High order purchases in zones F, G and H	National and international high order purchases
servin_abc	Low order purchases in zones A, B and C	Local low order purchases
servinf_de	Low order purchases in zones D and E	Regional low order purchases
servinf_fgh	Low order purchases in zones F, G and H	National and international low order purchases
Empl_abc	Employment in zones A, B and C	Local workplace
Empl_aut	Employment in zones D, E, F, G and H	Non-local workplace
Sans_empl	no employment	No workplace

As before, the above variables are then entered into a PCA, the results of which are given in Table 3.42. Three distinct dimensions of household spatial economic behaviour explain just over 67% of variance in the data set.

Table 3.42. Results of the Principal Component Analysis for household spatial behaviours

Eigenvalue	**1**	**2**	**3**
Value	2.9166	1.7914	1.3450
% variability	0.3241	0.1990	0.1494
% cumulate	0.3241	0.5231	0.6725
	factor 1	**factor 2**	**factor 3**
servsup_abc	0.7938	0.2123	0.0475
servsup_de	-0.5771	-0.3758	-0.5294
servsup_fgh	-0.4926	0.1547	0.6104
servinf_abc	0.8454	0.0470	-0.1010
servinf_de	-0.6509	-0.1892	-0.3819
servinf_fgh	-0.5450	0.1555	0.6233
empl_abc	0.3358	-0.8667	0.2765
empl_aut	-0.3961	0.0769	-0.0551
sans_emploi	-0.0754	0.8728	-0.2566

Factor 1, which explains 32% of the total, exhibits a positive correlation between low and high order purchasing in the local economy, and a negative correlation between local and regional purchases. Factor 2, which explains only 20% of the variance, opposes households without workplace (retired and unemployed) and households with local jobs. At this stage, there is no clear link between employment status and household consumption although the factor loading for a lack of high order purchasing in the regional economy is marginal. Factor 3, which captures 15% of the total information, shows a positive relationship between

national purchasing of low and high order goods and services, in contrast to regional high order purchasing.

The hierarchical cluster analysis aims to define a typology of households in several groups according to an individual's contributions to the three dimensions of spatial economic activity identified by the PCA. Seven groups are thus identified. These are first examined in terms of their contribution to each of the previously defined factors; this shows a sufficient level of differentiation between the groups in terms of spatial patterns of purchasing and employment activity. This differentiation is examined more closely in Table 3.43, which, for each cluster, presents the mean proportions of purchases and employment across the various geographical divisions.

Table 3.43. Classification results for the seven clusters

		High order purchases			Low order purchases			Workplace		
group	**N**	**ABC**	**DE**	**FGH**	**ABC**	**DE**	**FGH**	**ABC**	**D-H**	**No job**
I	2559	95.91	2.93	1.15	97.85	1.30	0.85	96.29	3.71	0.00
II	1337	93.57	4.54	1.89	96.61	2.36	1.03	0.00	13.76	86.24
III	913	51.43	45.98	2.59	83.68	13.96	2.36	85.52	14.48	0.00
IV	471	54.66	8.54	36.79	78.21	5.27	16.52	91.30	8.70	0.00
V	501	58.48	11.50	30.02	74.57	11.02	14.41	0.40	34.93	64.67
VI	380	24.27	71.13	4.60	57.51	38.96	3.53	27.24	41.18	31.58
VII	192	26.12	10.69	63.19	48.25	7.54	44.21	28.65	42.71	28.65

The analysis of the results helps to define the groups in terms of their integration into local, regional and national markets for purchases of low order and high order goods and services and employment. A summary of this is given in Table 3.44.

Table 3.44. Summary of classification results: integration into local, regional and national markets for the seven cluster groups

Cluster group	**N**	**High order purchases**	**Low order purchases**	**Workplace**
I = Local purchasing and employment	2559	Local	Local	Local
II = Local purchasing and no employment	1337	Local	Local	No work
III = Local purchasing and employment with more regional high order purchases	913	Local / regional	Local	Local
IV = Local purchasing and employment with more national high order purchases	471	Local / national	Local	Local
V = Local purchasing with more national high order purchasing: no employment	501	Local / national	Local	No work
VI = More regional purchasing	380	Regional	Local / regional	Varied
VII = More national purchasing	192	National	Local / national	Varied

All seven groups are shown to be distinct in terms of at least one attribute of purchasing and/or employment behaviour. However, to help define robust dependent variables for subsequent analysis it is necessary to reduce the number of cluster groups so that low cell

counts and zero cell counts (due to the use of dummy variables) in the logit analysis can be avoided. Thus, groups I and II are merged, which have the same purchasing behaviour but only differ in terms of employment status. In the same way, groups III, IV and V are merged, in which the strength of local low order integration is the same, with variations only in terms of employment status and relative strength of local high order integration. This leads us to four groups to be used as dependent variables in the subsequent logit analysis:

- Local purchases (groups I and II)
- More high order purchases in regional and national economy (groups III to V)
- More regional low and high order purchases (group VI)
- More national low and high order purchases (group VII)

Before presenting results from the logit analysis it would be useful to examine the distribution of the four revised groups across all 30 case study towns. This descriptive data is reported in Appendix 30 (Tables 1 to 5). Household economic behaviour is very local in the Polish and Portuguese study areas, where 70%-80% of the households have a local purchasing behaviour, the other households having a more regional or national behaviour for their high order purchases. The only exception is Tavira in Portugal (a small tourism study area) where the purchasing behaviour is less local (only 47% of those have local purchases) and more regional and national for the high order purchases (46% in this category).

French and Dutch households are an intermediate group, who exhibit local behaviours less often; 50% and 60% of households in these countries purchase locally. They tend make their purchases, especially their high order purchases, more regionally or nationally: a third of all households fall into this category. Note that 12% of the French households have more regional patterns of behaviour, irrespective of whether they are high or low order. The tourism study areas are particularly characterised by more regional and national purchasing behaviours. Indeed, in three out of the four study areas (Prades, Bolsward and Nunspreet), the share of households having more regional or national behaviour in terms of high order purchases are particularly high (greater than 40% of the local households). This is also the case in one of the French peri-urban study areas (Magny-en-Vexin), where only a quarter of households exhibit a local purchasing behaviour. This might be explained by the relatively low levels of service provision and, of course, the town's proximity to Paris.

UK households exhibit the least local economic behaviour of the five countries. Indeed, only 40% of households purchase locally, 42% having more regional or national behaviour for their high order purchases and 18% having the same characteristics for all their purchases. The extreme cases are both peri-urban study areas (Towcester, small peri-urban, and Saffron, medium-sized peri-urban).

3.8.5 Factors explaining differences in spatial household behaviours: a multinomial logit analysis

The aim of the logit analyses is to identify the characteristics of i) household and ii) local context, associated with the various forms of spatial economic behavior identified by the factor and cluster analyses. Three separate logit analyses are presented; one containing all

households (Table 3.45), one containing only economically active households (Table 3.46) and one containing only retired households (Table 3.47). This division is made because it is difficult to define a common set of variables due to multi-collinearity between certain sets. All variables selected for the household logit analyses are given in Appendix 31. In each case, one category of an explanatory variable is defined as the reference category; the effect of all other categories are then compared to the reference category.

The following analysis is mainly based on the results obtained with the complete sample of households (both active and retired, Table 3.45). This analysis is supplemented by results obtained when the sample is divided into 1) economically active households and 2) retired households. Because one group is economically inactive, included variables differ between the three models.

Focusing on geographical variables, it appears that households living in medium-sized towns have a more localised spatial behaviour compared to those living in small towns. This could be explained by the larger size of the local market, which allows households easier access to a greater range of local services. In contrast, households living in tourism study areas are more orientated towards regional - or national - markets than those living in agricultural areas, and those living in peri-urban areas are more nationally oriented.

Table 3.45. Logit analysis for all households

		Dependent variables			
Independent variables	**N**	**Extended local purchases**	**More regional or national high order purch.**	**More regional purchases**	**More national purchases**
N		**3745**	**1823**	**364**	**184**
Intercept		REF	-1.6556*** (0.2309)	-2.8472*** (0.4187)	-3.1157*** (0.5703)
Town size (reference: Small town, 3103 hh.)					
Medium size towns	3013	REF	-0.2255*** (0.0640)	-0.3361*** (0.1238)	-0.4218** (0.1708)
Study area type (reference: Agricultural area, 2250 hh)					
Tourism area	1920	REF	0.4302*** (0.0762)	0.5908*** (0.1448)	0.4308* (0.2472)
Peri-urban area	1946	REF	0.0667 (0.0788)	-0.0920 (0.1663)	0.8889*** (0.2218)
Country (reference: United Kingdom, 1323 hh)					
France	857	REF	-0.6263*** (0.1065)	-0.1511 (0.1729)	-2.2383*** (0.3827)
The Netherlands	1427	REF	-0.7947*** (0.1004)	-1.6923*** (0.2036)	-1.4259*** (0.2337)
Poland	1368	REF	-1.1919*** (0.1192)	-0.9004*** (0.2062)	-3.3104*** (0.6485)
Portugal	1141	REF	-1.6294*** (0.1124)	-2.1404*** (0.2923)	-2.9314*** (0.4295)
Location (reference: Zone B, i.e. hinterland, 3026 hh)					
In town centre	3090	REF	0.0554 (0.0733)	-0.0385 (0.1380)	-0.0192 (0.1879)
Farm/no farm household (reference: non farm, 4727 hh)					
farm households	1389	REF	-0.2712*** (0.1006)	0.2868 (0.1865)	-0.1963 (0.3564)

Table 3.45. Logit analysis for all households (continued)

Household type (reference: Elderly hhs, 525 hh)					
family of working adult aged 17+	3202	REF	0.3650***	0.1165	0.1583
			(0.1209)	(0.2128)	(0.2740)
family with dependants aged less then 12	1874	REF	0.3003**	0.0505	-0.4575
			(0.1324)	(0.2414)	(0.3364)
family with dependants aged 13-16 years	515	REF	0.3492**	0.1136	-0.0269
			(0.1610)	(0.3125)	(0.4178)
Indigeneity (reference: have always lived in zone A or B, 4594 hh)					
Moved to AB from CD in the last 5 years	201	REF	-0.007985	0.5759**	0.6393
			(0.1770)	(0.2852)	(0.3997)
Moved to AB from CD more than 5 years ago	307	REF	-0.0387	0.0356	0.1703
			(0.1454)	(0.3081)	(0.4030)
Moved to AB from the other zones in the last 5 years	370	REF	0.6050***	0.6555***	1.4480***
			(0.1370)	(0.2208)	(0.2604)
Moved to AB from the other zones more than 5 years ago	644	REF	0.3104***	0.5728***	0.8791***
			(0.1103)	(0.2034)	(0.2509)
Social class (reference: Retired with annual retired greater than 225,000 €, 374hh)					
Professional or manager	780	REF	0.6843	1.3503*	2.9015***
			(0.5460)	(0.7427)	(1.0772)
Skilled non manual	1056	REF	0.4369	1.1649	2.6020**
			(0.5440)	(0.7403)	(1.0644)
Skilled manual	831	REF	0.5163	0.8990	2.2287**
			(0.5439)	(0.7402)	(1.0739)
Unskilled	2073	REF	-0.0616	0.6427	1.5864
			(0.5401)	(0.7242)	(1.0256)
Retired with annual retired lower than 8,500 €	318	REF	-0.5608***	-0.6565*	-0.5322
			(0.2046)	(0.3811)	(0.4489)
Retired with annual retired between 8,500 & 13,500 €	214	REF	-0.3029	0.0701	-0.4557
			(0.2372)	(0.3514)	(0.5256)
Retired with annual retired between 13,500 & 225,000 €	470	REF	-0.6008***	0.0363	-0.1411
			(0.1992)	(0.2787)	(0.4345)
Workplace (reference: No workplace, 1377 hh)					
Both workers in AB	2806	REF	0.5848	-1.3631*	-2.0373**
			(0.5404)	(0.6976)	(1.0230)
One worker in AB, other workers elsewhere	1503	REF	0.7200	0.0790	-1.1344
			(0.5430)	(0.6996)	(1.0031)
Both workers in C	142	REF	0.5709	-1.9764*	-2.1149*
			(0.5676)	(1.0128)	(1.1805)
One worker in C, other workers in D-H	130	REF	0.8394	0.1253	-1.6369
			(0.5757)	(0.7797)	(1.1069)
Both workers in D-H	158	REF	1.2419**	1.9042***	-0.1975
			(0.5927)	(0.7350)	(1.0562)
Saving level (reference: No saving, < 0.93, 1527 hhs)					
Between 0.93 & 1.58	1530	REF	0.009213	-0.0419	-0.1310
			(0.0914)	(0.1810)	(0.2532)
Between 1.58 & 2.05	1521	REF	0.1061	0.0439	-0.2194
			(0.0998)	(0.2020)	(0.2738)
strong saving (more than 2.05)	1538	REF	-0.0380	0.1394	-0.1402
			(0.1206)	(0.2446)	(0.3278)
High order purchases per head (reference: < 46 €/head, 1521 hhs)					
Between 46 & 133 €	1529	REF	0.4330***	0.5033**	0.3506
			(0.1054)	(0.2114)	(0.3337)
Between 133 & 308 €	1536	REF	0.9530***	0.8881***	0.8821***
			(0.1129)	(0.2313)	(0.3393)
More than 308 €	1530	REF	1.2226***	1.4508***	1.0284***
			(0.1250)	(0.2546)	(0.3562)

Examining household characteristics, farm households appear to be more locally oriented than non-farm households, who more frequently purchase high order goods and services at the regional and even national level. Compared to the behaviour of elderly households, families of working adults (with or without dependants) have more regional and national behavioural patterns in terms of high order purchases. Thus, elderly (most often retired) families are more

locally oriented. Even when we restrict the analysis to economically active households (Table 3.46), this difference remains valid (even though the number of elderly households included in the analysis is relatively low) and no other differences are evident in terms of family stage.

The influence of indigeneity appears to be relatively strong. Despite how long they have resided in the study area, in-migrants that have moved from extra-regional zones (from zones E to H) have a purchasing behaviour that is more extra-locally oriented than those who have always lived in the study area. Households who have moved to the study area from zones C or D, however, exhibit similar patterns of behaviour to local people. These results remain valid when the sample is split into economically active and retired groups (Tables 3.46 and 3.47).

Table 3.46. Logit analysis for economically active households

		Dependent variables			
Independent variables	**N**	**Extended local purchases**	**More regional or national high order purch.**	**More regional purchases**	**More national purchases**
N		**2773**	**1554**	**272**	**141**
Intercept		REF	-0.0446 (0.2120)	-2.8543*** (0.4027)	-2.5148*** (0.6498)
Town size (reference: Small town, 2389 hh.)					
Medium size towns	2351	REF	-0.1955*** (0.0709)	-0.4899*** (0.1489)	-0.6140*** (0.2086)
Study area type (reference: Agricultural area, 1758 hh)					
Tourism area	1397	REF	0.5513*** (0.0855)	0.8012*** (0.1737)	0.5866** (0.2907)
Peri-urban area	1585	REF	0.0812 (0.0862)	-0.0921 (0.1942)	0.6526** (0.2581)
Country (reference: United Kingdom, 854 hh)					
France	621	REF	-0.5559*** (0.1263)	-0.0610 (0.2073)	-2.0451*** (0.3986)
The Netherlands	1074	REF	-0.8136*** (0.1175)	-1.9882*** (0.2456)	-1.8675*** (0.2900)
Poland	1070	REF	-1.1453*** (0.1306)	-0.8846*** (0.2421)	-3.0625*** (0.6613)
Portugal	1121	REF	-1.6067*** (0.1203)	-2.1645*** (0.3034)	-3.0309*** (0.4449)
Location (reference: Zone B, i.e. hinterland, 2487 hh)					
In town centre	2253	REF	0.0640 (0.0823)	-0.0549 (0.1632)	0.1451 (0.2274)
Farm/no farm household (reference: non farm, 3455 hh)					
farm households	1285	REF	-0.2193** (0.1047)	0.3992** (0.2026)	0.0854 (0.3710)
Household type (reference: family of working adult aged 17+, 2174)					
family with dependants aged less then 12	1174	REF	-0.0934 (0.0802)	-0.1963 (0.1666)	-0.5874** (0.2554)
family with dependants aged 13-16 years	489	REF	-0.0348 (0.1225)	-0.0967 (0.2615)	-0.1403 (0.3744)
elderly households	303	REF	-0.6864*** (0.1531)	-0.7940** (0.3305)	-0.6013 (0.3660)
Indigeneity (reference: have always lived in zone A or B, 3588 hh)					
Moved to AB from CD in the last 5 years	177	REF	-0.008239 (0.1867)	0.5538* (0.3081)	0.3396 (0.4920)
Moved to AB from CD more than 5 years ago	243	REF	0.0340 (0.1604)	0.1266 (0.3575)	0.2614 (0.4758)
Moved to AB from the other zones in the last 5 years	286	REF	0.6319*** (0.1577)	0.6335** (0.2681)	1.6289*** (0.2951)
Moved to AB from the other zones more than 5 years ago	446	REF	0.2911** (0.1273)	0.5726** (0.2507)	0.9185*** (0.3046)

Table 3.46. Logit analysis for economically active households (continued)

Social class (reference: Professional or manager, 780 hh)					
Skilled non manual	1056	REF	-0.2503**	-0.2092	-0.3094
			(0.1193)	(0.2200)	(0.2765)
Skilled manual	831	REF	-0.1822	-0.4561*	-0.6169*
			(0.1172)	(0.2419)	(0.3277)
Unskilled	2073	REF	-0.7605***	-0.7046***	-1.1841***
			(0.1101)	(0.2187)	(0.3295)
Workplace (reference: Both workers in AB, 2797 hh)					
One worker in AB, other workers elsewhere	1500	REF	0.1632**	1.5239***	1.0026***
			(0.0817)	(0.1795)	(0.2824)
Both workers in C	141	REF	0.0300	-0.5084	0.0727
			(0.1954)	(0.7841)	(0.6994)
One worker in C, other workers in D-H	129	REF	0.3150	1.5867***	0.5704
			(0.2168)	(0.3824)	(0.5605)
Both workers in D-H	158	REF	0.6911***	3.3670***	1.9441***
			(0.2511)	(0.2978)	(0.4285)
No workplace	15	REF	-1.6452	1.8068**	1.9659*
			(1.0941)	(0.9112)	(1.0784)
Saving level (reference: No saving, < 0.93, 1098 hh)					
Between 0.93 & 1.58	1190	REF	-0.0208	0.0110	-0.2680
			(0.1022)	(0.2172)	(0.3089)
Between 1.58 & 2.05	1249	REF	0.1129	0.1908	-0.1122
			(0.1087)	(0.2327)	(0.3155)
strong saving (more than 2.05)	1203	REF	-0.0245	0.1996	-0.0382
			(0.1305)	(0.2805)	(0.3865)
High order purchases per head (reference: < 46 €/head, 1166 hh)					
Between 46 & 133 €	1232	REF	0.3772***	0.5070**	0.4736
			(0.1136)	(0.2487)	(0.4460)
Between 133 & 308 €	1220	REF	0.9612***	1.0673***	1.4198***
			(0.1224)	(0.2636)	(0.4428)
More than 308 €	1122	REF	1.1364***	1.5818***	1.5797***
			(0.1369)	(0.2980)	(0.4655)

Across the whole sample (Table 3.45), the behaviour of social class categories is compared with the more wealthy retired households (those having an annual pension greater than 225,000 €). In this case, results show the more regional or national purchasing behaviour of professionals and managers. Further, skilled workers (manual or non-manual) tend to have a more national behaviour. However, at this stage, the hierarchy between retired people is a little unclear: it appears that a more local behaviour is evident for those households having an annual pension not exceeding 225,000 €. Results become clearer when the sample is divided. Among the economically active households (Table 3.46), the unskilled occupational groups exhibit the most local purchasing behaviour compared to professionals and managers, whilst skilled households (manual or non manual) form an intermediate group. Skilled non-manuals are less regionally or nationally oriented in terms of high order purchases and skilled manual groups are less often oriented towards regional or national markets for all purchases. This implies that managers and professionals tend to access regional markets for high order goods and services more frequently. In parallel, when we focus only on retired households (Table 3.47), purchasing becomes more regional as incomes rise.

Table 3.47. Logit analysis for retired households

Independent variables	N	Dependent variables: Extended local purchases	More regional or national high order purch.	More regional purchases	More national purchases
N		**972**	**269**	**92**	**43**
Intercept		REF	-1.9311 (0.0)	-3.2028*** (0.6024)	-3.3284 (2.9532)
Town size (reference: Small town, 714 hh.)					
Medium size towns	662	REF	-0.5438 (0.0)	-0.0271 (0.1684)	-0.0644 (0.3926)
Study area type (reference: Agricultural area, 492 hh)					
Tourism area	523	REF	-0.0991 (0.0)	0.1233 (0.2833)	0.3719 (0.5664)
Peri-urban area	361	REF	-0.0392 (0.1821)	-0.2092 (0.3329)	1.4721*** (0.3800)
Country (reference: United Kingdom + Portugal, 489 hh)					
France	236	REF	-0.8421*** (0.2155)	-0.3694 (0.3242)	-21.4459*** (0.1872)
The Netherlands	353	REF	-0.8188*** (0.2026)	-1.0619*** (0.3997)	-0.5358 (0.7521)
Poland	298	REF	-1.8551*** (0.4013)	-1.0996** (0.4152)	-20.9758*** (0.0745)
Location (reference: Zone B, i.e. hinterland, 539 hh)					
In town centre	837	REF	-0.0567 (0.1590)	0.0221 (0.2571)	-0.4739 (0.4413)
Farm/no farm household (reference: non farm, 1272 hh)					
farm households	104	REF	-1.4856* (0.7970)	-0.0601 (0.5165)	-18.0340*** (0.1564)
Indigeneity (reference: have always lived in zone A or B, 1006 hh)					
Moved to AB from CD in the last 5 years	24	REF	-0.3414 (0.6283)	0.2016 (0.8225)	1.4301* (0.7832)
Moved to AB from CD more than 5 years ago	64	REF	-0.4097 (0.3688)	-0.2843 (0.6509)	0.0710 (1.4594)
Moved to AB from the other zones in the last 5 years	84	REF	0.5361* (0.2926)	0.7231* (0.3757)	0.4812 (0.6943)
Moved to AB from the other zones more than 5 years ago	198	REF	0.3417* (0.2074)	0.5232* (0.3014)	0.8777* (0.4694)
Annual retired pension (Reference: Retired with annual retired lower than 8,500 €, 318 hh)					
Retired with annual retired between 8,500 & 13,500 €	214	REF	0.3848 (0.2531)	0.9437** (0.3896)	0.3626 (0.6982)
Retired with annual retired between 13,500 & 225,000 €	470	REF	0.0699 (0.2077)	0.9593*** (0.2961)	0.7481 (0.4628)
Retired with annual retired greater than 225,000 €	374	REF	0.4547** (0.1922)	0.9410*** (0.2569)	1.0246** (0.4294)
Saving level (reference: No saving, < 0.93, 429 hh)					
Between 0.93 & 1.58	340	REF	0.1033 (0.1913)	-0.2754 (0.2777)	-0.1194 (0.4308)
Between 1.58 & 2.05	272	REF	0.2572 (0.2082)	-0.4611 (0.3166)	-1.0464 (0.7531)
strong saving (more than 2.05)	335	REF	0.0155 (0.2509)	-0.0235 (0.2906)	-0.5116 (0.6603)
High order purchases per head (reference: < 46 €/head, 335 hh)					
Between 46 & 133 €	297	REF	0.9537*** (0.3034)	0.5620* (0.2759)	0.4187 (0.5427)
Between 133 & 308 €	316	REF	1.3266*** (0.1785)	0.5376** (0.2565)	-0.2007 (0.6119)
More than 308 €	408	REF	1.9534*** (0.1829)	1.1957*** (0.1547)	0.1560 (0.0)

While the savings rate (the ratio of income to total purchases) appears to have no effect on the spatial behaviour of households, the amount of high-order purchases per head appears to have a relatively strong influence on the spatial behaviour of both active and retired households. Indeed, the greater the level of high-order consumption the more non-local (and the more regional) the spatial purchase behaviour of the households.

When we focus on the influence of workplace location (obviously, only for the economically active households, Table 3.46), two categories of households exhibit a clear non-local behaviour. Households where both employed members work outside the extended study area (zones D to H), or those where one works in the study area and the other is employed elsewhere, are more regionally or nationally oriented than those working within the study area. There appears to be a strong link between commuting and shopping, which is not so clear for those households where both employed members work in zone C (which falls within the extended local economy).

A summary of the results from the multinomial logit analysis for firms and households are presented in Tables 3.48 and 3.49[19]. Compared to the analysis presented in the previous section, which focused on the predictors of local integration, the logit models attempt to explore non-local behaviours in more details, and to explain differences between them.

Whilst the extended local behaviour in terms of sales, purchases and labour concerns many firms (23% of the total), regional purchasing with local sales and labour is the most frequent form of spatial behaviour (28% of all firms). French firms and firms located in non peri-urban towns, along with larger, more productive and more input-intensive firms with non resident owner/managers, are consistently associated with strong regional purchasing and local sales and labour. All sectors, with the exception of construction and business services, are characterised by this behaviour.

Similar characteristics lead to national purchasing with local sales and labour, which is the second most frequent behaviour throughout the sample (20% of all firms). In addition to the previous factors, this behaviour also concerns firms located in small towns, branches of national firms and firms where the manager has moved from zones outside the region, although personal services tend to purchase less frequently in the national economy in comparison to the regional economy. 10% of firms adopt a regional behaviour in terms of purchases as well as of sales. They are more frequently French, small, highly productive firms with high input-intensity and a low potential of local vertical linkages, belonging to the manufacturing sector. In addition to all these characteristics, those having an international behaviour of both sales and purchases (only 7% of firms) are more frequently Dutch, located in small and tourism towns with a non-resident manager, or one that has moved from outside the region.

Moving onto household spatial behaviour, we find that 58% of all surveyed households exhibit extended local behaviour. The second most important group, comprising 33% of all households, are characterised by regional or national high order purchasing patterns.

[19] No summary table is presented for the farms because of the very poor results for this analysis.

This group concerns mostly the inhabitants of tourism and small towns, and non-farm households with adults working outside the study area. Managers and professionals as well as skilled manual workers and households that have moved from outside the region also tend to purchase high order goods and services in regional and national markets. Further, households where high order purchasing accounts for a greater proportion of total spend also tend to carry out their purchasing further afield. Households purchasing low as well as high order goods in regional or national markets are more rare: 6% of the surveyed households access all goods and services in regional markets, only 4% make all their purchasing nationally. However, in general they exhibit the same characteristics as those accessing such markets only for high order purchases.

Table 3.48. Summary of logit analysis of firm spatial behaviour (reference:extended local behaviour, 23.1% of surveyed firms)

	Local behaviour with regional purchases	**Regional behaviour**	**Local behaviour with national purchases**	**Local behaviour with national sales**	**International behaviour**	**Regional labour market**
Weight in sample	28.3%	9.6%	19.6%	5.8%	7.1%	6.7%
Local context	France Non peri-urban towns	France	Small towns Non peri-urban towns	Non peri-urban towns	Netherlands Small towns Tourism towns	
Firm's characteristics	International firms Larger firms High productivity High input- intensity	International firms Smaller firms High productivity High input- intensity	National and internat. firms Largest firms Intermediate to high productivity High input- intensity	International firms Largest firms High productivity	International firms Larger firms Younger firms Intermediate to high productivity High input- intensity	National and internat. firms Larger firms High productivity
Sector	Manufacturing sector Retailers and wholesalers Personal services	Manufacturing sector	Manufacturing sector Retailers and wholesalers		Manufacturing sector	Manufacturing sector
Manager's characteristics	Non resident		Moving from E-H Non resident		Moving from E-H Non resident	Moving from E-H Non resident
Firm's economic environment	Low local potential of vertical linkages	Low local potential of vertical linkages	Low local potential of vertical linkages	Low local potential of vertical linkages	Low local potential of vertical linkages Low local competition	Low local potential of vertical linkages

Table 3.49. Summary of logit analysis of household spatial behaviour (reference: extended local behaviour, 58.5% of surveyed households)

	More regional or national high order purchases	**More regional purchases**	**More national purchases**
Weight in sample	32.8%	5.7%	3.5%
Local context	Small towns Tourism towns	Small towns Tourism towns	Small towns Tourism towns Peri-urban towns
General household's characteristics	Non farm households Families with working adults		
Social classes and consumption behaviour	Higher consumption of high order goods and services Skilled manual Managers and professionals	Higher consumption of high order goods and services Skilled non manual Managers and professionals More wealthy retired	Skilled non manual Managers and professionals
Indigeneityand workplace location	Moved from outside the region (irrespective of moving date) One worker outside study area Both work outside extended study area	Moved from outside the region (whatever the moving date) Moved from C or D in the last 5 years One worker outside study area Both work outside extended study area	Moved from outside the region (irrespective of moving date) One worker outside study area Both work outside the extended study area

3.9 Conclusions

This section has presented the findings from two sets of analyses aimed at determining those characteristics of firm, farm, household and local context most strongly associated with various patterns of spatial economic activity. The principal aim, in accordance with that set out in the Technical Annex, was to determine the characteristics of entity and town most strongly associated with local economic integration. This aim was successfully and comprehensively met by employing a series of linear regression models to identify the relative influence of a large number of predictor variables on local integration, using proportional measures of 'local' (town plus 7 km hinterland) and 'extended local' (town plus 16 km hinterland) integration as dependent variables. Predictor variables were divided into three broad categories:

1) local context variables, including country and town type/size;
2) general entity characteristics, encompassing common sectoral and demographic divisions; and
3) more complex variables describing the relationship between entities and the local environment.

A series of pooled regressions, whereby country variations were introduced as dummy variables, highlighted some interesting patterns with regard to the influence of selected predictor variables on local, and extended local, integration. In particular, Poland and Portugal were found to have stronger levels of integration, and relatively little difference was found between local and extended local in terms of drivers of economic integration. Across all five countries relatively strong levels of integration were found to be characteristics of town locations, medium-sized agricultural towns, older, smaller firms, construction firms, arable farms, agricultural households and indigenous residents. However, the results of Chow tests, which were carried out to test for structural differences between the five country data sets, revealed that more robust models would be produced by running separate regression for each country. As such, 10 regression models were computed for firms (sales and purchases), farms (sales and purchases) and households (low and high order purchases) respectively, with dependent variables limited to proportions of transactions attributed to the 'local' economy.

Results of these models revealed some interesting differences between entity, town and other related characteristics with respect to the degree to which firms, farms and households are integrated into the local economy of small and medium-sized towns across Europe. Examining the local economic integration of firms, town locations, along with older, smaller and less productive firms using a higher proportion of unskilled labour were consistently associated with relatively strong local downstream linkages. Conversely, manufacturing firms and producer services stood out as sectors which were widely associated with weak downstream integration. A strong degree of local sourcing was most consistently associated with towns in areas of above average agricultural employment, firms in the construction sector, less productive and low input-intensive firms with owner/managers who were indigenous to the local area. Furthermore, while the potential relationship between a firm and its local environment had no significant influence over the strength of local downstream

linkages (as one might expect), a better matching between the availability of, and demand for, local inputs tended to increase the strength of local upstream integration.

In the farming sector, workforce size most consistently predicted the degree to which farms sold locally. In all cases, smaller farms were significantly more locally integrated and in Portugal and Poland, strong downstream linkages were also fostered to a greater degree in medium-sized agricultural towns and in peri-urban towns. A further characteristic unique to these two countries was the reliance on agricultural income: those farms deriving a greater proportion of their income from non-agricultural sources were found to be most strongly integrated into their locality in terms of both sales and purchases. In the case of both firm and farm (but not household) activity patterns, Portugal and Poland were found to share some unique characteristics with respect to predictors of local integration, in accordance with both enjoying relatively strong degrees of local economic integration in and around small and medium sized towns.

A stronger degree of local low order consumption expenditure was fostered by households living town locations, who were on lower incomes, working within the local area and, to a lesser degree, living in areas of relatively high agricultural employment. In all cases it was evident that people who commuted outside of their local area tended to combine the work journey with their low order shop and, as one might expect, peri-urban towns tended to suffer a higher degree of income leakage in comparison to other town types. Along with income level, in-migration was found to be the most important predictor of high order integration across the five countries. In four out of the five countries, in-migrants who had moved into the local area within the last five years were found to spend proportionally less on high order goods and services in their local area.

Having identified the key entity characteristics associated with strong local economic integration, a broader analysis of spatial economic behaviour was attempted, the aim of which was to:

a) examine the influence of such characteristics on regional, national and international integration; and
b) add depth the local integration analysis by examining in more detail the relationship between entity characteristics and spatial patterns of economic activity.

For example, whilst a positive correlation was revealed between the degree of local integration and firm workforce size, the spatial behaviour analyses revealed that only the largest firms had access to national or international markets, with SMEs more commonly reaching out to regional markets. In the same way, the analysis showed that firms with intermediate labour productivity tended to purchase inputs from national or international markets.

Summarising broader patterns of economic activity outside the local economy, national and international integration was more commonly associated with small towns, larger firms and those with relatively high levels of productivity. Whilst firms in the Netherlands were found to be more connected to the international economy, those in France were more likely to

be associated with regional activity patterns, along with smaller firms and those in the manufacturing sector. As might be expected, fewer dimensions of non-local activity were found in relation to household purchasing although some interesting patterns were revealed. Peri-urban towns were found to be more strongly associated with national purchasing patterns, whilst residents of tourism towns were found to be more connected to regional markets. The analysis clarified the role of agricultural towns as being more successful at retaining household income and it also showed some distinct patterns between shopping patterns and place of previous residence. Those residents that had moved from elsewhere in the region were found to be more strongly tied to the regional economy, whilst those that had moved from outside the region were found to be more strongly tied to the national economy.

3.10 Input-Output and SAM Results

3.10.1 Introduction

The following results are presented in sets of different analysis, of which there are three main types.

First, a general impression of the results is gauged from examining for each country, the aggregate SAM output multipliers. This identifies general trends in multipliers by size of town, zone of impact and industrial type. This analysis is followed by a look at the aggregate SAM household and wage multipliers, similarly divided into impacts on the productive and on the household and wage sectors of the economy.

Second, the focus turns to individual sectors and the analysis investigates which of these give the highest multipliers - 'the key sectors'. The top three industrial sectors in each town are highlighted, both in terms of their output and their employment. Following from this analysis, the average output and employment impact 'leakage' from zone A to zone B and vice versa is examined to see to what extent an investment in one zone is likely to have an effect in the other.

Third, we look at the nature of the linkages, and decompose them so the origin of the largest impacts can be identified. This was achieved in two stages. The first stage was to decompose into inter-regional and intra-regional effects, so it was possible to identify whether the major impact was caused within the zone where the impact was initially felt (intra-regional) or whether it was owing to flows between the zones (inter-regional). The second stage was to isolate, within the intra-regional flows, the industrial sector impact. This, in fact, gives the input-output multiplier, and isolating it helps us understand how much impact of change comes from within the productive sector, and how much arises from the induced impact of changes in household income and expenditure.

The following box, Box 3.1, encloses an explanation of the different types of multipliers used in this analysis.

Box 3.1. Explanation of multipliers

SAM output multiplier

This multiplier shows the adjustment in the local economy from an exogenous shock *in industrial demand* (e.g. due to extra exports, consumption or investments). The adjustment consists of impacts on industrial output, wage incomes (incomes from labour) and household incomes (incomes from labour, profits, government transfers) in town and hinterland.

For example, a SAM output multiplier of 1.85 for dairy farming can be decomposed in an output impact of 1.50, a wage income impact of 0.20 and a household income impact of 0.15. The output impact indicates that if the demand for dairy output will increase by €1 million, the towns' and hinterlands' economy will expand with €1.850 million (including the initial €1 million impact). Extra dairy production needs additional inputs of concentrates, power, water, use of contractors etc. This will generate additional production in the corresponding sectors, which will in turn ask for additional input deliveries from other sectors, etc. All things considered, the industrial output in town and hinterland will grow another €500,000. Further, the additional output will require more labour inputs resulting in €200,000 worth of additional wage payments by industries in town and hinterland. Finally, local households will gain from the initial demand impulse for dairy products as wages flow to these institutions. Total local household income will grow by €150,000.

SAM household income multiplier

This multiplier shows the adjustment in the local economy from an exogenous shock *in household incomes* (e.g. through a tax measure). The adjustment consists of impacts on industrial output, wage incomes, and household incomes in town and hinterland respectively from the household income shock.

For example, a SAM household income multiplier of 1.75 for the lowest household income group can be decomposed in an output impact of 0.60, a wage income impact of 0.10 and a household income impact of 1.05. The household income impulse indicates that if the lowest incomes will increase by €1 million, the towns' and hinterlands' economy will expand by €1.75 million (including the initial €1 million impact). The additional income will generate an additional output in town and hinterland of €600,000, which will in turn increase wage payments by €100,000. Finally, the total household income of town and hinterland can take advantage of another €50,000.

SAM wage income multiplier

This multiplier shows the adjustment in the local economy from an exogenous shock *in wage incomes* (e.g. through extra demand of particular skill types). The adjustment consists of impacts on industrial output, wage incomes and household incomes in town and hinterland respectively from the wage income shock.

For example, a SAM wage income multiplier of 2.00 for skilled manual functions can be decomposed in an output impact of 0.30, a wage income impact of 1.05 and a household income impact of 0.65. The wage income impulse indicates that if the demand for skilled manual functions increases by €1 million, the local economy will expand by €2 million (including the initial €1 million

impact). The additional demand for skills will generate an additional output in town and hinterland of €300,000, which will in turn increase wage payments with another €50,000. Finally, household incomes will gain from the additional demand for skills and grow by €650,000.

Employment multiplier
The *employment multiplier* indicates the additional employment generated in the town and hinterland's employment due to an initial employment increase in a particular industry. For example, an employment multiplier of 1.20 for the textile sector means that if the number of jobs in textile increases by 100, the local employment will expand by another 20 jobs.

Intra-regional multiplier
The *intra-regional multiplier* indicates the extent that the impacts on the local economy (in terms of output, wage income or household income) from an exogenous shock will be caused *within* the zone itself.

For example, to compare a SAM output multiplier of 1.50 for the towns' hotel sector with the intra-regional multiplier of 1.40 for this sector, we can first disregard the initial unitary change, and compare 0.4 with 0.5. Thus, this would indicate the 80% of the total impact on the local economy originating from a change in the demand for hotel activities within the town is accounted for within the town itself. The rest of the impact arises from cross flows between the town and hinterland.

Input-output multiplier
The input-output multiplier shows the adjustment within only the productive sector of a change in final demand in any one of the industrial sectors. It represents how much the total output of the productive sectors will change as a result of a one unit change in final demand for one of the industrial sectors.

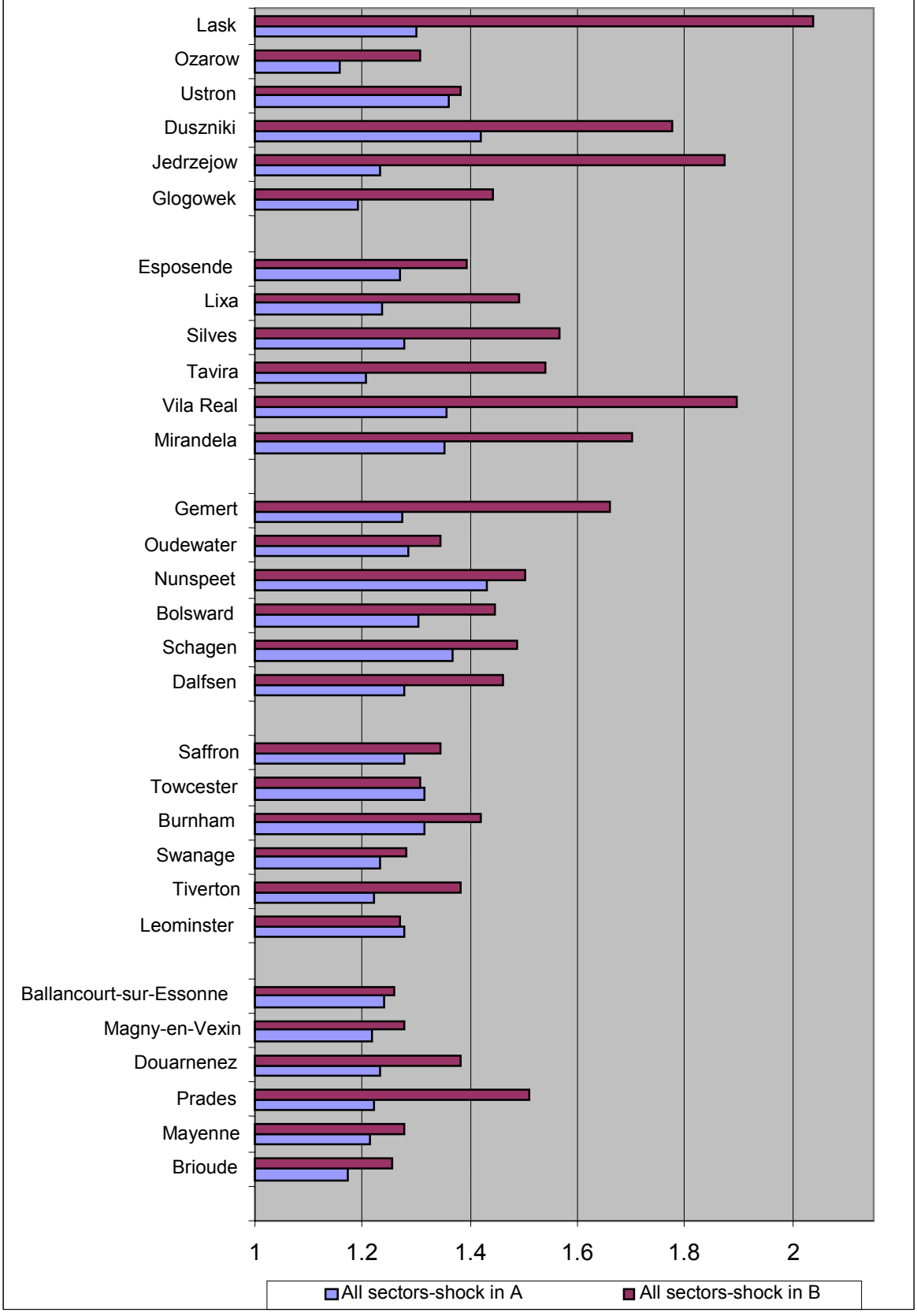
3.10.2 SAM output, household income and wage income multipliers - a comparison between countries

The next few figures compare the patterns of average multipliers across the five different countries, illustrating broad differences in average multiplier size, depending on the type and size of town and zonal location.

3.10.2.1 SAM output multipliers

Figure 3.7 compares the SAM output multipliers for the average sector in the studied towns in the UK, France, Netherlands, Portugal and Poland from an initial demand shock in zone A and zone B respectively. The most immediately noticeable result is the size of the Polish and Portuguese output multipliers in zone B compared to the other nations. They are on average much larger. The Netherlands zone B multipliers are the next largest, then the French and the smallest belong in the UK. Except for the UK towns of Leominster and Towcester, the hinterland multipliers exceed the multipliers of the town location (zone A).

Figure 3.7 SAM output multipliers in zone A and B



In general, the average multipliers from the town locations are a fairly similar size across the countries, with those in some of the Dutch and Polish towns being slightly bigger. The multipliers in the UK and France are generally very similar between zone A and zone B, probably relating to less differentiation in industrial structure between rural and urban.

3.10.2.2 SAM household income multipliers

Figure 3.8 compares the SAM household income multipliers for the average household income in the studied towns in the five countries from an initial household income impulse in zone A and zone B respectively. The figure shows that the multipliers for Portuguese and Polish towns are generally larger than for Dutch, French and UK towns. Except for Ozarow, Oudewater, Mayenne and Towcester, average SAM household income multipliers for Dutch, Polish, French and UK towns are larger from shock in zone A than from shock in zone B. On the other hand, SAM household income multiplier effects for Portuguese towns are pretty similar for shocks in zones A and B, and do not show a particular pattern. Also, although the Dutch multipliers are larger from zone A then from B, they are fairly even in size. It is only in Poland that there is a big difference between the size of the multipliers depending on whether they are from zone A or zone B. It may be due to the settlement patterns in Poland.

The multipliers in the medium-sized towns are larger than in the small towns, with the exception of the zone A impact on tourist towns in Poland, zone A impact on the agricultural towns in Portugal, and the agricultural towns and zone B impact on the tourist towns in France. As one would expect the medium-sized towns to have greater multipliers because of the expected greater diversity of industries, the interesting question is why these other smaller towns have larger multipliers. There does not appear to be any pattern regarding town type.

3.10.2.3 SAM wage income multipliers

Figure 3.9 emphasises once again the large multipliers coming out of Poland and Portugal, and the relatively very small wage income multipliers in France and the UK. This may well relate to a greater tradition of commuting longer distances to work within the latter two countries. Also, in both the UK and France (with the exception of Prades), all the zone B impacts are greater than the zone A impacts, the reverse of the household income multiplier effect. This may relate to those working in the towns commuting a greater distance (i.e. outside the local economy) compared to those who work in the hinterlands, thus spending less locally than those in the hinterlands. In the other three countries, there appears to be less difference between the A and B impact except in Oudewater, Ustron and Duszniki where the zone A impact is greater than that in zone B.

Figure 3.8. SAM household income multipliers in zone A and B

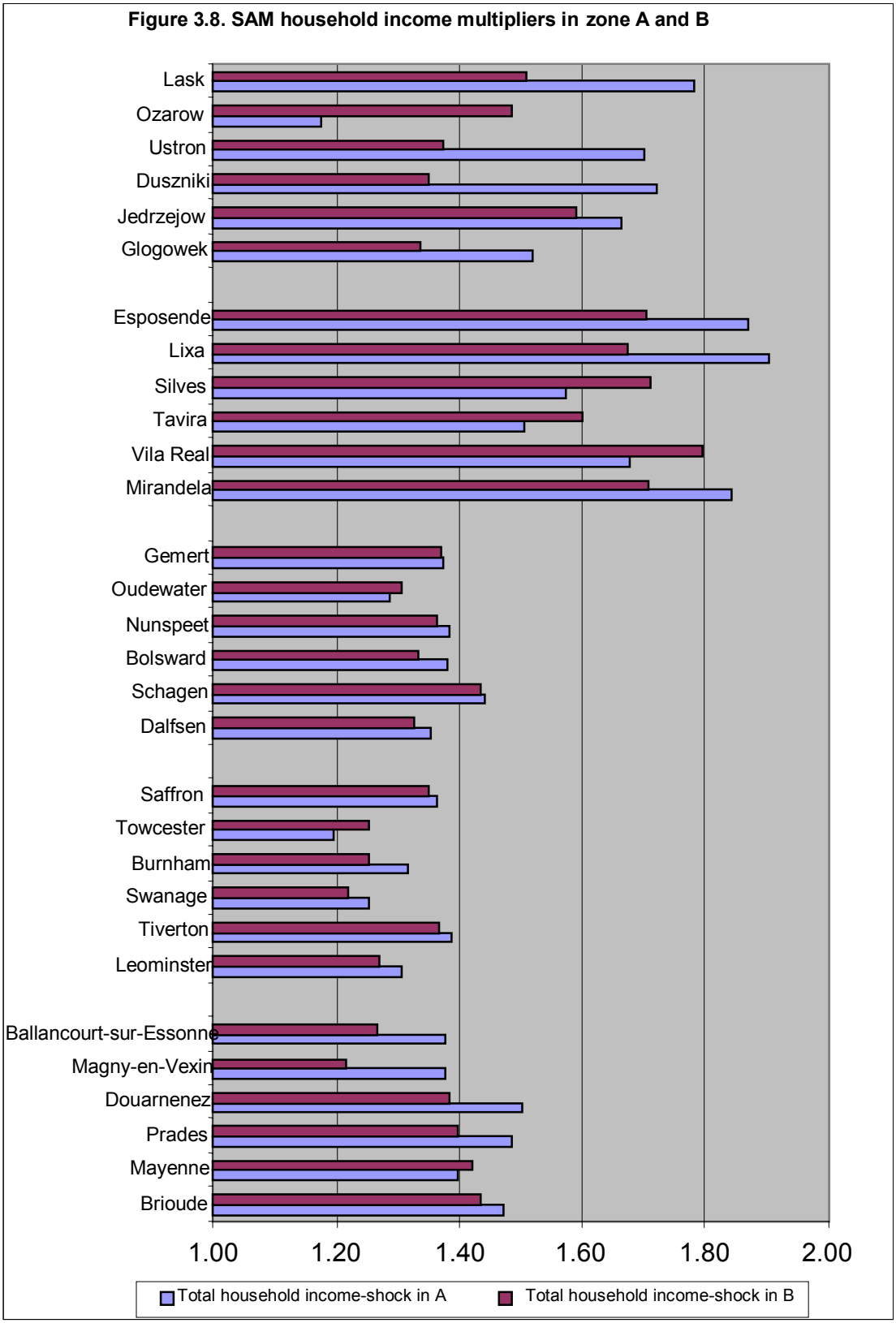
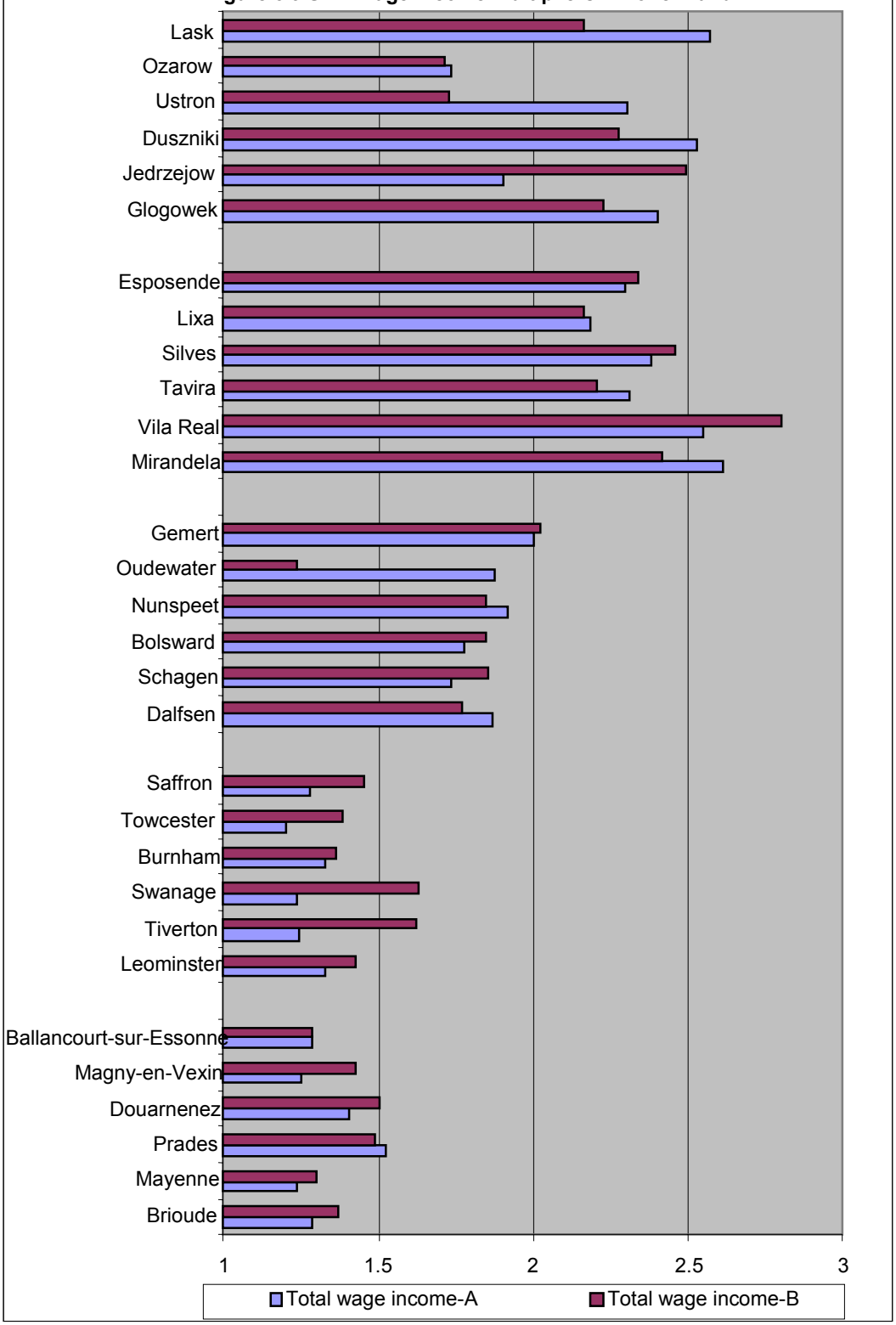


Figure 3.9 SAM wage income multipliers in zone A and B



3.10.3 SAM output, household income and wage income multipliers by individual country

This next section looks at each country's results in turn, disaggregating the average multipliers in terms of industrial sector, household income groups and wage skill groups.

3.10.3.1 UK Results

These multiplier results in Table 3.50 show for each UK town, the aggregate SAM output multiplier for each of the six broad industrial sectors (agriculture, manufacturing, construction, producer services, consumer services and public and personal services) in both zone A (the town) and zone B (the hinterland). This is the impact on output, income and wages of an exogenous change in industrial demand. The other two columns illustrate how this SAM multiplier is made up, and divided into its impact on output (i.e. from industrial sectors) and its impact on household income. These SAM output multipliers are between 1.1 and 1.56, and the average multipliers are larger in zone B than zone A in five out of the six towns, where the exception is Towcester, the small peri-urban town. Manufacturing industries appear to have the largest multipliers in the town locations in all towns except Towcester, where public and personal services have the largest multiplier, but manufacturing comes a close second. The manufacturing sector also has the largest multipliers in the hinterlands in the peri-urban towns and small agricultural town, and the second largest multipliers in the tourist towns and medium agricultural town.. Construction has large multipliers in the hinterlands of the agricultural towns, (largest multiplier in Tiverton's hinterland) although it is interesting to look at the split between impact on industrial output and household income, as the impact on household income is relatively much smaller for both towns. Agriculture also has significant multipliers in the hinterlands of Tiverton, and also in the hinterlands of the peri-urban towns where it is the second largest multiplier. Producer services have multipliers over 1.3 in the hinterlands of the small towns (Leominster, Swanage and Towcester), and in the Swanage hinterland, this is the largest multiplier (1.447). This is the only obvious trend regarding impact of town size which would appear to indicate that for the UK towns at least, this factor has little impact on the size of local linkages. Consumer services have low multipliers in all towns

Table 3.51 shows the SAM household multipliers, which indicate the change on output, incomes and wages of an external impact on household income (for example, income tax change). These multipliers are, on average, much larger than the output multipliers. This means that external changes that have a direct impact on peoples' incomes have a greater impact on the economy as a whole than do changes to the industrial final demand. Examining the income bands, it can be seen that, in all towns, the lowest income band displays a higher multiplier than the highest income band, but this pattern is not a continuum. On average, the multipliers are largest in zone A (the town) compared to zone B, but looking individually at the income bands, this pattern is not so obvious, for example for the low income band in Tiverton and Saffron, the multipliers are higher in zone B than in zone A. The multipliers seem to be more similar across income bands in zone A, and more disparate in zone B. It is interesting that most of the variation in the aggregate SAM household income multiplier appears to arise from the impact on industrial output, rather than impact on the household income itself.

Table 3.50. SAM Output and account output multipliers and effects on household incomes from exogenous shock in industrial demand.

Impact of shock in Zone A on A + B				Impact of shock in Zone B on A + B		
	SAM output multipliers	Impact on industrial output	Impact on household income	SAM output multipliers	Impact on industrial output	Impact on household income
Leominster – small agricultural						
Agriculture	1.187	1.113	0.014	1.210	1.126	0.015
Manufact.	1.501	1.365	0.027	1.437	1.320	0.019
Construction	1.059	1.042	0.003	1.399	1.351	0.009
Prod-service	1.272	1.210	0.012	1.416	1.279	0.023
Cons-service	1.126	1.068	0.011	1.119	1.084	0.007
Publ-service	1.028	1.009	0.004	1.224	1.201	0.004
Average	*1.196*	*1.134*	*0.012*	*1.301*	*1.227*	*0.013*
Tiverton- medium agricultural						
Agriculture	1.226	1.140	0.016	1.320	1.197	0.025
Manufact.	1.303	1.193	0.020	1.364	1.265	0.015
Construction	1.025	1.010	0.003	1.386	1.314	0.011
Prod-service	1.163	1.133	0.005	1.024	1.023	0.000
Cons-service	1.157	1.120	0.007	1.113	1.083	0.005
Publ-service	1.014	1.006	0.002	1.368	1.260	0.017
Average	*1.148*	*1.100*	*0.009*	*1.263*	*1.190*	*0.012*
Swanage – Small tourist						
Agriculture	1.166	1.072	0.010	1.055	1.017	0.006
Manufact.	1.418	1.292	0.014	1.292	1.215	0.010
Construction	1.028	1.012	0.001	1.036	1.014	0.004
Prod-service	1.156	1.118	0.004	1.447	1.238	0.028
Cons-service	1.093	1.066	0.003	1.230	1.172	0.009
Publ-service	1.025	1.006	0.002	1.022	1.006	0.003
Average	*1.148*	*1.095*	*0.006*	*1.180*	*1.110*	*0.010*
Burnham – medium tourist						
Agriculture	1.183	1.077	0.023	1.348	1.187	0.042
Manufact.	1.501	1.316	0.041	1.395	1.326	0.014
Construction	1.025	1.009	0.003	1.031	1.016	0.002
Prod-service	1.137	1.097	0.009	1.068	1.008	0.013
Cons-service	1.128	1.055	0.016	1.123	1.089	0.007
Publ-service	1.243	1.219	0.006	1.557	1.511	0.010
Average	*1.203*	*1.129*	*0.016*	*1.254*	*1.190*	*0.015*
Towcester – small peri-urban						
Agriculture	1.000	1.000	0.000	1.390	1.239	0.040
Manufact.	1.446	1.420	0.006	1.443	1.370	0.012
Construction	1.436	1.335	0.022	1.017	1.005	0.003
Prod-service	1.165	1.121	0.009	1.342	1.245	0.015
Cons-service	1.104	1.059	0.009	1.040	1.020	0.005
Publ-service	1.526	1.507	0.006	1.018	1.010	0.002
Average	*1.280*	*1.241*	*0.008*	*1.208*	*1.148*	*0.013*
Saffron – medium peri-urban						
Agriculture	1.000	1.000	0.000	1.332	1.210	0.032
Manufact.	1.445	1.317	0.026	1.469	1.306	0.032
Construction	1.169	1.118	0.008	1.069	1.038	0.008
Prod-service	1.045	1.018	0.006	1.157	1.012	0.034
Cons-service	1.051	1.019	0.007	1.078	1.028	0.011
Publ-service	1.020	1.006	0.003	1.212	1.200	0.002
Average	*1.122*	*1.080*	*0.008*	*1.219*	*1.132*	*0.020*

Agriculture = SIC 02, 05; industry = SIC 10, 11, 14-37, 40, 41; construction= SIC 45; producer services = SIC 60-67, 70-74; consumer services = SIC 50-52, 55; public services: SIC 70-85, 90-94.

Table 3.51. SAM HH income and account HH income multipliers, and effects on industrial output from exogenous shock in household income

Impulse in Zone A				**Impulse in Zone B**		
	SAM HH income multiplier	**Impact on output**	**Impact on HH income multiplier**	**SAM HH income multiplier**	**Impact on output**	**Impact on HH income multiplier**
Leominster: small agricultural						
Low incomes	1.366	0.342	1.006	1.380	0.357	1.006
Low-middle incomes	1.425	0.395	1.007	1.303	0.281	1.005
Middle-high incomes	1.271	0.252	1.005	1.199	0.184	1.004
High incomes	1.166	0.155	1.003	1.192	0.180	1.003
Average	*1.307*	*0.286*	*1.005*	*1.269*	*0.250*	*1.004*
Tiverton: medium agricultural						
Low incomes	1.458	0.436	1.004	1.618	0.588	1.006
Low-middle incomes	1.383	0.359	1.005	1.279	0.263	1.003
Middle-high incomes	1.496	0.472	1.004	1.311	0.292	1.004
High incomes	1.200	0.187	1.002	1.263	0.251	1.002
Average	1.384	0.363	1.004	1.368	0.348	1.004
Swanage: small tourist						
Low incomes	1.270	0.257	1.003	1.187	0.172	1.003
Low-middle incomes	1.314	0.297	1.003	1.283	0.258	1.006
Middle-high incomes	1.166	0.157	1.002	1.183	0.174	1.002
High incomes	1.262	0.243	1.004	1.221	0.204	1.004
Average	*1.253*	*0.238*	*1.003*	*1.218*	*0.202*	*1.004*
Burnham: medium tourist						
Low incomes	1.559	0.506	1.012	1.236	0.212	1.005
Low-middle incomes	1.296	0.272	1.005	1.380	0.347	1.007
Middle-high incomes	1.269	0.243	1.006	1.295	0.276	1.004
High incomes	1.139	0.127	1.003	1.098	0.089	1.002
Average	*1.316*	*0.287*	*1.006*	*1.252*	*0.231*	*1.005*
Towcester: small peri-urban						
Low incomes	1.229	0.218	1.002	1.251	0.237	1.003
Low-middle incomes	1.262	0.251	1.002	1.324	0.310	1.003
Middle-high incomes	1.135	0.129	1.001	1.317	0.304	1.002
High incomes	1.149	0.143	1.001	1.111	0.106	1.001
Average	*1.194*	*0.185*	*1.002*	*1.251*	*0.239*	*1.002*
Saffron: medium peri-urban						
Low incomes	1.544	0.515	1.007	1.728	0.684	1.010
Low-middle incomes	1.343	0.326	1.004	1.239	0.228	1.003
Middle-high incomes	1.364	0.342	1.005	1.232	0.221	1.003
High incomes	1.192	0.182	1.003	1.205	0.194	1.002
Average	*1.361*	*0.341*	*1.005*	*1.351*	*0.332*	*1.004*

Table 3.52. SAM Wage income and account wage income multipliers, and effects on industrial output from exogenous shock in wage income

Impulse in Zone A				**Impulse in Zone B**		
	SAM wage income multiplier	**Impact on output**	**Impact on wage income multiplier**	**SAM wage income multiplier**	**Impact on output**	**Impact on wage income multiplier**
Leominster: small agricultural						
Management/professional	1.253	0.039	1.002	1.575	0.096	1.005
Non-manual	1.397	0.075	1.004	1.240	0.042	1.002
Skilled manual	1.417	0.089	1.005	1.739	0.152	1.009
Partly/unskilled manual	1.241	0.051	1.003	1.145	0.029	1.002
Average	*1.327*	*0.064*	*1.004*	*1.425*	*0.080*	*1.005*
Tiverton: medium agricultural						
Management/professional	1.182	0.035	1.002	2.239	0.334	1.015
Non-manual	1.245	0.070	1.003	1.402	0.123	1.005
Skilled manual	1.244	0.061	1.003	1.448	0.085	1.004
Partly/unskilled manual	1.307	0.075	1.004	1.388	0.078	1.004
Average	*1.244*	*0.060*	*1.003*	*1.619*	*0.155*	*1.007*
Swanage: small tourist						
Management/professional	1.217	0.043	1.002	1.899	0.141	1.008
Non-manual	1.265	0.050	1.003	1.544	0.085	1.005
Skilled manual	1.226	0.040	1.002	1.607	0.093	1.005
Partly/unskilled manual	1.235	0.042	1.002	1.460	0.069	1.003
Average	*1.236*	*0.044*	*1.002*	*1.628*	*0.097*	*1.005*
Burnham: medium tourist						
Management/professional	1.354	0.050	1.004	1.476	0.077	1.006
Non-manual	1.315	0.055	1.004	1.252	0.047	1.004
Skilled manual	1.214	0.043	1.003	1.498	0.081	1.006
Partly/unskilled manual	1.444	0.089	1.006	1.222	0.036	1.003
Average	*1.332*	*0.059*	*1.004*	*1.362*	*0.060*	*1.005*
Towcester: small peri-urban						
Management/professional	1.170	0.020	1.001	1.834	0.151	1.005
Non-manual	1.126	0.018	1.001	1.108	0.011	1.000
Skilled manual	1.177	0.031	1.001	1.483	0.077	1.003
Partly/unskilled manual	1.338	0.059	1.002	1.113	0.019	1.001
Average	*1.203*	*0.032*	*1.001*	*1.385*	*0.065*	*1.003*
Saffron: medium peri-urban						
Management/professional	1.282	0.056	1.003	1.883	0.139	1.006
Non-manual	1.265	0.050	1.002	1.223	0.036	1.002
Skilled manual	1.333	0.083	1.004	1.459	0.078	1.003
Partly/unskilled manual	1.220	0.056	1.003	1.238	0.041	1.002
Average	*1.275*	*0.062*	*1.003*	*1.451*	*0.074*	*1.003*

As far as town size is concerned, on average, the multipliers are greater in the medium sized towns than in the small towns. This is more or less what one would expect given the likelihood of a more diverse economy in the larger towns.

Table 3.52 shows the multipliers resulting from an exogenous shock to the wage sector, first in total, then subdivided into impact on output and the wage impact multiplier. The range of multipliers is higher than for the output and household income multipliers, ranging from 1.05 to 2.2. In the agricultural towns, there appears to be a marked difference between the multipliers in zone A and zone B, with those in zone B being much larger. They are also larger in zone B in Swanage, the small tourist town, and Towcester, the small peri-urban town, but in the other two towns, larger in zone A, significantly in the case of Saffron, (medium peri-urban). As with the household incomes, the averages hide much variation. All bar Leominster, have higher multipliers from the lowest skill group (partly unskilled/manual) than from the highest skill group (management/professional) in zone A, but this is reversed in zone B, where the highest skill group has much higher multipliers in all towns. The size of the town also seems to have a different impact depending upon whether we are looking at zone A or zone B. In zone A, the multipliers are larger in the medium sized towns, and in zone B, they are slightly larger in the small towns.

3.10.3.2 French Results

Table 3.53 shows that the French SAM output multipliers range from 1.1 to 1.8, but are roughly the same dimensions as those in the UK. However, different patterns within the multipliers are revealed. The largest average multipliers are seen in the hinterlands of the tourist towns, and the town location of the medium-sized peri-urban town of Ballancourt. In the hinterland of every town bar Mayenne (the medium-sized agricultural town), the multipliers from the service sector (four producer services, one public services) are larger than those from the other sectors. In Mayenne, the agricultural industry has the largest multipliers within zone B, and the agricultural industry is also important within the hinterland of small agricultural town of Brioude. In the town location, for Mayennne, Prades and Douarnenez, Construction has the largest multipliers. Only in Ballancourt-sur Essonne does the manufacturing sector seem to be important. Producer services are important in all the hinterlands (with the exception of the medium-sized agricultural town of Mayenne), but they are important in the town location of Mayenne itself, and are in fact the largest of the six sectors in the other agricultural town of Brioude. Unlike the UK, consumer service multipliers are relatively large in the town locations of the tourist and peri-urban towns.

The difference between zone A and zone B multipliers also seems small, and three are smaller in zone A than zone B and three are larger. Similarly, the difference between small and medium-sized towns is not great. In general, the multipliers are greater in the medium-sized towns; only for the tourist towns is the small town average multiplier greater than that for the medium-sized towns.

Table 3.53. SAM output multiplier, account multiplier and impact of household incomes from an exogenous shock to the industrial sector

Impact of shock in Zone A on A + B				Impact of shock in Zone B on A + B		
	SAM output multipliers	Impact on industrial output	Impact on household income	SAM output Multipliers	Impact on industrial output	Impact on household income
Brioude – small agricultural						
Agriculture	1.000	1.000	0.000	1.224	1.159	0.014
Manufact.	1.112	1.085	0.006	1.124	1.109	0.003
Construction	1.105	1.060	0.010	1.176	1.102	0.018
Prod-service	1.254	1.159	0.022	1.613	1.314	0.050
Cons-service	1.117	1.091	0.006	1.206	1.156	0.011
Publ-service	1.209	1.096	0.027	1.037	1.023	0.004
Average	*1.133*	*1.082*	*0.012*	*1.230*	*1.144*	*0.016*
Mayenne – medium agricultural						
Agriculture	1.000	1.000	0.000	1.321	1.198	0.031
Manufact.	1.229	1.213	0.004	1.059	1.046	0.003
Construction	1.312	1.205	0.029	1.109	1.057	0.015
Prod-service	1.230	1.118	0.030	1.071	1.028	0.013
Cons-service	1.156	1.097	0.014	1.205	1.113	0.025
Publ-service	1.093	1.021	0.021	1.046	1.030	0.004
Average	*1.170*	*1.109*	*0.016*	*1.135*	*1.079*	*0.015*
Prades – small tourist						
Agriculture	1.000	1.000	0.000	1.090	1.038	0.010
Manufact.	1.209	1.140	0.014	1.581	1.495	0.014
Construction	1.383	1.284	0.018	1.596	1.364	0.030
Prod-service	1.191	1.080	0.022	1.819	1.474	0.045
Cons-service	1.327	1.076	0.050	1.109	1.043	0.014
Publ-service	1.169	1.033	0.029	1.202	1.108	0.019
Average	*1.213*	*1.102*	*0.022*	*1.400*	*1.254*	*0.022*
Douarnenez – medium tourist						
Agriculture	1.000	1.000	0.000	1.190	1.101	0.024
Manufact.	1.110	1.071	0.011	1.231	1.216	0.003
Construction	1.647	1.422	0.066	1.233	1.082	0.043
Prod-service	1.188	1.095	0.027	1.589	1.355	0.047
Cons-service	1.427	1.234	0.056	1.114	1.054	0.016
Publ-service	1.124	1.045	0.024	1.537	1.501	0.010
Average	*1.249*	*1.145*	*0.031*	*1.315*	*1.218*	*0.024*
Magny-en-Vexin small peri-urban						
Agriculture	1.000	1.000	0.000	1.058	1.022	0.006
Manufact.	1.215	1.192	0.004	1.249	1.230	0.002
Construction	1.081	1.054	0.004	1.128	1.013	0.023
Prod-service	1.144	1.090	0.008	1.623	1.375	0.031
Cons-service	1.891	1.697	0.026	1.061	1.026	0.005
Publ-service	1.155	1.084	0.011	1.008	1.007	0.000
Average	*1.248*	*1.186*	*0.009*	*1.188*	*1.112*	*0.011*
Ballancourt-sur-Essonne medium peri-urban						
Agriculture	1.000	1.000	0.000	1.040	1.011	0.008
Manufact.	3.457	3.283	0.043	1.181	1.163	0.005
Construction	1.065	1.028	0.008	1.446	1.388	0.017
Prod-service	1.224	1.119	0.026	1.629	1.470	0.035
Cons-service	1.853	1.313	0.119	1.115	1.077	0.009
Publ-service	1.251	1.171	0.021	1.040	1.005	0.011
Average	*1.642*	*1.486*	*0.036*	*1.242*	*1.186*	*0.014*

Agriculture = SIC 02, 05; industry = SIC 10, 11, 14-37, 40, 41; construction= SIC 45; producer services = SIC 60-67, 70-74; consumer services = SIC 50-52, 55; public services: SIC 70-85, 90-94.

Table 3.54. SAM HH income and account HH income multipliers, and effects on industrial output from exogenous shock in household income

Impulse in Zone A				**Impulse in Zone B**		
	SAM HH income multiplier	**Impact on output**	**Impact on HH income multiplier**	**SAM HH income multiplier**	**Impact on output**	**Impact on HH income multiplier**
Brioude: small agricultural						
Low incomes	2.008	0.953	1.014	1.755	0.706	1.012
Low-middle incomes	1.773	0.732	1.011	1.705	0.660	1.011
Middle-high incomes	1.456	0.429	1.007	1.654	0.613	1.010
High incomes	1.471	0.441	1.007	1.583	0.556	1.007
Average	*1.677*	*0.639*	*1.010*	*1.674*	*0.634*	*1.010*
Mayenne: medium agricultural						
Low incomes	1.697	0.632	1.013	1.754	0.708	1.009
Low-middle incomes	1.675	0.630	1.009	1.826	0.775	1.010
Middle-high incomes	1.565	0.531	1.007	1.467	0.438	1.006
High incomes	1.512	0.475	1.008	1.465	0.440	1.005
Average	*1.612*	*0.567*	*1.009*	*1.628*	*0.590*	*1.007*
Prades: small tourist						
Low incomes	1.970	0.878	1.029	1.680	0.602	1.024
Low-middle incomes	1.723	0.643	1.025	1.768	0.679	1.027
Middle-high incomes	1.560	0.499	1.019	1.369	0.331	1.012
High incomes	1.683	0.609	1.024	1.462	0.409	1.017
Average	*1.734*	*0.657*	*1.024*	*1.570*	*0.505*	*1.020*
Douarnenez: medium tourist						
Low incomes	2.293	1.194	1.025	1.524	0.482	1.010
Low-middle incomes	1.811	0.757	1.014	1.787	0.722	1.017
Middle-high incomes	1.634	0.591	1.011	1.477	0.444	1.008
High incomes	1.640	0.605	1.009	1.395	0.368	1.007
Average	*1.845*	*0.787*	*1.015*	*1.546*	*0.504*	*1.011*
Magny-en-Vexin: small periurban						
Low incomes	1.755	0.709	1.009	1.293	0.282	1.002
Low-middle incomes	1.561	0.538	1.005	1.484	0.462	1.005
Middle-high incomes	1.553	0.525	1.006	1.388	0.371	1.004
High incomes	1.286	0.272	1.003	1.284	0.272	1.003
Average	*1.539*	*0.511*	*1.005*	*1.362*	*0.347*	*1.003*
Ballancourt-sur-Essonne: medium periurban						
Low incomes	1.524	0.514	1.002	1.192	0.186	1.001
Low-middle incomes	1.804	0.783	1.005	1.464	0.447	1.003
Middle-high incomes	1.510	0.479	1.006	1.495	0.486	1.002
High incomes	1.387	0.377	1.002	1.323	0.313	1.002
Average	*1.556*	*0.538*	*1.004*	*1.368*	*0.358*	*1.002*

Table 3.55. SAM Wage income and account wage income multipliers, and effects on industrial output from exogenous shock in wage income

Impulse in Zone A				**Impulse in Zone B**		
	SAM wage income multiplier	**Impact on output**	**Impact on wage income multiplier**	**SAM wage income multiplier**	**Impact on output**	**Impact on wage income multiplier**
Brioude: small agricultural						
Management/professional	1.442	0.139	1.006	2.196	0.467	1.022
Non-manual	1.338	0.129	1.006	1.389	0.153	1.007
Skilled manual	1.240	0.082	1.004	1.376	0.147	1.006
Partly/unskilled manual	1.283	0.093	1.004	1.274	0.104	1.004
Average	*1.326*	*0.111*	*1.005*	*1.559*	*0.218*	*1.010*
Mayenne: medium agricultural						
Management/professional	1.313	0.106	1.006	2.350	0.427	1.021
Non-manual	1.240	0.083	1.005	1.262	0.097	1.005
Skilled manual	1.259	0.086	1.005	1.198	0.068	1.004
Partly/unskilled manual	1.287	0.095	1.005	1.142	0.047	1.002
Average	*1.275*	*0.093*	*1.005*	*1.488*	*0.160*	*1.008*
Prades: small tourist						
Management/professional	1.665	0.212	1.018	2.425	0.539	1.048
Non-manual	1.625	0.204	1.017	1.556	0.202	1.018
Skilled manual	1.651	0.254	1.020	1.647	0.215	1.018
Partly/unskilled manual	1.499	0.180	1.014	1.429	0.138	1.012
Average	*1.610*	*0.213*	*1.017*	*1.764*	*0.274*	*1.024*
Douarnenez: medium tourist						
Management/professional	1.535	0.197	1.011	2.495	0.521	1.031
Non-manual	1.428	0.166	1.008	1.459	0.155	1.009
Skilled manual	1.454	0.155	1.008	1.712	0.226	1.012
Partly/unskilled manual	1.583	0.207	1.010	1.301	0.098	1.005
Average	*1.500*	*0.181*	*1.009*	*1.742*	*0.250*	*1.014*
Magny-en-Vexin: small periurban						
Management/professional	1.307	0.087	1.004	2.223	0.389	1.015
Non-manual	1.356	0.104	1.004	1.196	0.049	1.002
Skilled manual	1.239	0.074	1.003	1.328	0.091	1.003
Partly/unskilled manual	1.214	0.066	1.003	1.147	0.039	1.002
Average	*1.279*	*0.083*	*1.003*	*1.474*	*0.142*	*1.005*
Ballancourt-sur-Essonne: medium periurban						
Management/professional	1.412	0.168	1.004	1.903	0.262	1.006
Non-manual	1.388	0.153	1.003	1.118	0.038	1.001
Skilled manual	1.214	0.064	1.003	1.171	0.048	1.001
Partly/unskilled manual	1.265	0.075	1.004	1.062	0.017	1.000
Average	*1.320*	*0.115*	*1.003*	*1.314*	*0.091*	*1.002*

The SAM household income multipliers shown in Table 3.54 are quite large, averaging around 1.6, and are much larger than the output multipliers. This means that stimulation to the local economy through external change to incomes directly will have a greater impact on the local economy than through an external change in the industrial sectors. The low income bands have higher multipliers than the high incomes in all the towns but there is not a consistent pattern throughout the bands, in several towns the low-middle income group has the highest multiplier. This indicates that it may be more beneficial for the local economy to stimulate the low income, rather than the high-income groups within the towns. The town size seems to have little difference on the multipliers. The multipliers in zone A, however, seem to be higher than in zone B. The town type seems to influence the size of the multipliers, where the agricultural town multipliers are all around 1.6, multipliers in tourist zone A are the highest and above 1.7 (1.734, and 1.845) and those in tourist zone B around 1.5. In the peri-urban towns, they average around 1.5 in zone A and 1.36 in zone B.

The SAM wage income multipliers (Table 3.55) are again quite large compared to the output multipliers, especially in the tourist towns. The multipliers are also higher in zone B than zone A. The different skills groups also show a marked difference in size of multipliers with the largest multipliers consistently coming from shocks to the highest skill levels (management and professional). This is the other way round in the other countries, with the exception of the hinterlands of the UK towns.

In general, the multipliers are larger in the small towns, than the medium-sized towns (again counter-intuitive) with the exception of the peri-urban towns.

3.10.3.3 Dutch Results

This section presents different types of SAM multipliers for the studied Dutch towns. The sectors have been aggregated into six main industrial groups for which Table 3.56 shows the SAM output multipliers.

Most notable from Table 3.56 is that the average multipliers resulting from an impact in Zone B are all larger than those resulting from an impact in Zone A. This leads to the assumption that the industries in zone B are more locally integrated than those in Zone A. This is with the exception of Oudewater, where the multipliers are higher in zone A for all sectors apart from the manufacturing sector. However, when the six sectoral groups are examined, there is considerable variation from this pattern. The construction sector, in particular, has greater multipliers in zone A in five of the towns.

A similar pattern is found looking at the household income component, where we can see that the greatest impact comes from the service sector again when the shock is in zone A, but when the shock is in zone B, in Oudewater the greatest impact comes from the agricultural sector.

The agricultural towns have the most similar pattern with the multipliers, where in zone A the largest multipliers are found in construction, and in zone B, the public and consumer services, and next largest in agriculture. Other town types do not seem to influence the size of multipliers.

Table 3.56. SAM output multipliers and impacts on output and household incomes resulting from an exogenous shock in industrial demand

Impact of shock in Zone A on A + B				Impact of shock in Zone B on A + B		
	SAM output multipliers	Impact on industrial output	Impact on household income	SAM output multipliers	Impact on industrial output	Impact on household income
Dalfsen: agricultural town – small						
Agriculture	1.000	1.000	0.000	1.446	1.119	0.131
Manufact.	1.102	1.040	0.025	1.443	1.194	0.098
Construction	2.062	1.622	0.173	1.446	1.173	0.103
Prod-service	1.408	1.179	0.091	1.328	1.056	0.104
Cons-service	1.552	1.105	0.181	1.582	1.157	0.165
Publ-service	1.605	1.054	0.226	1.546	1.070	0.191
Average	*1.277*	*1.088*	*0.076*	*1.459*	*1.136*	*0.128*
Schagen: agricultural town – medium						
Agriculture	1.000	1.000	0.000	1.561	1.259	0.110
Manufact.	1.319	1.166	0.057	1.371	1.178	0.074
Construction	1.863	1.461	0.150	1.427	1.137	0.111
Prod-service	1.854	1.434	0.149	1.370	1.068	0.115
Cons-service	1.517	1.135	0.137	1.614	1.073	0.209
Publ-service	1.510	1.096	0.156	1.617	1.207	0.154
Average	*1.366*	*1.154*	*0.077*	*1.488*	*1.178*	*0.117*
Bolsward: tourist town – small						
Agriculture	1.000	1.000	0.000	1.361	1.188	0.072
Manufact.	1.294	1.157	0.049	1.407	1.200	0.080
Construction	1.722	1.281	0.156	1.382	1.090	0.112
Prod-service	1.531	1.318	0.086	1.570	1.201	0.155
Cons-service	1.773	1.109	0.255	1.533	1.073	0.191
Publ-service	1.385	1.081	0.112	1.614	1.115	0.204
Average	*1.305*	*1.104*	*0.075*	*1.449*	*1.164*	*0.116*
Nunspeet: tourist town – medium						
Agriculture	1.005	1.000	0.002	1.483	1.183	0.121
Manufact.	1.398	1.208	0.076	1.379	1.241	0.054
Construction	1.387	1.114	0.114	1.309	1.051	0.100
Prod-service	1.834	1.114	0.305	1.716	1.219	0.200
Cons-service	2.102	1.298	0.327	1.195	1.025	0.069
Publ-service	1.506	1.079	0.177	2.062	1.287	0.322
Average	*1.429*	*1.126*	*0.125*	*1.504*	*1.190*	*0.127*
Oudewater: urban town – small						
Agriculture	1.000	1.000	0.000	1.190	1.082	0.031
Manufact.	1.126	1.042	0.035	1.199	1.138	0.016
Construction	1.659	1.200	0.173	1.133	1.023	0.025
Prod-service	1.399	1.044	0.119	1.064	1.025	0.008
Cons-service	1.396	1.042	0.139	1.150	1.014	0.025
Publ-service	1.843	1.127	0.297	1.088	1.022	0.011
Average	*1.269*	*1.049*	*0.086*	*1.158*	*1.073*	*0.021*
Gemert: urban town – medium						
Agriculture	1.000	1.000	0.000	1.743	1.316	0.191
Manufact.	1.165	1.038	0.055	1.369	1.105	0.119
Construction	1.343	1.066	0.119	1.588	1.122	0.207
Prod-service	1.285	1.036	0.107	1.804	1.210	0.270
Cons-service	1.919	1.194	0.321	1.881	1.152	0.327
Publ-service	1.539	1.077	0.204	1.839	1.283	0.249
Average	*1.274*	*1.051*	*0.098*	*1.659*	*1.207*	*0.203*

Agriculture = SIC 02, 05; industry = SIC 10, 11, 14-37, 40, 41; construction= SIC 45; producer services = SIC 60-67, 70-74; consumer services = SIC 50-52, 55; public services: SIC 70-85, 90-94.

Table 3.57. SAM household income multipliers and impacts on output and household incomes resulting from exogenous shock in household income

Impact of shock in Zone A on A + B				Impact of shock in Zone B on A + B		
	SAM household income multiplier	Impact on industrial output	Impact on household income	SAM household income multiplier	Impact on industrial output	Impact on household income
Dalfsen: agricultural town – small						
Low	1.681	0.508	1.072	1.649	0.555	1.038
Low-middle	1.290	0.238	1.021	1.266	0.218	1.019
Middle-High	1.201	0.161	1.016	1.247	0.203	1.018
High	1.242	0.193	1.020	1.137	0.108	1.011
Average	*1.353*	*0.275*	*1.032*	*1.325*	*0.271*	*1.022*
Schagen: agricultural town – medium						
Low	1.663	0.514	1.058	1.534	0.450	1.032
Low-middle	1.485	0.380	1.038	1.565	0.466	1.037
Middle-High	1.378	0.304	1.028	1.418	0.341	1.029
High	1.236	0.192	1.017	1.222	0.185	1.014
Average	*1.441*	*0.347*	*1.035*	*1.435*	*0.360*	*1.028*
Bolsward: tourist town – small						
Low	1.556	0.467	1.033	1.683	0.550	1.052
Low-middle	1.468	0.343	1.048	1.340	0.273	1.027
Middle-High	1.250	0.213	1.014	1.190	0.155	1.014
High	1.246	0.206	1.015	1.115	0.100	1.006
Average	*1.380*	*0.307*	*1.027*	*1.332*	*0.270*	*1.025*
Nunspeet: tourist town – medium						
Low	1.365	0.279	1.035	1.582	0.448	1.055
Low-middle	1.608	0.419	1.077	1.351	0.262	1.037
Middle-High	1.352	0.261	1.038	1.291	0.218	1.030
High	1.208	0.160	1.020	1.229	0.175	1.022
Average	*1.383*	*0.280*	*1.043*	*1.363*	*0.276*	*1.036*
Oudewater: urban town – small						
Low	1.400	0.369	1.011	1.581	0.548	1.008
Low-middle	1.287	0.237	1.019	1.345	0.320	1.008
Middle-High	1.290	0.252	1.015	1.162	0.151	1.003
High	1.162	0.140	1.008	1.136	0.121	1.005
Average	*1.285*	*0.250*	*1.013*	*1.306*	*0.285*	*1.006*
Gemert: urban town – medium						
Low	1.611	0.484	1.056	1.630	0.489	1.064
Low-middle	1.452	0.322	1.057	1.371	0.297	1.033
Middle-High	1.231	0.189	1.019	1.304	0.233	1.032
High	1.203	0.165	1.017	1.177	0.136	1.018
Average	*1.374*	*0.290*	*1.037*	*1.371*	*0.289*	*1.037*

In general, Table 3.57 shows that the lower the income group, the higher the SAM income multiplier. In most of the towns, there is a very consistent pattern showing that the lower income groups have the highest multipliers; the low-middle income groups, the next highest etc. However, this pattern is not the same when the impact of these multipliers from a shock in zone A on the household income alone is analysed. This implies that the lower income groups have a relatively greater impact on the industrial output, as opposed to the impact on household income. This is not the case where there is an impact in zone B, and the household income impacts follow the trend set by the SAM household income multipliers where the household income multipliers are higher in the lower income groups.

Table 3.58. SAM wage income multipliers and impacts on output and wage incomes resulting from exogenous shock in skills wages

Impact of shock in Zone A on A + B				Impact of shock in Zone B on A + B		
	SAM wage income multiplier	Impact on industrial output	Impact on wage income	SAM wage income multiplier	Impact on industrial output	Impact on wage income
Dalfsen: agricultural town – small						
Management/prof	1.968	0.151	1.023	1.718	0.088	1.013
Non-manual	1.756	0.121	1.018	1.882	0.114	1.017
Skilled manual	1.832	0.130	1.018	1.667	0.101	1.014
Partly/unskilled manual	1.913	0.153	1.021	1.807	0.136	1.018
Average	*1.867*	*0.139*	*1.020*	*1.769*	*0.110*	*1.016*
Schagen: agricultural town – medium						
Management/prof	1.916	0.168	1.025	1.825	0.157	1.021
Non-manual	1.778	0.162	1.024	1.784	0.197	1.027
Skilled manual	1.527	0.099	1.015	1.968	0.247	1.034
Partly/unskilled manual	1.718	0.169	1.026	1.848	0.176	1.023
Average	*1.735*	*0.150*	*1.022*	*1.856*	*0.194*	*1.026*
Bolsward: tourist town – small						
Management/prof	1.716	0.125	1.017	1.824	0.098	1.012
Non-manual	1.758	0.142	1.020	1.875	0.096	1.010
Skilled manual	1.652	0.119	1.017	1.734	0.131	1.018
Partly/unskilled manual	1.964	0.247	1.043	1.940	0.192	1.029
Average	*1.772*	*0.158*	*1.024*	*1.843*	*0.129*	*1.017*
Nunspeet: tourist town – medium						
Management/prof	1.956	0.139	1.025	1.956	0.144	1.027
Non-manual	1.879	0.153	1.031	1.867	0.148	1.029
Skilled manual	1.944	0.174	1.037	1.770	0.139	1.028
Partly/unskilled manual	1.892	0.158	1.033	1.785	0.140	1.028
Average	*1.918*	*0.156*	*1.032*	*1.845*	*0.143*	*1.028*
Oudewater: urban town – small						
Management/prof	1.786	0.105	1.010	1.193	0.028	1.002
Non-manual	1.929	0.163	1.016	1.253	0.041	1.003
Skilled manual	2.002	0.175	1.013	1.240	0.045	1.003
Partly/unskilled manual	1.777	0.227	1.011	1.266	0.035	1.002
Average	*1.873*	*0.168*	*1.013*	*1.238*	*0.037*	*1.002*
Gemert: urban town – medium						
Management/prof	1.991	0.143	1.019	2.022	0.138	1.022
Non-manual	2.003	0.156	1.023	2.038	0.148	1.023
Skilled manual	1.871	0.146	1.023	2.061	0.162	1.026
Partly/unskilled manual	2.168	0.230	1.037	1.967	0.246	1.039
Average	*2.008*	*0.169*	*1.026*	*2.022*	*0.174*	*1.028*

Table 3.58 covers the wage income multipliers for the skills groups management and professional functions, non-manual functions, skilled manual functions, and partly and unskilled manual functions. The multipliers are higher than those for output and household income, and it appears that there is very little difference between the different skill levels. There are no obvious patterns of impact between zones, except in Oudewater, where there is a large difference between the impact in zone A (average 1.873) and zone B (average 1.238). This is due to the relatively large numbers of people living in the hinterland who

commute for their work to other towns. Oudewater is a peri-urban town with the large town of Utrecht nearby.

3.10.3.4 Poland

This section presents the SAM output multipliers (Table 3.59), SAM household income multipliers (Table 3.60) and SAM wage income multipliers (Table 3.61) for the studied Polish towns.

Once again, we see that the SAM output multipliers are largest when the impact is felt in zone B. The relative importance of the agricultural sector is shown in all the towns where the largest (in four towns) or second largest multipliers (in two towns) from zone B are from the agricultural sector. When the impact is in zone A, the service sector multipliers are the largest in all of the towns, and these are especially large in the tourism towns. When we look at the impact on the household income, we can see that the zone B impact is much greater than that from zone A, and mainly from the agricultural and service sectors and not manufacturing.

Table 3.60 shows the SAM household income multipliers are large for the lowest income group, especially in the medium-sized towns. This seems to stem from a particularly large impact on the industrial output of the region. There is a consistent pattern from the household income groups in the hinterlands, of a continuum where the lowest income group having the highest multipliers and the highest income group the lowest multipliers. Within the town locations, this pattern is there but not so consistently. With the exception of the small urban town of Ozarow, all the impacts to zone A produce bigger multipliers than those to the hinterlands.

The SAM wage income multipliers are shown in Table 3.61. These multipliers for the Polish towns are again very large, particularly so from impacts in zone A in four of the towns. From zone A, apart from the medium-sized agricultural town of Jedrzejow, all of the greatest impacts are seen in the partly/unskilled manual group. This pattern is not seen in zone B, where the greatest multipliers lie in the non-manual wage groups for the medium tourism town and peri-urban towns and in the non-manual and the managerial wage groups for the small tourism towns and the medium-sized agricultural town. The sources of the differentials in these wage group multipliers lies not on their impact on wage income itself, but their impact on the industrial output.

Table 3.59. SAM output multipliers and impacts on output and household incomes resulting from an exogenous shock in industrial demand

Impact of shock in Zone A on A + B				Impact of shock in Zone B on A + B		
	SAM output multipliers	Impact on industrial output	Impact on household income	SAM output Multipliers	Impact on industrial output	Impact on household income
Glogowek: agricultural town – small						
Agriculture	1.110	1.076	0.016	1.791	1.326	0.229
Industry	1.061	1.024	0.018	1.103	1.022	0.040
Construction	1.653	1.188	0.223	1.476	1.084	0.195
Prod-service	1.182	1.090	0.044	1.702	1.137	0.282
Cons-service	1.370	1.117	0.122	1.568	1.108	0.228
Publ-service	1.689	1.298	0.189	1.709	1.172	0.265
Average	*1.344*	*1.132*	*0.334*	*1.558*	*1.141*	*0.207*
Jedrzejow: agricultural town – medium						
Agriculture	1.001	1.001	0.000	2.327	1.623	0.339
Industry	1.217	1.152	0.026	1.271	1.128	0.064
Construction	1.219	1.113	0.043	1.383	1.275	0.050
Prod-service	1.314	1.119	0.080	2.167	1.578	0.282
Cons-service	1.197	1.112	0.034	1.685	1.326	0.169
Publ-service	1.231	1.089	0.052	1.091	1.040	0.018
Average	*1.197*	*1.098*	*0.376*	*1.654*	*1.328*	*0.154*
Duszniki: tourist town – small						
Agriculture	1.423	1.153	0.122	1.689	1.157	0.162
Industry	1.204	1.131	0.036	1.522	1.170	0.229
Construction	1.670	1.372	0.148	1.235	1.033	0.149
Prod-service	1.180	1.097	0.040	1.397	1.173	0.154
Cons-service	1.416	1.242	0.094	1.588	1.221	0.222
Publ-service	2.205	1.672	0.257	1.802	1.214	0.259
Average	*1.516*	*1.278*	*0.502*	*1.539*	*1.162*	*0.196*
Ustron: tourist town – medium						
Agriculture	1.036	1.005	0.012	2.190	1.393	0.363
Industry	1.284	1.152	0.052	1.083	1.046	0.015
Construction	1.170	1.094	0.031	1.220	1.148	0.024
Prod-service	1.293	1.176	0.039	1.119	1.093	0.007
Cons-service	2.317	1.568	0.300	1.166	1.084	0.031
Publ-service	1.956	1.343	0.275	1.189	1.071	0.044
Average	*1.509*	*1.223*	*0.569*	*1.328*	*1.139*	*0.081*
Ozarow: urban town – small						
Agriculture	1.068	1.049	0.007	1.456	1.213	0.103
Industry	1.275	1.219	0.020	1.303	1.257	0.017
Construction	1.224	1.077	0.051	1.073	1.039	0.014
Prod-service	1.205	1.143	0.025	1.372	1.252	0.049
Cons-service	1.268	1.049	0.075	1.528	1.303	0.092
Publ-service	1.419	1.083	0.124	1.165	1.057	0.042
Average	*1.243*	*1.103*	*0.130*	*1.316*	*1.187*	*0.053*
Lask: urban town – medium						
Agriculture	1.105	1.033	0.035	2.939	1.815	0.536
Industry	1.180	1.098	0.039	1.712	1.471	0.112
Construction	1.488	1.243	0.117	2.209	1.579	0.290
Prod-service	1.422	1.244	0.086	1.892	1.439	0.209
Cons-service	1.437	1.222	0.103	1.431	1.175	0.120
Publ-service	1.611	1.220	0.186	2.489	1.410	0.506
Average	*1.374*	*1.177*	*0.631*	*2.112*	*1.481*	*0.296*

Agriculture = SIC 02, 05; industry = SIC 10, 11, 14-37, 40, 41; construction= SIC 45; producer services = SIC 60-67, 70-74; consumer services = SIC 50-52, 55; public services: SIC 70-85, 90-94.

Table 3.60. SAM household income multipliers and impacts on output and household incomes resulting from exogenous shock in household income

Impact of shock in Zone A on A + B				Impact of shock in Zone B on A + B		
	SAM household income multiplier	Impact on industrial output	Impact on household income	SAM household income multiplier	Impact on industrial output	Impact on household income
Glogowek: agricultural town – small						
Low	1.958	0.846	1.054	1.591	0.524	1.033
Low-middle	1.495	0.449	1.023	1.493	0.449	1.021
Middle-High	1.270	0.248	1.011	1.196	0.173	1.011
High	1.354	0.312	1.020	1.074	0.062	1.006
Average	*1.519*	*0.464*	*1.027*	*1.338*	*0.302*	*1.018*
Jedrzejow: agricultural town – medium						
Low	2.271	1.175	1.038	2.149	1.011	1.059
Low-middle	1.549	0.510	1.015	1.765	0.680	1.036
Middle-High	1.287	0.257	1.013	1.313	0.278	1.015
High	1.539	0.487	1.021	1.122	0.108	1.006
Average	*1.661*	*0.607*	*1.022*	*1.587*	*0.519*	*1.029*
Duszniki: tourist town – small						
Low	2.453	1.269	1.090	1.922	0.786	1.064
Low-middle	1.660	0.596	1.031	1.316	0.265	1.023
Middle-High	1.277	0.253	1.012	1.091	0.079	1.006
High	1.490	0.428	1.030	1.064	0.054	1.005
Average	*1.720*	*0.637*	*1.041*	*1.348*	*0.296*	*1.024*
Ustron: tourist town – medium						
Low	2.291	1.070	1.089	1.828	0.704	1.053
Low-middle	1.715	0.588	1.051	1.465	0.405	1.025
Middle-High	1.261	0.220	1.016	1.135	0.120	1.007
High	1.534	0.450	1.036	1.061	0.054	1.003
Average	*1.701*	*0.582*	*1.048*	*1.372*	*0.320*	*1.022*
Ozarow: urban town – small						
Low	1.350	0.314	1.014	2.132	1.040	1.036
Low-middle	1.167	0.154	1.005	1.450	0.409	1.016
Middle-High	1.090	0.083	1.003	1.287	0.259	1.011
High	1.088	0.080	1.003	1.073	0.067	1.002
Average	*1.174*	*0.158*	*1.006*	*1.485*	*0.444*	*1.017*
Lask: urban town – medium						
Low	2.544	1.383	1.077	2.020	0.877	1.068
Low-middle	1.740	0.651	1.043	1.618	0.530	1.042
Middle-High	1.261	0.231	1.014	1.337	0.292	1.021
High	1.578	0.501	1.037	1.063	0.056	1.003
Average	*1.781*	*0.691*	*1.043*	*1.510*	*0.439*	*1.034*

Table 3.61. SAM wage income multipliers and impacts on output and wage incomes resulting from exogenous shock in skills wages

Impact of shock in Zone A on A + B				Impact of shock in Zone B on A + B		
	SAM wage income multiplier	Impact on industrial output	Impact on wage income	SAM wage income multiplier	Impact on industrial output	Impact on wage income
Glogowek: agricultural town – small						
Management/prof	2.340	0.357	1.023	2.163	0.143	1.010
Non-manual	2.342	0.403	1.023	2.158	0.162	1.011
Skilled manual	2.403	0.423	1.025	2.133	0.165	1.012
Partly/unskilled manual	2.532	0.511	1.031	2.453	0.475	1.031
Average	*2.404*	*0.423*	*1.026*	*2.227*	*0.236*	*1.016*
Jedrzejow: agricultural town – medium						
Management/prof	2.096	0.365	1.019	2.607	0.589	1.041
Non-manual	1.768	0.268	1.015	2.424	0.400	1.029
Skilled manual	1.921	0.362	1.019	2.328	0.527	1.035
Partly/unskilled manual	1.830	0.344	1.018	2.618	0.631	1.043
Average	*1.904*	*0.335*	*1.018*	*2.494*	*0.537*	*1.037*
Duszniki: tourist town – small						
Management/prof	2.449	0.481	1.032	4.728	0.653	1.061
Non-manual	2.419	0.458	1.030	1.547	0.126	1.013
Skilled manual	2.465	0.508	1.032	1.272	0.072	1.007
Partly/unskilled manual	2.796	0.775	1.058	1.557	0.122	1.012
Average	*2.532*	*0.556*	*1.038*	*2.276*	*0.243*	*1.023*
Ustron: tourist town – medium						
Management/prof	1.979	0.261	1.029	1.574	0.194	1.020
Non-manual	2.386	0.427	1.047	2.090	0.198	1.018
Skilled manual	2.387	0.419	1.050	1.460	0.038	1.004
Partly/unskilled manual	2.481	0.461	1.052	1.804	0.064	1.006
Average	*2.308*	*0.392*	*1.044*	*1.732*	*0.124*	*1.012*
Ozarow: urban town – small						
Management/prof	1.385	0.032	1.002	1.872	0.100	1.006
Non-manual	1.823	0.106	1.006	2.049	0.216	1.013
Skilled manual	1.873	0.086	1.005	1.392	0.071	1.004
Partly/unskilled manual	1.870	0.142	1.009	1.549	0.149	1.009
Average	*1.738*	*0.091*	*1.006*	*1.716*	*0.134*	*1.008*
Lask: urban town – medium						
Management/prof	2.543	0.529	1.040	1.992	0.125	1.009
Non-manual	2.371	0.447	1.035	2.640	0.567	1.048
Skilled manual	2.653	0.619	1.045	2.334	0.412	1.034
Partly/unskilled manual	2.722	0.633	1.047	1.684	0.290	1.025
Average	*2.572*	*0.557*	*1.042*	*2.163*	*0.348*	*1.029*

3.10.3.5 Portugal

This section presents the SAM output multipliers (Table 3.62), SAM household income multipliers (Table 3.63) and SAM wage income multipliers (Table 3.64) for the studied Portuguese towns.

Overall, the SAM output multipliers are very large, especially in the hinterlands of the agricultural towns, where many of the sectors have multipliers over 2.0. Similar to the Netherlands, most of the multipliers are larger where the impact originates in zone B. Where the impact is in zone A, the greatest impact is from the public service sector, in four of the towns and the construction sector in the other two. Where the impact is in zone B, construction has the largest multiplier in four out of six of the towns. The other two towns, Tavira (tourist, small) and Esposende (peri-urban medium) have largest multipliers for public services. The agricultural multipliers are also very high (over 2.0) in the agricultural towns.

The household income impact mirrors the total impact in zone A, but in zone B, only for the agricultural towns. For the other town types, the total impact on household income seems to be greater from the service sector.

Table 3.63 shows the SAM household income multipliers. These multipliers are particularly high on average, but show wide variation between the different income groups, where in general, the low income groups have higher multipliers. However the consistent pattern observed in the Netherlands data is only seen here in the tourist towns, although the highest income group in each town does have the lowest multiplier in both zone A and zone B. There are no obvious patterns as regards town size or type.

Table 3.64 shows that on average, the SAM wage income multipliers are also very high. In the small towns, the multipliers are larger when they are from zone A. In the medium-sized towns, they are larger from zone B. In general, it would also appear that the more skilled workers have a lower multiplier impact, with the partly/unskilled manual workers having the largest multipliers. This is consistently the case for the agricultural towns when the impact is in zone A, but not for the other locations.

Table 3.62. SAM output multipliers and impacts on output and household incomes resulting from an exogenous shock in industrial demand

Impact of shock in Zone A on A + B				Impact of shock in Zone B on A + B		
	SAM output multipliers	Impact on industrial output	Impact on household income	SAM output multipliers	Impact on industrial output	Impact on household income
Mirandela: agricultural town – small						
Agriculture	1.000	1.000	0.000	2.085	1.324	0.353
Manufact.	1.159	1.060	0.047	1.340	1.223	0.054
Construction	1.465	1.233	0.109	2.361	1.711	0.296
Prod-service	1.622	1.308	0.151	1.526	1.280	0.116
Cons-service	1.350	1.117	0.112	1.438	1.155	0.132
Publ-service	2.076	1.283	0.382	1.454	1.192	0.123
Average	*1.445*	*1.167*	*0.989*	*1.701*	*1.314*	*0.179*
Vila Real: agricultural town – medium						
Agriculture	1.116	1.078	0.019	2.063	1.288	0.383
Manufact.	1.203	1.137	0.033	1.590	1.407	0.090
Construction	2.078	1.684	0.194	2.371	1.740	0.313
Prod-service	1.574	1.315	0.127	2.288	1.658	0.311
Cons-service	1.431	1.182	0.122	1.577	1.282	0.146
Publ-service	1.661	1.308	0.173	2.028	1.392	0.315
Average	*1.511*	*1.284*	*0.702*	*1.986*	*1.461*	*0.260*
Tavira: tourist town – small						
Agriculture	1.517	1.125	0.175	1.658	1.168	0.224
Manufact.	1.048	1.018	0.014	1.439	1.363	0.033
Construction	1.074	1.046	0.013	1.557	1.467	0.039
Prod-service	1.246	1.130	0.056	1.507	1.282	0.105
Cons-service	1.333	1.078	0.122	1.314	1.122	0.087
Publ-service	1.795	1.186	0.292	2.246	1.417	0.377
Average	*1.336*	*1.097*	*0.388*	*1.620*	*1.303*	*0.144*
Silves: tourist town – medium						
Agriculture	2.011	1.288	0.340	1.634	1.254	0.178
Manufact.	1.035	1.021	0.007	1.570	1.355	0.103
Construction	1.689	1.215	0.229	1.847	1.432	0.196
Prod-service	1.057	1.027	0.014	1.629	1.377	0.121
Cons-service	1.280	1.124	0.074	1.458	1.166	0.140
Publ-service	2.772	1.584	0.578	1.953	1.366	0.272
Average	*1.641*	*1.210*	*0.380*	*1.682*	*1.325*	*0.168*
Lixa: urban town – small						
Agriculture	1.338	1.064	0.116	1.688	1.158	0.230
Manufact.	1.190	1.140	0.022	1.325	1.243	0.036
Construction	1.336	1.086	0.107	2.189	1.873	0.139
Prod-service	1.317	1.219	0.041	1.499	1.313	0.080
Cons-service	1.276	1.107	0.071	1.197	1.044	0.067
Publ-service	1.875	1.436	0.180	1.991	1.676	0.138
Average	*1.388*	*1.175*	*1.302*	*1.648*	*1.384*	*0.115*
Esposende: urban town – medium						
Agriculture	1.226	1.056	0.076	1.549	1.159	0.176
Manufact.	1.295	1.211	0.037	1.253	1.137	0.052
Construction	1.799	1.660	0.060	1.147	1.038	0.048
Prod-service	1.480	1.284	0.084	1.604	1.347	0.113
Cons-service	1.277	1.073	0.088	1.386	1.165	0.100
Publ-service	1.508	1.264	0.108	1.650	1.140	0.233
Average	*1.431*	*1.258*	*1.109*	*1.432*	*1.164*	*0.120*

Agriculture = SIC 02, 05; industry = SIC 10, 11, 14-37, 40, 41; construction= SIC 45; producer services = SIC 60-67, 70-74; consumer services = SIC 50-52, 55; public services: SIC 70-85, 90-94.

Table 3.63. SAM household income multipliers and impacts on output and household incomes resulting from exogenous shock in household income

Impact of shock in Zone A on A + B				Impact of shock in Zone B on A + B		
	SAM household income Multiplier	Impact on industrial output	Impact on household income	SAM household income multiplier	Impact on industrial output	Impact on household income
Mirandela: agricultural town – small						
Low	1.761	0.627	1.065	1.748	0.643	1.050
Low-middle	2.189	0.971	1.105	1.906	0.749	1.075
Middle-high	1.992	0.798	1.093	1.807	0.696	1.053
High	1.431	0.351	1.038	1.368	0.306	1.030
Average	*1.843*	*0.687*	*1.075*	*1.707*	*0.598*	*1.052*
Vila Real: agricultural town – medium						
Low	1.645	0.536	1.054	1.701	0.592	1.053
Low-middle	1.797	0.675	1.060	1.647	0.550	1.048
Middle-high	1.842	0.714	1.063	2.331	1.112	1.108
High	1.431	0.365	1.033	1.507	0.423	1.041
Average	*1.679*	*0.572*	*1.052*	*1.797*	*0.669*	*1.063*
Tavira: tourist town – small						
Low	1.660	0.555	1.050	1.915	0.796	1.054
Low-middle	1.576	0.497	1.038	1.622	0.550	1.033
Middle-high	1.489	0.409	1.038	1.572	0.497	1.035
High	1.307	0.265	1.020	1.289	0.245	1.020
Average	*1.508*	*0.431*	*1.036*	*1.599*	*0.522*	*1.036*
Silves: tourist town – medium						
Low	2.002	0.829	1.083	1.867	0.744	1.059
Low-middle	1.582	0.508	1.036	1.842	0.731	1.053
Middle-high	1.443	0.394	1.024	1.772	0.644	1.062
High	1.267	0.225	1.021	1.368	0.308	1.029
Average	*1.574*	*0.489*	*1.041*	*1.712*	*0.607*	*1.051*
Lixa: urban town – small						
Low	1.820	0.726	1.039	1.842	0.776	1.029
Low-middle	2.517	1.380	1.059	1.981	0.903	1.034
Middle-high	1.767	0.697	1.030	1.612	0.558	1.023
High	1.520	0.473	1.020	1.258	0.234	1.010
Average	*1.906*	*0.819*	*1.037*	*1.673*	*0.618*	*1.024*
Esposende: urban town – medium						
Low	1.954	0.844	1.048	1.988	0.896	1.040
Low-middle	2.331	1.174	1.069	1.761	0.687	1.032
Middle-high	1.755	0.678	1.033	1.609	0.537	1.032
High	1.439	0.389	1.021	1.464	0.405	1.026
Average	*1.870*	*0.772*	*1.043*	*1.705*	*0.631*	*1.033*

Table 3.64. SAM wage income multipliers and impacts on output and wage incomes resulting from exogenous shock in skills wages

Impact of shock in Zone A on A + B				Impact of shock in Zone B on A + B		
	SAM wage income multiplier	Impact on industrial output	Impact on wage income	SAM wage income multiplier	Impact on industrial output	Impact on wage income
Mirandela: agricultural town – small						
Management/prof	2.464	0.426	1.051	2.386	0.452	1.044
Non-manual	2.524	0.481	1.057	2.473	0.480	1.047
Skilled manual	2.618	0.544	1.065	2.199	0.399	1.035
Partly/unskilled manual	2.850	0.759	1.087	2.614	0.627	1.060
Average	*2.614*	*0.553*	*1.065*	*2.418*	*0.490*	*1.046*
Vila Real: agricultural town – medium						
Management/prof	2.441	0.416	1.039	2.700	0.608	1.059
Non-manual	2.480	0.449	1.043	2.651	0.563	1.056
Skilled manual	2.562	0.506	1.049	2.905	0.758	1.075
Partly/unskilled manual	2.707	0.646	1.061	2.950	0.811	1.079
Average	*2.547*	*0.504*	*1.048*	*2.802*	*0.685*	*1.067*
Tavira: tourist town – small						
Management/prof	2.243	0.262	1.023	2.261	0.381	1.032
Non-manual	2.275	0.307	1.028	2.319	0.401	1.032
Skilled manual	2.246	0.287	1.025	1.842	0.273	1.020
Partly/unskilled manual	2.481	0.474	1.041	2.411	0.505	1.043
Average	*2.311*	*0.333*	*1.029*	*2.208*	*0.390*	*1.032*
Silves: tourist town – medium						
Management/prof	2.204	0.288	1.023	2.459	0.440	1.041
Non-manual	2.300	0.294	1.027	2.400	0.370	1.037
Skilled manual	2.390	0.368	1.030	2.652	0.624	1.059
Partly/unskilled manual	2.650	0.567	1.049	2.323	0.504	1.046
Average	*2.386*	*0.379*	*1.032*	*2.458*	*0.484*	*1.046*
Lixa: urban town – small						
Management/prof	2.220	0.422	1.025	2.274	0.405	1.022
Non-manual	2.055	0.354	1.021	2.189	0.375	1.020
Skilled manual	2.161	0.414	1.024	2.102	0.336	1.018
Partly/unskilled manual	2.315	0.648	1.035	2.086	0.228	1.013
Average	*2.188*	*0.460*	*1.026*	*2.162*	*0.336*	*1.018*
Esposende: urban town – medium						
Management/prof	1.984	0.286	1.021	2.220	0.376	1.028
Non-manual	2.331	0.475	1.034	2.330	0.434	1.032
Skilled manual	2.457	0.548	1.039	2.199	0.377	1.027
Partly/unskilled manual	2.412	0.601	1.041	2.603	0.634	1.041
Average	*2.296*	*0.477*	*1.034*	*2.338*	*0.455*	*1.032*

3.10.3.6 Summary of results for SAM output, household income and wage income multipliers

On average, the hinterland output multipliers are much larger in Portugal and Poland than in the other countries. However the town location multipliers are of more similar dimensions across the different countries. This has two implications. Not only that any investment in industrial activity in the hinterlands of Portugal and Poland is likely to have a bigger impact on the local economy than in the other countries, but also that there is a greater difference between the hinterland and town functioning in Portugal and Poland. This may be due to the greater difference in industrial structure between 'rural' and 'urban' (namely regarding the percentage of the workforce engaged in agriculture).

The household income and wage income multipliers are also higher in Portugal and Poland than in the other countries. This means that when there are outside shocks to household and wage income, more of the impact is retained within the local economy in these countries. A tradition of commuting long distances to work in the UK, France and the Netherlands may go someway to explaining lower wage income multipliers.

Across all the countries, the household income and wage income multipliers are larger than the output multipliers. This implies that a greater impact on the local economy would be felt from an exogenous shock to household income (e.g. tax changes) or wage incomes (e.g. changes in the minimum wage) than investments in local industry.

On the whole, the hinterland output multipliers tend to be larger than those within the town locations, which implies that a greater benefit to the economy would be felt from investing in firms in the hinterlands rather than in the towns themselves. However, when the average multipliers are disaggregated by sector, considerable variation between the sectors is shown.

The reverse is shown for the household income which tend to have a greater impact within the town location rather than in the hinterlands. Once again, when this impact is disaggregated by income bands, considerable differentiation is found, for example the largest wage income multiplier in the UK towns is found for the lowest income group in the hinterlands of Tiverton.

The wage income multipliers tend to be higher in the hinterlands compared to the town locations for the UK and France. There is less differentiation in the other countries.

It is very interesting to see the difference between the output multipliers in all the countries when the output sectors are disaggregated. For the UK, the manufacturing sector had the largest multipliers. In France, it was the service sectors with the highest multipliers. In Portugal and the Netherlands, construction and service sectors were important. On the other hand, the hinterlands of Poland emphasized the importance of the agricultural sector.

In general it was the low income groups which had the highest multipliers and the high income groups with the lowest. This has an important policy implication of greater local benefits by boosting the incomes of the lowest as opposed to the highest income groups.

It is the low skill groups that have the higher multipliers in Portugal and in the town locations in Poland. However, in the hinterlands in Poland, the higher multipliers come from the higher skill groups. A similar story is seen in France and the hinterlands of the UK where the highest multipliers come from the management/professional groups. The Netherlands shows little differentiation.

The medium towns usually have higher multipliers than the small towns, but this is what one would expect given a greater likelihood of a more diverse economy.

3.10.4 Output and employment multipliers for key sectors and the division of their impact in the local economy

This section considers all the sectors (Appendix 7) in each town, and ranks them from high to low in terms of their SAM output multipliers and employment multipliers respectively. The full results are given in Appendix 32, however here we shall examine the sectors with the highest multipliers, usually indicated as *key sectors*, which thus generate the largest impacts on town and hinterland from an exogenous injection in industrial demand or employment. Section 3.10.4.1 pays attention to the key sectors in the UK towns, while sections 3.10.4.2 to 3.10.4.5 focus on the French, the Dutch, the Polish and the Portuguese key sectors respectively. Section 3.10.5 makes a comparison among all study towns.

3.10.4.1 The UK

Table 3.65 highlights the three key sectors for output in both zone A and zone B. Thus, the key sectors in the first column represent those industries, which have the greatest direct, indirect and induced output impact on the locality from an exogenous shock to their final demand. The second column gives the output multiplier for the key sector (impact on zone A + zone B) and, as we are interested in the potential of a sector to influence the surrounding economy, the third and fourth column shows the impact only on zone B both as part of the multiplier and then as a percentage of the total impact. This means it gives a measure of how much of the multiplier impact from the sector in zone A is affecting sectors in zone B. The next four columns do the same but for sectors in the hinterland location, zone B.

Where there is an exogenous change to output in zone A, it can be seen that Banking and financial services is the sector with the largest output multiplier in five out of six of the UK towns (the exception being Saffron-Walden, the medium peri-urban town. The energy sector is amongst the top three sectors in four out of six of the towns, and Chemicals, plastics, rubber and glass, and Food and drink appear twice. Very little of the impact however is transferred to the hinterland (between 0-13%) except in the peri-urban towns. In Towcester, between 35-59% of the total impact of the key sectors is felt in the hinterland, and in Saffron-Walden, the Forestry and fishing sector has most of their impact (87%) in the hinterland.

Table 3.65. Output multipliers of key sectors in zone A of the UK towns and their impacts in the hinterland

Impact of output shock in Zone A on A + B				Impact of output shock in Zone B on A + B			
Key sector/ town	Impact on output in A+B	Impact on output in B	Impact on B as % of impact on A+B	Key sector/ town	Impact on employment in A+B	Impact on employment in B	Impact on B as % of impact on A+B
Leominster – small agricultural							
Banking and financial	2.099	0.002	0%	Metals, etc	1.483	0.026	6%
Energy	1.426	0.000	0%	Construction	1.391	0.051	13%
Food, drink	1.409	0.013	3%	Transport Services	1.351	0.043	13%
Tiverton – medium agricultural							
Banking and financial	2.0803	0.000	0%	Banking and financial	2.072	0.647	60%
Energy	1.4502	0.000	0%	Food, drink	1.511	0.052	10%
Transport Services	1.326	0.001	0%	Chemicals etc	1.510	0.079	16%
Swanage – small tourist							
Banking and financial	2.082	0.006	1%	Wholesale, retail	1.689	0.141	21%
Chemicals, etc	1.391	0.002	1%	Metals etc	1.473	0.012	3%
Energy	1.386	0.002	1%	Transport services	1.336	0.010	3%
Burnham – medium tourist							
Banking and financial	2.1079	0.008	1%	Banking and financial	2.700	0.100	6%
Metals, etc	1.4651	0.006	1%	Coal, oil ,gas	1.579	0.004	1%
Food, drink	1.4335	0.057	13%	Public admin.	1.574	0.061	11%
Towcester – small peri-urban							
Banking and financial	2.254	0.447	35%	Banking and financial	2.143	0.053	5%
Textiles	1.550	0.379	47%	Metals etc	1.449	0.002	0%
Public Admin.	1.509	0.217	59%	Chemicals etc	1.413	0.007	2%
Saffron-Walden – medium peri-urban							
Forestry, fishing	2.329	1.157	87%	Banking and financial	2.117	0.043	4%
Energy	1.453	0.005	1%	Metals etc	1.439	0.007	2%
Chemicals etc	1.428	0.004	1%	Arable farming	1.331	0.173	52%

The key sector multipliers resulting from a shock to the output sectors in zone B, the hinterland of the town, show that although Banking and financial services are still the key sector in the hinterland in four out of the six towns, the Machinery, metals and computing industries now appear in four of the towns key sectors too. Chemicals, glass, plastics and rubber, Transport services and Food and drink appear in two of the towns. On average, a greater impact is felt in the town from multipliers initiated in the hinterland, but most impacts are still less than 15% with the exceptions of Banking and financial services (60%) and Chemicals, glass, plastics and rubber (16%) in Tiverton, Wholesale and retail in Swanage (21%) and Arable farming in Saffron-Walden (52%). This finding of over half the impact of the arable farming in Saffron-Walden being transferred to the town indicates in this case a strong link between farming and the local town.

It is interesting to see the lack of diversity of key sectors, with five sectors: Banking and financial services, Machinery, metals and computing, Energy, Chemicals, glass, plastics and rubber, and Food and drink dominating. The first four of these are what have been classified by the EU as 'knowledge-intensive' industries (i.e. tend to have a high percentage of graduates), so the discovery that these also have high local multipliers may be of great interest to policy makers who are also promoting them on the grounds of their abilities to retain young graduates in rural areas.

Table 3.66 shows that the same key sectors are also important from the point of view of employment. In all towns bar Towcester, at least two of the three key sectors are the same as they were for the output multipliers. Banking and financial services again comes in the top three sectors in all the towns except Saffron-Walden, and Food and drink, and Chemicals, glass, plastics and rubber are key employment sectors in three of the towns. Machinery, metals and computing, Coal, oil and gas, and Transport services also appear twice in the list of key employment sectors.

Table 3.66. Employment, employment multipliers and employment coefficients of key sectors in zone A of UK towns and their impact in the hinterland

Key sector	Employment of key sector in A (FTEs)	Total employment in A+B allied with key sector in A (FTEs)	Employment multiplier	Impact on B as % of impact on A+B from employment shock in A	Employment coefficient (FTEs per 1€m output)	Total employment in A+B from 1€m output shock in A (FTEs)
Leominster: small agricultural						
Transport Services	20	49	2.46	1%	1.03	2.44
Banking and Finance	580	932	1.61	0%	28.71	45.79
Food, drink	90	134	1.49	3%	6.01	8.77
Tiverton: medium agricultural						
Banking and finance	96	223	2.32	0%	3.62	8.41
Energy	42	62	1.48	0%	5.18	7.66
Food, drink	260	340	1.31	3%	6.49	8.49
Swanage: small tourist						
Banking, finance	50	112	2.234	9%	3.67	8.25
Chem, rubber	50	73	1.459	1%	4.73	6.94
Textiles	70	92	1.321	1%	7.48	9.91
Burnham: medium tourist						
Banking, finance	60	141	2.345	1%	3.56	8.36
Food, drink	130	220	1.696	45%	6.05	10.25
Metals	150	212	1.414	1%	8.60	12.17
Towcester: small peri-urban						
Banking,finance	20	61	3.069	50%	3.10	9.31
Chemicals, rubber	10	20	2.000	41%	3.13	6.03
Transport services	20	36	1.804	59%	3.12	5.26
Saffron: medium peri-urban						
Energy	30	46	1.522	1%	4.05	6.17
Chemicals, rubber	50	73	1.467	1%	4.52	6.65
Metals, computing	340	464	1.363	1%	8.93	12.20

Table 3.67. Employment, employment multipliers and employment coefficients of key sectors in zone B of UK towns and their impact in the town

Key sector	Employment of key sector in B (FTEs)	Total employment in A+B allied with key sector in B (FTEs)	Employment Multiplier	Impact on A as % of impact on A+B from employment shock in B	Employment Coefficient of key sector in B (FTEs per from 1€m output)	Total employment in A+B from 1€m output shock in B (FTEs)
Leominster: small agricultural						
Chemicals etc	10	15	1.471	3%	4.78	7.00
Food, drink	180	264	1.465	2%	6.01	9.15
Machinery etc	30	44	1.462	3%	8.82	11.07
Tiverton: medium agricultural						
Banking, finance	2	6	3.250	59%	2.53	5.39
Food, drink	14	29	2.055	4%	6.99	11.20
Chemicals etc	8	13	1.642	11%	4.82	7.70
Swanage: small tourist						
Wholesale, retail	120	169	1.405	18%	13.74	19.66
Machinery etc	40	56	1.405	1%	8.94	12.65
Chemicals etc	10	14	1.350	2%	4.57	6.26
Burnham: medium tourist						
Banking, finance	10	32	3.228	5%	4.27	13.78
Food, drink	293	523	1.784	2%	3.54	6.31
Energy	563	895	1.590	1%	6.10	9.71
Towcester: small peri-urban						
Banking, finance	14	33	2.392	4%	3.55	8.47
Food, drink	257	492	1.913	1%	6.15	10.12
Mixed farming	65	113	1.752	26%	4.31	7.16
Saffron: medium peri-urban						
Banking, finance	20	48	2.403	5%	3.56	8.53
Food, drink	17	27	1.616	2%	3.54	5.60
Chemicals etc	300	425	1.418	2%	4.77	6.76

Multipliers in this instance can be misleading, as a large multiplier where an industry has only a few people employed for a large value of output can mean a lesser impact on the actual number of jobs affected than a smaller multiplier in the case of an industry where there is a less high output value per person employed. Thus, the absolute size of employment impact is important, and the rest of the table indicates this in different ways. The second column shows the current employment in the sector in the town location in FTEs. The third column indicates the total employment, including that allied to the industry. These two columns are important as they indicate the relative importance of the industry within the locality. The multiplier in the next column gives the measure of the relationship between the two, i.e. for every FTE in a particular sector, how many FTEs in other sectors are related. The percentage in the fifth column is the percentage of the total impact that is felt in the hinterland, which can be seen as neglible in most cases with the exception of Towcester where over 40% of each sectors impact is felt in the hinterland, and the food and drink industry in Burnham where 45% of the impact is felt in the hinterland. The two columns shows the employment coefficient (number of FTEs for each €1 million of output) and the global employment coefficient (the number of FTEs in all related industries relating to a shock in zone A of €1 million. Thus, these indicate absolute numbers of FTE that one can relate to changes in output in that sector.

For example, for Banking and financial services in Leominster, for every million euro change in output, 29 FTEs would be affected directly and 46 including those affected indirectly. This compares with the Transport services, which has a higher multiplier but far fewer people employed in the locality and much lower employment coefficient, indicating that for every million euro change in output in that industry, only 1.06 FTE would be affected directly and 2.44 FTE indirectly.

For zone B, once again, the employment key sectors are similar to those key output sectors, though the food and drink sector takes on a greater importance. It only makes an appearance in two of the towns key output sectors, yet appears in the key sectors for employment in five out of six of the towns. Chemicals, rubber, plastics and glass and Banking and financial services are key sectors in four of the towns, where the Banking and financial services seem to have particularly high multipliers. However, it is in the Coal, oil and gas, and the Food and drink sector where the actual numbers of people in direct and allied employment are the greatest (895 FTEs in Burnham in the Coal, oil and gas sector, and for the Food and drink sector, 523 FTE in Burnham, and 492 FTE in Towcester, and 264 FTEs in Leominster)

Most of the sectors have only a small employment impact on zone A, with the exception of Banking and finance in Tiverton (59%), Mixed farming in Towcester (26%) and Wholesale and retail in Swanage (18%).

3.10 4.2 France

The French key sectors are a little more diverse than those from the UK towns, and more service sector orientated. Table 3.68 shows Banking and financial services are again very important and come up in four out of six of the towns, and Transport services also appear in four of the towns (as top sector in three of them). Construction is amongst the key sectors in the two tourist towns, and Wholesale and retail, Hotels and catering, and Chemicals, plastics, rubber and glass also appear in two of the town's key sector lists. The percentage of the total impact felt in the hinterland from an impact in zone A ranges from 0% (i.e. all the impact felt in zone A) to 92 % (i.e. almost all the impact in zone B). The largest share of impact in zone B are found in the key sectors in Ballancourt, where all three key sectors have over 80% of their impact felt in the hinterland. The fact that Ballancourt has a much more densely populated hinterland which in turn is close to a major urban area (Paris) may account for some of this.

Examining the impact of any exogenous change to the industries in zone B, once again the same key sectors appear. The service sectors have the largest output multipliers, with Banking and financial services as key sectors in five towns, and Transport services in four. Hotels and catering are key sectors in both the agricultural towns. Horticulture is a key sector in both Dourarnenez and Magny-en-Vexin. The impact on zone A from zone B is greater than from zone A to zone B, and greatest in the tourist towns of Prades and Dourarnez, with up to 99% of the impact being felt in zone A. Looking at the key sectors which have a big impact on the towns, most are in the services, with the largest from Public administration (99%), Other business (88%), Textiles (87%), then Banking and financial services has between 24% and 60%

Table 3.68. Output multipliers of key sectors in zone A of the French towns and their impacts in the hinterland

Impact of output shock in Zone A on A + B				Impact of output shock in Zone B on A + B			
Key sector/ town	Impact on output in A+B	Impact on output in B	Impact on B as % of impact on A+B	Key sector/ town	Impact on output in A+B	Impact on output in A	Impact on A as % of impact on A+B
Brioude							
Transport services	1.365	0.003	1%	Hotels, catering	1.390	0.053	14%
Chemicals etc	1.326	0.012	4%	Transport services	1.352	0.027	8%
Textiles	1.256	0.011	4%	Chemicals,etc	1.314	0.018	6%
Mayenne							
Transport services	1.439	0.006	1%	Banking, financial	1.462	0.109	24%
Hotels,catering	1.350	0.005	1%	Hotels, catering	1.424	0.049	12%
Banking, financial	1.348	0.004	1%	Food, drink	1.346	0.021	6%
Prades							
Food, drink	1.342	0.122	36%	Other Business	2.066	0.938	88%
Banking, financial	1.320	0.006	2%	Textiles	2.031	0.900	87%
Construction	1.303	0.050	17%	Banking, financial	1.726	0.408	56%
Douarnenez							
Transport services	1.532	0.006	1%	Horticulture	1.501	0.040	8%
Construction	1.428	0.007	2%	Public Admin.	1.488	0.483	99%
Banking, financial	1.422	0.004	1%	Banking, financial	1.454	0.274	60%
Magny-en-Vexin							
Wholesale, retail	1.480	0.007	1%	Banking, financial	1.626	0.196	31%
Banking, financial	1.445	0.002	0%	Horticulture	1.604	0.029	5%
Hotels, catering	1.388	0.022	6%	Transport services	1.422	0.025	6%
Ballancourt-sur-Essin							
Chemicals etc	2.168	0.949	81%	Banking, financial	1.616	0.175	28%
Machinery etc	2.104	1.016	92%	Transport services	1.517	0.048	9%
Transport services	2.093	0.930	85%	Construction	1.489	0.069	14%

The impact of an employment shock in zone A seems to follow a similar pattern to that of an output shock with Transport services key sectors in both the agricultural and peri-urban towns. The Energy industries, Banking and financial services, and Machinery, metals and computing appearing as a key sectors for employment in three out of six of the towns. The largest employment impact in the hinterland from a shock in zone A is seen in the Food and drink industry in Prades, where 86% of the employment impact is felt in the hinterland. For every person employed in the Food and drink industry in Prades, there are two others employed in the hinterland in supporting industries. Other industries with large impacts in the hinterlands are Food and drink in Brioude (40%), Textiles in Prades (43%) and Metals, machinery and computing in Ballancourt (44%).

As for zone A, the zone B key sectors include more industrial sectors, although still Banking and financial services are important. This time, however, Food and drink is a key sector for employment in all of the six towns. Banking and financial services is a key sector in four of the towns, and Coal, oil and gas in three towns.

In general, the impact of industries in zone B upon zone A is greater than the reverse, the impact of zone A on zone B, with the majority of the key sectors having over 15% of their impact in the town. The largest impacts are seen in the Banking and financial services in Dourarnenez (71%) and in the Machinery, metals and computing industries in Prades (61%). These large impacts on the 'other zone' emphasise the importance of the linkages between town and hinterland.

Table 3.69. Employment, employment multipliers and employment coefficients of key sectors in zone A of French towns and its impact in the hinterland

Key sector	Employment of key sector in A (FTEs)	Total employment in A+B allied with key sector in A (FTEs)	Employment multiplier (for key sectors in zone A)	Impact on B as % of impact on A+B from employment shock in A	Employment coefficient (FTEs per 1€m output)	Total employment in A+B from 1€m output shock in A (FTEs)
Brioude – small agricultural						
Chemicals etc	11	16	1.532	10%	1.56	2.39
Food, drink	165	225	1.365	40%	2.42	3.31
Transport services	242	326	1.347	1%	6.54	8.80
Mayenne – medium agricultural						
Transport services	235	324	1.377	2%	6.54	9.00
Energy	85	114	1.343	2%	2.15	2.88
Machinery etc	1008	1346	1.336	0%	1.80	2.41
Prades – small tourist						
Food, drink	39	116	2.970	86%	2.42	7.19
Textiles	38	52	1.363	43%	2.10	2.87
Banking, finance	74	99	1.324	4%	3.96	5.24
Dourarnenez – medium tourist						
Energy	15	23	1.540	6%	0.114	0.176
Chemicals etc	35	51	1.469	3%	1.56	2.29
Banking, finance	132	185	1.399	1%	3.96	5.54
Magny-en-Vexin – small peri-urban						
Banking, finance	27	37	1.372	1%	3.96	5.44
Transport services	146	192	1.317	0%	6.53	8.60
Machinery etc	113	149	1.311	4%	2.10	2.76
Ballancourt-sur-Essonne medium peri-urban						
Machinery etc	133	207	1.561	44%	2.51	3.93
Energy	24	33	1.378	12%	2.15	2.97
Transport services	100	136	1.358	3%	6.53	8.87

Table 3.70. Employment, employment multipliers and employment coefficients of key sectors in zone B of French towns and its impact in the town

Key sector	Employment of key sector in B (FTEs	Total employment in A+B allied with key sector in B (FTEs)	Employment Multipliers (for key sectors in B)	Impact on A as % of impact on A+B from employment shock in B	Employment coefficient of key sector (FTEs per 1€m output)	Total employment change in A+B from 1€m output shock in B (FTEs)
Brioude – small agricultural						
Chemicals etc	11	17	1.575	19%	1.56	2.46
Food, drink	64	86	1.350	33%	2.42	3.27
Energy	8	11	1.343	20%	2.35	3.16
Mayenne – medium agricultural						
Food, drink	37	62	1.674	7%	2.42	4.06
Banking, finance	8	12	1.553	33%	3.26	5.05
Energy	23	30	1.296	40%	2.12	2.75
Prades – small tourist						
Machinery etc	20	35	1.738	61%	2.00	3.47
Food and drink	17	25	1.490	7%	2.42	3.61
Banking, finance	6	9	1.449	21%	2.32	2.89
Dourarnenez – medium tourist						
Banking, finance	1	2	2.051	71%	1.63	3.34
Food, drink	21	35	1.659	7%	2.42	4.02
Textiles	5	7	1.441	37%	2.64	3.81
Magny-en-Vexin – small peri-urban						
Food, drink	4	6	1.594	22%	2.42	3.86
Banking, finance	8	12	1.525	26%	3.96	6.04
Machinery etc	163	222	1.367	7%	1.62	2.21
Ballancourt-sur-Essonne medium peri-urban						
Energy	60	90	1.492	19%	0.96	1.44
Food, drink	105	149	1.422	12%	2.42	3.45
Chemicals etc	112	153	1.365	18%	1.56	2.13

3.10.4.3 The Netherlands

Table 3.71 indicates the key sectors in zone A and B of the Dutch towns in terms of output. In the town location (zone A), Construction appears as a key sector in four out the six towns and therefore seems to be most important in the industry group. Hotels and catering, and Machinery, metals and computing are also important sectors in three of the towns. Public business is a key sector in both the peri-urban towns. The impact on the hinterlands' output as share in the total impact is on average larger than in the UK and France, and ranges from 3% for Transport services in Dalfsen to 78% for Machinery in Nunspeet. For each €1 million investment in the machinery sector in zone A of Nunspeet, 424,000 euros worth of output will be generated in allied industries in the hinterland.

Agriculture is the most important sector in terms of output multipliers in zone B of the Dutch towns and is ranked as a key sector in each town at least once, and twice in the medium peri-urban town of Germert. Food and drink are important in the agricultural towns, and Nunspeet, the medium-sized tourist town. Other industrial types which are ranked are the Textile, wood, leather

sector and Chemical, rubber, glass and plastics. Banking and financial services are important in Bolsward, the small tourist town, and in Schagen. In general, impacts on the other zone is larger from an initial shock in zone B than from an initial shock in zone A, with many of the sectors having the majority of their impact in the town location.

Table 3.71 Output multipliers of key sectors in zone A of the Dutch towns and their impacts in the hinterland

Impact of output shock in Zone A on A + B				Impact of output shock in Zone B on A + B			
Key sector/ town	Impact on output in A+B	Impact on output in B	Impact on B as % of impact on A+B	Key sector/ town	Impact on output in A+B	Impact on output in A	Impact on A as % of impact on A+B
Dalfsen: agricultural town – small							
Construction	1.622	0.114	18%	Chemicals etc	1.395	0.333	84%
Transport services	1.354	0.012	3%	Food, drink	1.316	0.241	76%
Hotels, catering	1.163	0.010	6%	Mixed farming	1.287	0.112	39%
Schagen: agricultural town – medium							
Construction	1.4613	0.031	7%	Food, drink	1.512	0.440	86%
Banking, financial	1.4381	0.170	39%	Horticulture	1.352	0.058	16%
Machinery etc	1.4325	0.019	4%	Forestry, fishing	1.332	0.165	50%
Bolsward: tourist town – small							
Chemicals, etc	1.3471	0.019	5%	Livestock	1.411	0.089	22%
Banking, financial	1.3459	0.009	3%	Textiles,etc	1.370	0.343	93%
Construction	1.2798	0.036	13%	Banking, financial	1.367	0.352	96%
Nunspeet: tourist town – medium							
Machinery, etc	1.5414	0.424	78%	Food, drink	1.421	0.384	91%
Hotels, catering	1.5323	0.079	15%	Arable	1.398	0.362	91%
Food, drink	1.2712	0.096	35%	Machinery, etc	1.388	0.300	77%
Oudewater: urban town – small							
Public business	1.2425	0.119	49%	Chemicals,etc	1.359	0.325	91%
Construction	1.2002	0.122	61%	Textiles,etc	1.284	0.263	93%
Machinery, etc	1.1472	0.086	58%	Livestock	1.190	0.035	18%
Gemert: urban town – medium							
Hotels, catering	1.3246	0.163	50%	Mixed farming	1.497	0.153	31%
Chemicals, etc	1.1328	0.016	12%	Public business	1.413	0.394	95%
Public business	1.0837	0.034	41%	Arable	1.397	0.165	42%

Tables 3.72 and 3.73 show the employment impacts of the key sectors in terms of actual employment, allied employment, multipliers, employment coefficients (average FTEs per million euro output) and global employment coefficients (which show the average number of FTEs that would be affected by a change in the original sectors output of €1 million). In terms of employment impacts in zone A, the industrial sectors are ranked sixteen times (out of a possible 18) as key sectors. Machinery, metals and computing seem particularly important, ranked in four of the six towns, and Food and drink and Chemicals, rubber, glass and plastics appear as key sectors in three of the towns. The Food and drink industries in Schagen and Nunspeet not only view large employment impacts, but they also seem to offer many jobs for the local economy. For example almost 1,000 full-time jobs are linked to the food production industry in zone A and B of Nunspeet, while the sector's impact on the hinterlands' employment is relatively large (34%). With a share of

73%, however, the Machinery, metals and computing sector in Nunspeet contributes most to employment impact in the hinterland from an employment shock in zone A.

Table 3.72. Employment, employment multipliers and employment coefficients of key sectors in zone A of Dutch towns and its impact in the hinterland

Key sector	Employment of key sector in A (FTEs)	Total employment in A+B allied with key sector in A (FTEs)	Employment multiplier (for key sectors in zone A)	Impact on B as % of impact on A+B from employment shock in A	Employment coefficient (FTEs per 1€m output)	Total employment in A+B from 1€m output shock in A (FTEs)
Dalfsen: small agricultural						
Construction	57	95	1.674	17%	7.8	13.0
Machinery etc	2	2	1.504	22%	0.2	0.3
Transport services	36	50	1.394	3%	8.2	11.4
Schagen: medium agricultural						
Energy	3	7	2.981	3%	0.0	0.1
Food, drink	159	263	1.654	5%	2.8	4.7
Machinery etc	212	341	1.606	4%	5.1	8.1
Bolsward: small tourist						
Chemicals etc	98	165	1.684	10%	3.2	5.4
Energy	1	1	1.612	1%	0.0	0.0
Banking, financial	168	239	1.427	2%	6.4	9.2
Nunspeet: medium tourist						
Machinery etc	462	729	1.580	73%	5.1	8.1
Food, drink	686	970	1.414	34%	2.8	4.0
Chemicals etc	6	8	1.370	18%	0.1	0.1
Oudewater: small peri-urban						
Machinery etc	65	81	1.248	64%	2.8	3.5
Construction	268	306	1.145	63%	7.7	8.8
Textiles etc	90	97	1.076	34%	3.0	3.2
Gemert: medium peri-urban						
Food, drink	16	24	1.568	5%	0.1	0.1
Chemicals etc	511	564	1.105	10%	10.9	12.0
Hotels, catering	229	252	1.101	39%	16.6	18.3

In the hinterland, the key sectors are mainly industrial, of which the most important appear to be Food and drink (this is the top sector in both the agricultural and tourist towns) and the Energy sector. The impact on the employment in zone A as share in the total employment impact is in general very high, ranging from 23% for Livestock in Gemert to 98% for Energy in Schagen, and 12 of the sectors out of 18 have an impact in the 'other zone' of over 80%. This emphasizes the importance of the town to the hinterland in terms of economic linkages. On the other hand, if we calculate the number of jobs that are allied to other sectors (total allied employment minus direct employment in key sector), the Livestock industry in Gemert has almost 400 jobs that are indirectly related to employment in the industry (i.e. are not in the Livestock industry but depend upon it) and

in Oudewater over 200 jobs are indirectly related to employment in the textile, wood and leather industry.

Table 3.73. Employment, employment multipliers and employment coefficients of key sectors in zone B of Dutch towns and its impact in the town

Key sector	Employment of key sector in B (FTEs	Total employment in A+B allied with key sector in B (FTEs)	Employment Multipliers (for key sectors in B)	Impact on A as % of impact on A+B from employment shock in B	Employment coefficient of key sector (FTEs per 1€m output)	Total employment change in A+B from 1€m output shock in B (FTEs)
Dalfsen: small agricultural						
Food, drink	124	210	1.691	75%	2.8	4.8
Chemicals etc	30	39	1.325	82%	7.7	10.2
Arable	1	1	1.213	27%	2.6	3.1
Schagen: medium agricultural						
Food, drink	92	166	1.816	78%	2.8	5.1
Energy	3	4	1.649	98%	0.2	0.3
Forestry,fishing	6	9	1.430	50%	5.8	8.2
Bolsward: small tourist						
Food, drink	50	84	1.703	88%	2.8	4.8
Energy	6	9	1.637	95%	0.6	1.0
Banking, financial	104	150	1.451	97%	6.4	9.4
Nunspeet: medium tourist						
Food, drink	173	268	1.556	86%	2.8	4.4
Machinery etc	333	507	1.523	81%	4.9	7.5
Textiles	127	186	1.463	94%	2.4	3.5
Oudewater: small peri-urban						
Energy	1	1	1.462	89%	0.0	0.0
Chemicals etc	268	351	1.309	87%	5.5	7.2
Textiles	993	1173	1.181	90%	7.3	8.6
Gemert: medium peri-urban						
Energy	7	11	1.587	96%	0.3	0.5
Livestock	1083	1454	1.342	23%	5.3	7.1
Banking, financial	262	342	1.310	96%	6.4	8.4

3.10.4.4 Poland

Table 3.74 indicates the key sectors in zone A and zone B of the Polish towns in terms of output multipliers. Services sectors in zone A are eleven times ranked as key sectors in terms of output impacts, and Industrial types seven times. With four ranks, Hotels and catering seems to be most important among the service types. Except for Textiles, wood and leather and Chemicals and glass in Ozarow where the percentages of the impact on the hinterlands output are 80% and 44% respectively, the impacts on the hinterlands' output as share in the total output impact ranges are rather small (under 10%).

Agriculture, on the other hand, is the most important of the key sectors in zone B of the Polish towns. There is only one town, Duzniki, where no Agricultural types appear in the rankings, and the agricultural sectors have eight ranks overall in terms of output impacts. The service sector is ranked six times and the industrial sectors only four times. The industrial sectors consist of three Food and drink and one Textiles, wood and leather i.e. all sectors with strong agricultural links. With four ranks, mixed farming looks the most important among agricultural types.

Table 3.74. Output multipliers of key sectors in zone A and zone B of the Polish towns and their impacts in the 'other zone'.

Impact of output shock in Zone A on A + B				Impact of output shock in Zone B on A + B			
Key sector/ town	Impact on output in A+B	Impact on output in B	Impact on B as % of impact on A+B	Key sector/ town	Impact on output in A+B	Impact on output in A	Impact on Ak as % of impact on A+B
Glogowek: agricultural town – small							
Public business	1.293	0.003	1%	Livestock	1.493	0.270	55%
Construction	1.189	0.008	4%	Banking, financial	1.429	0.418	97%
Hotels, catering	1.146	0.001	1%	Mixed farming	1.231	0.143	62%
Jedrzejow: agricultural town – medium							
Hotels, catering	1.5589	0.004	1%	Hotels, catering	2.019	0.995	98%
Transport services	1.2702	0.008	3%	Banking, financial	1.958	0.625	65%
Machinery etc	1.2282	0.014	1%	Mixed farming	1.893	0.670	75%
Duszniki: tourist town – small							
Chemicals, etc	1.9924	0.006	6%	Food, drink	2.131	0.782	69%
Public business	1.6364	0.026	4%	Transport services	1.417	0.385	92%
Transport services	1.6212	0.004	1%	Hotels, catering	1.406	0.096	24%
Ustron: tourist town – medium							
Hotels, catering	1.6596	0.030	5%	Mixed farming	1.523	0.106	20%
Wholesale, retail	1.526	0.046	9%	Livestock	1.385	0.090	23%
Chemicals etc	1.362	0.007	2%	Textiles, wood, leather	1.313	0.011	4%
Ozarow: urban town – small							
Textiles	1.2506	0.201	80%	Transport services	1.556	0.024	4%
Chemicals etc	1.2447	0.109	44%	Food, drink	1.425	0.396	93%
Food, drink	1.2017	0.034	17%	Horticulture	1.371	0.151	41%
Lask: urban town – medium							
Transport services	1.719	0.067	9%	Mixed farming	2.132	0.728	64%
Other business	1.3426	0.009	3%	Horticulture	1.724	0.435	60%
Hotels, catering	1.3127	0.007	2%	Food, drink	1.653	0.614	94%

The impact on the output in zone A as share in total output impact ranges from 4% for Textiles in Ustron to around 98% and 94% respectively for Hotels and catering in Jedrzejow and Lask, and 97% for Banking and financial services in Glogowek. This means for these industries, almost all the multiplier impact from them is felt in the town rather than the hinterland. Like the Dutch towns and the Portuguese towns, impacts on the other zone seem to be evidently larger from an initial shock in zone B than from an initial shock in zone A.

In terms of employment impacts, the industrial sectors seem more important. The key sectors in zone A are shown in Table 3.75. The industrial sectors are ranked twelve times as key sectors. Construction and Chemicals, plastics, rubber and glass each appear in the key sectors three times. Service sectors are ranked six times. With a share of 5% and 38% respectively of total employment impact, the Construction industry of Glogowek and Ustron contribute most to employment impacts in the hinterland. This sector is also important as supplier of jobs (417 and 491 respectively) for employment in town and hinterland. The sector with the largest indirect and induced employment is Hotels and catering in Ustron, with a prospective 685 jobs. Only 4% of these, however, would be

in the hinterland. The employment coefficients show the potential employment increase from a million euro investment in the industry and we see that for example in Ustron, although the construction industry has a higher multiplier, that the actual employment impact of a €1 million investment would be greater in the Hotels and catering sector than the Construction.

In terms of employment impacts from the hinterland, industries are eight times ranked as key sectors, services seven times and agriculture four times. The impact on the employment in zone A as share in the total employment impact ranges from 3% for Textiles, wood and leather in Ustron to 97% for Energy in Lask, and 94% for Textiles, wood and leather in Ozarow. Providing the greatest potential overall employment impact, we have the Livestock industry in Glogowek (1112 related jobs), Food and drink (1106 related jobs) and Wholesale and retail (1458 related) both in Ozarow.

Table 3.75. Employment, employment multipliers and employment coefficients of key sectors in zone A of Polish towns and its impact in the hinterland

Key sector	Employment of key sector in A (FTEs)	Total employment in A+B allied with key sector in A (FTEs)	Employment multiplier (for key sectors in zone A)	Impact on B as % of impact on A+B from employment shock in A	Employment coefficient (FTEs per 1€m output)	Total employment in A+B from 1€m output shock in A (FTEs)
Glogowek: small agricultural						
Textiles	100	114	1.135	8%	10.2	11.6
Transport services	112	126	1.121	10%	10.9	12.2
Construction	383	417	1.090	55%	16.4	17.9
Jedrzejow: medium agricultural						
Machinery etc	169	214	1.266	13%	8.6	10.9
Energy	298	343	1.154	4%	3.2	3.6
Banking, financial	176	202	1.147	3%	11.2	12.9
Duszniki: small tourist						
Banking, financial	21	29	1.369	2%	3.3	4.5
Food, drink	400	515	1.287	13%	8.0	10.3
Chemicals etc	12	15	1.282	3%	23.0	29.5
Ustron: medium tourist						
Construction	346	491	1.419	38%	2.9	4.1
Chemicals etc	33	45	1.379	2%	8.7	12.0
Hotels, catering	528	685	1.298	4%	19.0	24.6
Ozarow: small peri-urban						
Food, drink	164	223	1.360	28%	2.7	3.7
Other business	112	129	1.148	80%	7.9	9.0
Chemicals etc	430	489	1.138	46%	11.0	12.5
Lask: medium peri-urban						
Hotels, catering	49	63	1.280	3%	11.1	14.3
Construction	125	157	1.252	3%	10.4	13.0
Energy	133	159	1.198	3%	3.6	4.3

Table 3.76. Employment, employment multipliers and employment coefficients of key sectors in zone B of Polish towns and its impact in the town

Key sector	Employment of key sector in B (FTEs	Total employment in A+B allied with key sector in B (FTEs)	Employment Multipliers (for key sectors in B)	Impact on A as % of impact on A+B from employment shock in B	Employment coefficient of key sector (FTEs per 1€m output)	Total employment change in A+B from 1€m output shock in B (FTEs)
Glogowek: small agricultural						
Energy	6	7	1.207	50%	1.5	1.8
Transport services	96	116	1.205	79%	5.3	6.4
Livestock	950	1112	1.170	46%	20.7	24.2
Jedrzejow: medium agricultural						
Forestry,fishing	15	30	2.059	46%	5.1	10.4
Banking, financial	29	44	1.549	38%	36.9	57.1
Chemicals etc	155	193	1.248	79%	9.8	12.2
Duszniki: small tourist						
Hotels, catering	120	165	1.376	5%	45.7	62.9
Wholesale,retail	164	201	1.226	19%	20.1	24.7
Forestry,fishing	40	48	1.199	73%	18.7	22.4
Ustron: medium tourist						
Wholesale,retail	262	340	1.296	5%	6.7	8.7
Textiles	95	120	1.259	3%	8.8	11.0
Transport services	40	46	1.162	44%	4.0	4.6
Ozarow: small peri-urban						
Textiles	54	74	1.387	94%	1.8	2.5
Wholesale,retail	1228	1458	1.188	11%	19.0	22.6
Food, drink	936	1106	1.181	83%	8.0	9.5
Lask: medium peri-urban						
Food, drink	102	157	1.543	80%	8.0	12.4
Chemicals etc	28	43	1.538	88%	7.2	11.1
Energy	22	30	1.354	97%	4.4	6.0

3.10.4.5 Portugal

Table 3.77 indicates the key sectors in zone A and B of the Portuguese towns in terms of output multipliers. In zone A, unlike the other countries, it is the service sectors that appear to be the most important in terms of having the largest multipliers in these Portuguese towns. Thirteen times they are ranked as the key sectors in terms of output impacts. Five of these sectors are Other business services, four Public administration, and four Hotels and catering. There are only four industrial sectors ranked, of which three are Construction and one Forestry and fishing. The impacts on the hinterlands' output as share in the total output impact ranges are moderate, ranging between 1% and 14%, except in Lixa for Hotels and catering where 61%of the output impact is felt in the hinterland.

The key sectors in zone B of the Portuguese towns show a greater importance of the industrial sectors. Industrial sectors are ranked eleven times as key sectors in terms of output impacts, and Construction is the most important of these, ranked in four out of the six towns. The Service sectors are ranked six times and Agriculture only once. The impact on the output in zone A as share in total output impact ranges from 3% for Construction in Lixa to 99% for Construction and Food and drink in Tavira. Once again we see the same pattern where the impacts on the other zone seem to be much larger from an initial shock in zone B than from an initial shock in zone A. In the

majority of the key sectors in the hinterland, over 60% of the impact to the key sector is felt in the town.

Table 3.77. Output multipliers of key sectors in zone A and zone B of the Portuguese towns and their impacts in the 'other zone'.

Impact of output shock in Zone A on A + B				Impact of output shock in Zone B on A + B			
Key sector/ town	Impact on output in A+B	Impact on output in B	Impact on B as % of impact on A+B	Key sector/ town	Impact on output in A+B	Impact on output in A	Impact on A as % of impact on A+B
Hotels, catering	1.599	0.011	2%	Livestock	1.953	0.716	75%
Other business	1.463	0.005	1%	Construction	1.690	0.648	94%
Public Administration	1.286	0.004	1%	Textiles, wood, leather	1.660	0.423	64%
Vila Real: agricultural town – medium							
Construction	1.6627	0.053	8%	Transport services	2.113	0.338	30%
Other business	1.6266	0.018	3%	Construction	1.729	0.609	84%
Hotels, catering	1.5076	0.036	7%	Food, drink	1.710	0.606	85%
Tavira: tourist town – small							
Hotels, catering	1.2826	0.009	3%	Textiles,	1.597	0.586	98%
Other business	1.2207	0.002	1%	Food, drink	1.547	0.540	99%
Public Administration	1.1867	0.004	2%	Construction	1.467	0.463	99%
Silves: tourist town – medium							
Public Administration	1.6212	0.046	7%	Machinery etc	1.601	0.401	67%
Forestry, fishing	1.3159	0.014	4%	Chemicals etc	1.590	0.371	63%
Construction	1.2258	0.048	21%	Other business	1.470	0.423	90%
Lixa: urban town – small							
Public Administration	1.4215	0.059	14%	Construction	1.857	0.022	3%
Hotels, catering	1.4137	0.253	61%	Public business	1.641	0.129	20%
Other business	1.2865	0.021	7%	Transport services	1.539	0.419	28%
Esposende: urban town – medium							
Construction	1.6959	0.036	5%	Other business	1.531	0.492	93%
Machinery, etc	1.419	0.036	9%	Hotels, catering	1.502	0.415	83%
Other business	1.3915	0.039	10%	Chemicals etc	1.349	0.311	89%

Table 3.78 shows that in terms of employment impacts for zone A, services sectors are ten times ranked as key sectors and Industrial sectors eight times. Included in all the towns top three sectors, the Other business sector seems to be most important in the services group. Machinery, metals and computing are ranked in three of the towns' key sectors. Construction in Vila Real and Esposende not only view relatively large employment impacts, but they also seem to offer many jobs (both around 1,400 jobs) for the local economy. With a share of 87% and 47% respectively in total employment impact, the Food and drink industry, and Chemicals and glass industry of Silves contribute most to employment impact in the hinterland. In absolute terms, however, current allied employment in these sectors (11 and 8 jobs respectively) is rather restricted. Thus, if we subtract the direct employment from the total allied employment, (which gives 2 and 3 respectively) and allocated 87% of 2 and 47% of the 3 to the hinterland, we are only talking in terms of a maximum of 2FTEs in the hinterland being related to these sectors in the town. This highlights the importance

of examining all the columns within the table. The last two columns illustrate the importance of Hotels and catering, and Construction in terms of FTEs created per million euro invested.

Table 3.78. Employment, employment multipliers and employment coefficients of key sectors in zone A of Portuguese towns and their impact in the hinterland

Key sector	Employment of key sector in A (FTEs)	Total employment in A+B allied with key sector in A (FTEs)	Employment multiplier (for key sectors in zone A)	Impact on B as % of impact on A+B from employment shock in A	Employment coefficient (FTEs per 1€m output)	Total employment in A+B from 1€m output shock in A (FTEs)
Mirandela: small agricultural						
Other business	149	249	1.671	1%	10.7	17.9
Energy	6	8	1.329	2%	0.5	0.6
Hotels, catering	181	227	1.257	2%	34.4	43.3
Vila Real: medium agricultural						
Other business	459	807	1.758	3%	13.5	23.8
Machinery etc	326	502	1.539	14%	6.0	9.3
Construction	1004	1298	1.293	9%	26.2	33.9
Tavira: small tourist						
Machinery etc	1	1	2.033	19%	0.1	0.1
Other business	141	191	1.358	1%	7.1	9.6
Transport services	32	42	1.315	1%	4.9	6.4
Silves: medium tourist						
Chemicals etc	5	8	1.477	47%	0.8	1.2
Other business	20	29	1.421	3%	0.8	1.2
Food, drink	9	11	1.209	87%	0.3	0.3
Lixa: small peri-urban						
Other business	143	229	1.604	6%	7.2	11.5
Transport services	50	80	1.592	11%	4.0	6.4
Banking, financial	64	88	1.384	8%	4.5	6.2
Esposende: medium peri-urban						
Other business	268	434	1.621	9%	10.0	16.2
Machinery etc	314	492	1.566	8%	7.4	11.6
Construction	996	1397	1.403	5%	26.2	36.8

Table 3.79 gives the employment impact for key sectors in the hinterlands. In terms of employment impacts, services are ranked nine times as key sectors, with Other business ranked in five out of the six towns. Industrial sectors are ranked eight times and agricultural sectors (livestock) once. The impact on the employment in zone A as share in the total employment impact ranges from 3% for construction in Lixa to 99% for Other business services in Mirandela. As we have seen in the other countries, there seems to be a far greater impact on the town from the

hinterland industries than vice versa, especially with the Other business sector, where over 90% of the multiplier impact is felt in the town. Despite its small impact on the other region, Construction in Lixa is very important for local employment with a contribution (directly and indirectly) of almost 3,000 full-time jobs.

Table 3.79. Employment, employment multipliers and employment coefficients of key sectors in zone B of Portuguese towns and its impact in the town

Key sector	Employment of key sector in B (FTEs	Total employment in A+B allied with key sector in B (FTEs)	Employment Multipliers (for key sectors in B)	Impact on A as % of impact on A+B from employment shock in B	Employment coefficient of key sector (FTEs per 1€m output)	Total employment change in A+B from 1€m output shock in B (FTEs)
Mirandela: small agricultural						
Other business	97	163	1.685	99%	12.6	21.2
Textiles, wood, leather	109	166	1.526	47%	19.5	29.7
Livestock	75	114	1.511	58%	24.2	36.5
Vila Real: medium agricultural						
Transport services	378	832	2.200	19%	18.2	40.1
Machinery etc	302	590	1.957	67%	5.9	11.6
Food, drink	108	195	1.814	70%	6.3	11.5
Tavira: small tourist						
Other business	337	469	1.391	96%	12.6	17.5
Food, drink	57	73	1.281	95%	6.3	8.1
Transport services	324	407	1.256	6%	18.2	22.9
Silves: medium tourist						
Other business	651	936	1.438	87%	12.6	18.1
Transport services	629	874	1.388	6%	18.2	25.3
Machinery etc	305	419	1.375	31%	9.5	13.1
Lixa: small peri-urban						
Chemicals etc	39	63	1.620	78%	0.5	0.7
Other business	299	482	1.612	92%	12.6	20.3
Construction	2127	2914	1.370	3%	26.2	35.9
Esposende: medium peri-urban						
Other business	170	284	1.672	94%	12.6	21.0
Hotels, catering	415	509	1.226	88%	34.4	42.2
Chemicals etc	243	287	1.179	64%	14.3	16.9

3.10.5 Key sectors - a comparison between countries

This section compares the output and employment impacts from the key sectors from the UK, France, the Netherlands, Portugal and Poland. In the previous sections we have considered the key sectors in zone A and zone B of the towns. It appears that service sectors are most often indicated as key sectors in zone A of French, Portuguese and Polish towns, while industrial sectors seem to have highest multipliers in zone A of the towns in the UK and the Netherlands. In contrast, agricultural types in zone B of the towns appear to offer more often larger impacts for the local economy of Dutch and Polish towns, and services sector more frequently for Portuguese, UK and French towns.

Looking at the particular sectors, it is striking for how many towns in the UK and France, Banking and financial services was a key sector for output and employment, in both zones A and B. Chemicals, rubber, plastics and glass are important in the UK, the Netherlands and Poland, as are Machinery, metals and computing (also important for employment in France). These three sectors (Banking and financial services, Chemicals and Machinery) all come under the EU definition for knowledge-intensive industries, with an average workforce comprising at least one quarter graduates. They have been promoted in rural areas in an effort to retain the young educated workforce, but may in fact have the extra benefit of being sectors with relatively large local linkages. For the Netherlands and Portugal, Construction seems potentially an important sector, and in Portugal and Poland, Hotels and catering. Only in Portugal does the Other business service sector seem key. For employment impact, Food and drink is important in all countries, bar Portugal. Transport services stand out as a key sector in France and Portugal.

Table 3.80 summarises the key sectors from each country, and whether they are important for output (O) or employment (E) or both.

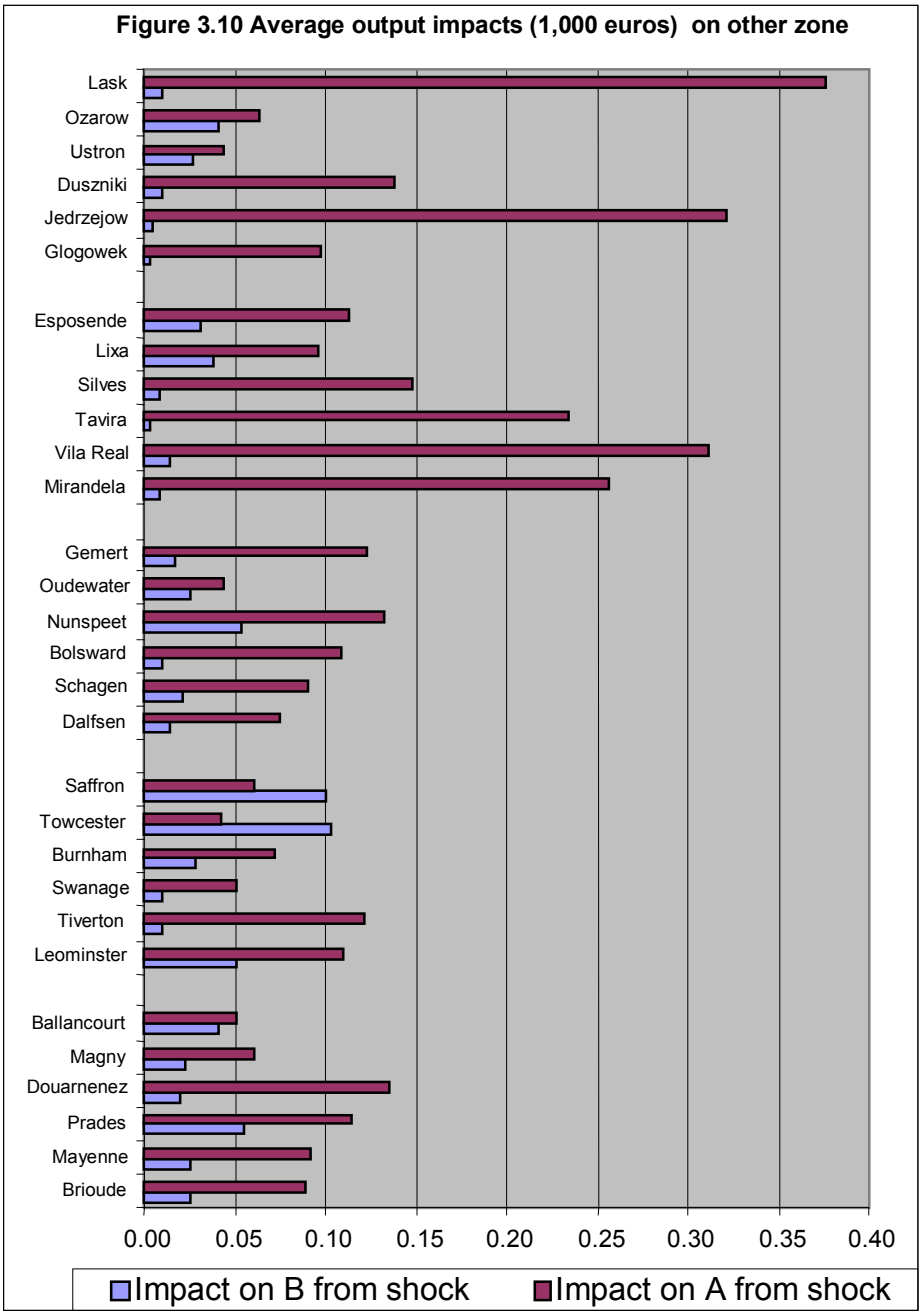
Table 3.80. Table showing key sectors for employment and output in each country

	Agric.	Food and Drink	Chemical, rubber, plastics and glass	Mach., metals computing	Construction	Transport services	Banking and finance	Other bus. services	Hotels and catering	Public Admin.
UK		OE	OE	O			OE			
FR		E		E		OE	OE			
NL	O	OE	OE	OE	O					
PR					O	OE		OE	O	O
PO	O	OE	OE	E					O	

The Marketowns study has particular interest in how a particular impact on the output or employment in one zone may affect other zone. From the previous sections, it was clear that for all the towns in the Netherlands, Portugal and Poland, any impact in zone B for both output and employment had a much greater impact on zone A than vice versa. This implies that any investment in the hinterlands will affect the local economy in the town to a greater extent than any investment in the town will impact on the hinterland. This pattern was also seen in the majority of the French and UK towns, albeit to a lesser extent. For France, the greatest impact from zone B to A was seen in the tourist towns for both output and employment, but for the peri-urban town of Ballancourt, and the tourist town of Prades, the impacts of towns on hinterland are much larger than vice versa. In the UK, in the hinterland of the towns, only Banking and finance in Tiverton and Mixed farming in Towcester has a major proportion of the multiplier impact affecting the town, although, because of the very low employment in the Banking and financial services in Tiverton, this would in fact only imply a couple of FTEs reliant on this service in the town, whereas with the Mixed farming, the figure would be around 12 FTEs. On the other hand, all the key sectors in Towcester, and Food and drink in Burnham had significant impacts (over 35%+) on zone B from a shock in zone A. However, it was only the key sectors in this instance for which the output and employment impacts were examined. We are interested in the pattern of impact from one zone to another, thus the following section examines the aggregate sectors for all the countries

3.10.5.1 Output impacts on other zone

This section compares the average output impact on the other zone for all of the towns. This is illustrated in Figure 3.10.



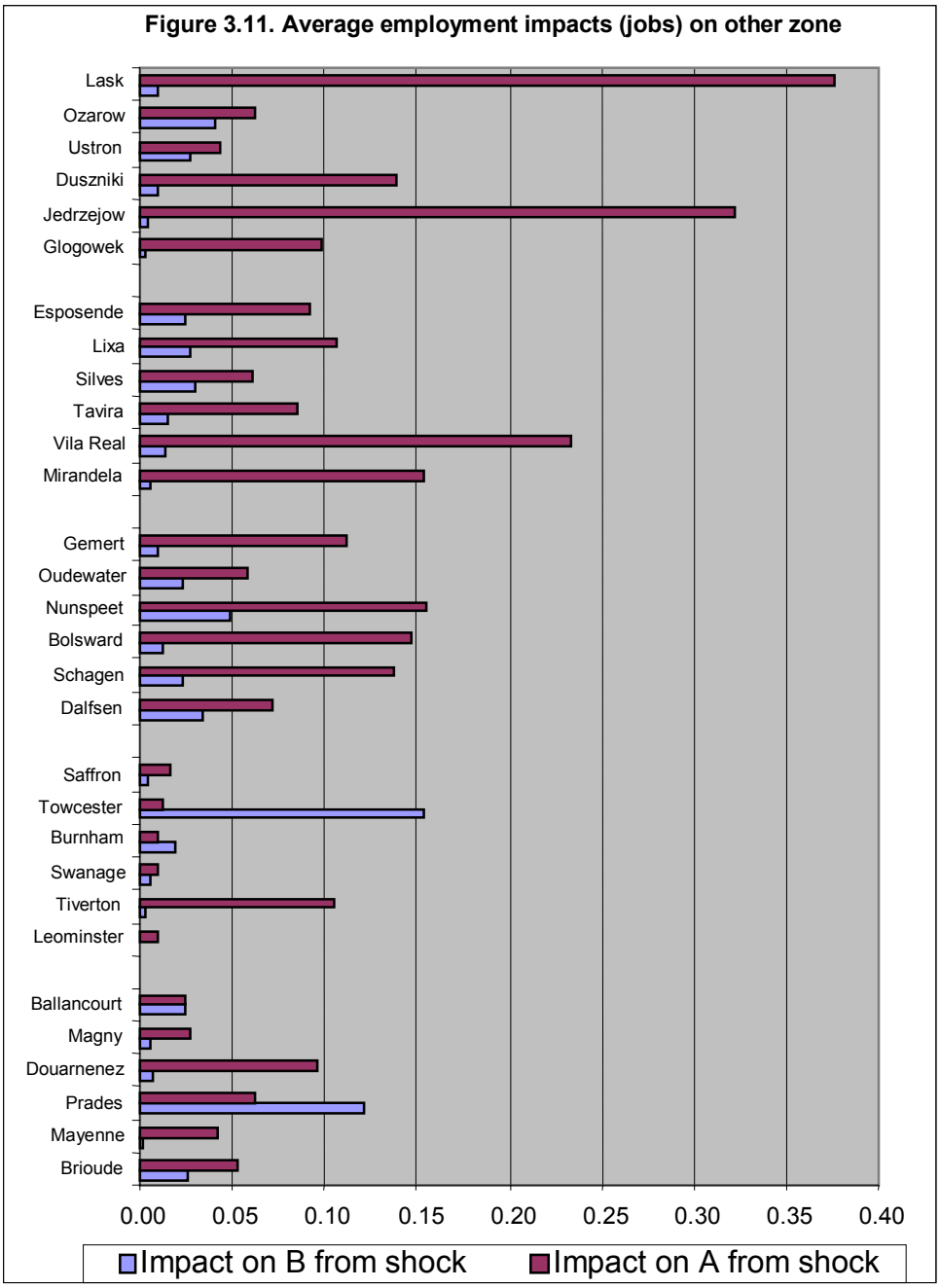
It shows for all bar two towns, the average output impact from an impulse to zone B on zone A is greater than the impact from an impulse to zone A on zone B. The exceptions are in Saffron Waldron and Towcester (peri-urban, UK), where the impact from the town to hinterland is greater than vice versa. The largest impacts occurring in the town from an impact in the hinterland are in the Polish and Portuguese towns, whereas those in the Netherlands are smaller, and those in France and the UK, smaller still. This reflects the magnitude of the multipliers. The sectors with the largest impacts on the 'other zone' (see Appendix 32) also reflect the key sector multipliers with

Food and drink, Construction and services (particularly Banking and finance and Transport services) all being important. However, some interesting results emerge in the UK hinterlands, where the agricultural sector (in the hinterland) often has the largest or one of the largest impact on the town. This is also seen in the agricultural towns of Brioude and Mayenne in France.

3.10.5.2 Employment impacts on the other zone

The employment impact on the other zone is shown in Figure 3.11 and follows a similar pattern to the output impact in that, for most of the towns (exceptions are Towcester and Burham in the UK and Prades in France), the employment impact from industries in zone B to zone A is much greater than that from zone A to zone B. This implies that an investment to an industrial sector in the hinterland will have a greater impact on the industrial sectors in the town than an investment to an industrial sector in the town on the hinterland.

Figure 3.11. Average employment impacts (jobs) on other zone



From Appendix 30, the sectors with the largest employment impact in the other zone vary from country to country, but in general, Hotels and catering, Food and drink and Construction are important in many of the towns. Agriculture is important in the hinterlands of the UK, Polish and Dutch towns, and also in the agricultural towns of France. Machinery, metals and computing is an important sector in the Portuguese, Polish and Dutch towns.

3.10.5.3 Summary of results for key sectors for output and employment

Banking and financial services are key sectors in nearly all the UK and French towns, both for output and employment. Otherwise, it is in France and Portugal, that the service sectors seem the most important for output multipliers. Other business service sector is particularly important in the Portuguese towns, as are the Hotels and catering and Public administration service sectors.

On the other hand, the industrial sectors predominate the key sectors in the UK, the Netherlands and Poland, with Chemical, rubber, plastics and glass, and Metals, machinery and computing sectors being the most important .

Agricultural sectors have an important output impact in many of the Dutch and Polish towns, but less so regarding employment.

For all countries bar Portugal, the Food and drink industry stands out as important for employment. Transport services are key for employment in many French and Portuguese towns.

In general, output and employment impacts on zone A from zone B are much greater than from zone A to zone B. This is particularly so for the towns in the Netherlands, Portugal and Poland, but this pattern is also seen in the UK and France to a lesser extent. In fact, output impacts from zone A to B are frequently very small indeed (less than 10%). This indicates that an investment in the industries and services within the town locations is likely to have very little impact on those in the hinterland, although there is variation within sectors, and some sectors in the town locations for example Food and drink, Construction and some of the services have a consistently greater impact on their hinterlands. On the other hand, especially in the towns in the Netherlands, Portugal and Poland, a considerable percentage of the impact of any change in the hinterland was felt in the town. Thus, investment in the hinterland firms is likely to have a bigger impact on the town than vice versa.

3.10.6 Comparison of SAM output multipliers and intra-regional multipliers

The following tables show the decomposition of the total SAM multiplier for key sector into intra-regional (M1) and inter-industrial (input-output) effects.

3.10.6.1 The UK

For the UK towns, the intra-regional impact makes up most of the total multiplier impact, i.e. the repercussions from an external shock to a sector in the town is mainly felt within the town itself. In most of the towns, this is more than 85% of the impact, but that still means that up to 15% of the impact is felt outside the town, which is not negligible. On the other hand, the key sectors in the town location of Towcester (small peri-urban), and the Banking and financial services in Tiverton's

hinterland, and Mixed farming in Towcester's hinterland have a noticeably smaller intra-regional impact. This implies that these towns and hinterlands are more interlinked with one another. The intra-regional multipliers are slightly smaller in zone B for the agricultural and small tourist towns than in zone A. There is no obvious difference between the importance of intra-regional linkages in zone A and zone B for the other towns.

The last two columns in the tables show the input-output multipliers and their percentage of the total SAM output multiplier impact. Examining these, it becomes apparent that most of the total multiplier is created from inter-industrial linkages. If the percentage of the SAM from the input-output multiplier is than subtracted from the percentage of the SAM from the intra-regional multiplier we are left with the percentage of the intra-regional impact that is accounted for by the induced impact from household income and wage impact. For these UK towns, this ranges from 3% to 30%, with the maximum in Swanage, the small tourist town. From this it can be deduced that for some of the sectors in these towns and hinterlands, the induced impact makes up a substantial proportion of the total multiplier impact. In general, they seem larger in the town locations as opposed to the hinterland locations, and in the tourist and peri-urban towns, as opposed to the agricultural towns.

Table 3.81. SAM output multiplier and intra-regional multipliers of key sectors in UK towns

	Output impulse in zone A				
	SAM output multiplier	**Intra-regional**	**% SAM**	**IO multiplier**	**% SAM**
Leominster: small agricultural					
Banking and financial services	2.319	2.204	91%	2.09	83%
Metals, machinery, electrical, computing, transport equipments	1.546	1.464	85%	1.38	70%
Food, drink and tobacco	1.535	1.456	85%	1.39	73%
Tiverton: medium agricultural					
Banking and financial services	2.129	2.126	100%	2.08	98%
Coal, oil and gas, metal ore, electricity	1.528	1.515	98%	1.45	85%
Textiles, leather, wood, furniture	1.487	1.456	94%	1.3	62%
Swanage: small tourist					
Banking and financial services	2.318	2.284	97%	2.06	80%
Chemicals, rubber, plastics, glass	1.550	1.529	96%	1.38	69%
Textiles, leather, wood, furniture	1.531	1.508	96%	1.35	66%
Burnham:medium tourist					
Banking and financial services	2.383	2.306	94%	2.09	79%
Metals, machinery, electrical, computing, transport equipments	1.682	1.621	91%	1.45	66%
Food, drink and tobacco	1.615	1.504	82%	1.37	60%
Towcester: small peri-urban					
Banking and financial services	2.485	1.980	66%	1.81	55%
Transport Services	1.853	1.430	50%	1.33	39%
Food, drink and tobacco	1.739	1.452	61%	1.36	49%
Saffron: medium peri-urban					
Metals, machinery, electrical, computing, transport equipments	1.610	1.527	86%	1.41	67%
Chemicals, rubber, plastics, glass	1.583	1.510	87%	1.42	72%
Textiles, leather, wood, furniture	1.538	1.460	86%	1.35	65%

Table 3.82. SAM output multipliers and intra-regional multipliers in UK towns

	Output impulse in zone B				
	SAM output multiplier	**Intra-regional**	**% of SAM**	**IO multiplier**	**% SAM**
Leominster: small agricultural					
Metals, machinery, electrical, computing, transport equipments	1.627	1.522	83%	1.45	72%
Transport Services	1.472	1.363	77%	1.3	64%
Food, drink and tobacco	1.438	1.373	85%	1.32	73%
Tiverton: medium agricultural					
Banking and financial services	2.129	1.447	40%	1.42	37%
Food, drink and tobacco	1.595	1.496	83%	1.46	77%
Chemicals, rubber, plastics, glass	1.594	1.467	79%	1.43	72%
Swanage: small tourist					
Metals, machinery, electrical, computing, transport equipments	1.689	1.608	88%	1.46	67%
Transport Services	1.529	1.458	87%	1.32	60%
Textiles, leather, wood, furniture	1.528	1.450	85%	1.3	57%
Burnham: medium tourist					
Banking and financial services	3.032	2.736	85%	2.6	79%
Coal, oil and gas, metal ore, electricity	1.683	1.617	90%	1.57	83%
public administration, education, health, other services	1.628	1.545	87%	1.51	81%
Towcester: small peri-urban					
Banking and financial services	2.285	2.152	90%	2.09	85%
Mixed farming	1.701	1.387	55%	1.24	34%
Chemicals, rubber, plastics, glass	1.507	1.448	88%	1.41	81%
Saffron: medium peri-urban					
Banking and financial services	2.335	2.195	90%	2.07	80%
Food, drink and tobacco	1.610	1.536	88%	1.46	75%
Metals, machinery, electrical, computing, transport equipments	1.605	1.524	87%	1.43	71%

3.10.6.2 France

The tables of the French intra-regional and input-output multipliers (Tables 3.83 and 3.84) also show that the majority of the SAM output multiplier is created from links within the one region, either the town or the hinterland, and not from cross flows. When the impulse is in the town location, most of the intra-regional multipliers are over 80%, but are a little lower when the impulse is felt in the hinterlands (around 70%). There are, however, two very large exceptions. The first are the key sectors in Ballancourt-sur-Essone when the impulse is in zone A, where only a small fraction of total multiplier impact (greatest is 15%) is created from the intra-regional linkages. The second is for Prades, when the impulse is in zone B, and again only a small percentage of the impact on key sectors is due to linkages within the hinterland itself and the rest are due to linkages with the town.

For Ballancourt, the intra-regional impact that there is, is almost 100% from inter-industrial linkages rather than from any induced impact. On the whole, the inter-industrial impact is again very important within these French towns and hinterlands, although less than in the UK. It appears to be the service sectors within the town where the induced impact is greater, and within the agricultural sectors within the hinterland. The intra-regional multipliers tend to be slightly smaller in zone B, indicating a greater reliance on zone A by zone B than vice versa.

Table 3.83. SAM output multiplier and intra-regional multipliers of key sectors in French towns

	Output impulse in zone A				
	SAM output multiplier	**Intra-regional**	**% SAM**	**IO multiplier**	**% SAM**
Brioude: small agricultural					
Transport Services	1.622	1.504	81%	1.34	55%
Hotels and catering	1.356	1.315	88%	1.12	34%
chemicals, rubber, plastics, glass	1.335	1.317	95%	1.31	92%
Mayenne: medium agricultural					
Transport Services	1.736	1.606	82%	1.42	57%
Hotels and catering	1.609	1.496	81%	1.34	56%
Banking and financial services	1.605	1.494	82%	1.33	55%
Prades: small tourist					
Hotels and catering	1.900	1.644	72%	1.08	9%
Banking and financial services	1.582	1.480	82%	1.29	60%
Food, drink and tobacco	1.436	1.261	60%	1.2	46%
Douarnenez: medium tourist					
Transport Services	1.851	1.764	90%	1.51	60%
Banking and financial services	1.701	1.627	89%	1.4	57%
Construction	1.651	1.586	90%	1.41	63%
Magny-en-Vexin: small periurban					
wholesalers and retailers	1.939	1.865	92%	1.73	78%
Banking and financial services	1.587	1.535	91%	1.44	74%
Hotels and catering	1.529	1.456	86%	1.36	68%
Ballancourt-sur-Essonne: medium periurban					
Transport Services	2.365	1.199	15%	1.14	10%
chemicals, rubber, plastics, glass	2.347	1.195	14%	1.19	14%
Metals, machinery, electrical, computing, transport equipments	2.292	1.062	5%	1.06	5%

Table 3.84. SAM output multiplier and intra-regional multipliers of key sectors in French towns

	Output impulse in zone B				
	SAM output multiplier	**Intra-regional**	**% of SAM**	**IO multiplier**	**%SAM**
Brioude: small agricultural					
Transport Services	1.633	1.479	76%	1.32	47%
Other Business services	1.383	1.283	74%	1.2	52%
Hotels and catering	1.358	1.266	74%	1.19	53%
Mayenne: medium agricultural					
Horticulture	2.007	1.595	59%	1.29	29%
Banking and financial services	1.688	1.449	65%	1.35	51%
Food, drink and tobacco	1.440	1.367	83%	1.32	73%
Prades: small tourist					
Other Business services	2.273	1.190	15%	1.01	1%
Textiles, leather, wood, furniture	2.163	1.144	12%	1.14	12%
Banking and financial services	1.988	1.466	47%	1.29	29%
Douarnez: medium tourist					
Horticulture	2.100	1.757	69%	1.45	41%
Transport Services	1.624	1.428	69%	1.32	51%
Banking and financial services	1.563	1.228	40%	1.18	32%
Magny: small peri-urban					
Horticulture	2.112	1.930	84%	1.57	51%
Banking and financial services	1.833	1.572	69%	1.43	52%
Transport Services	1.650	1.556	86%	1.4	62%
Ballancourt-sur-Essone: medium peri-urban					
Banking and financial services	1.793	1.521	66%	1.43	54%
Transport Services	1.682	1.567	83%	1.46	67%
Construction	1.564	1.448	80%	1.41	73%

3.10.6.3 The Netherlands

Generally the intra-regional impacts are a large proportion of the total impact i.e. the total impact relies less on flows between the town and countryside than within them. On average though, they are not as high as in the UK, although most of the intra-regional impact accounts for over 60% of the total and only in Nunspeet, for the Banking and financial sector is the intra-regional impact very tiny (2% - meaning that only 2% of the local impact of a shock to the Banking and financial sector is felt within Nunspeet itself, the rest is felt in the hinterland) The proportion of the total multiplier from the input-output relationships (inter-industrial transactions within the region) varies considerably, but in general, is far less important as part of the multiplier impact than in the UK and France, especially in the peri-urban towns. If the input-output multiplier impact proportion is subtracted from the intra-regional proportion of the SAM multiplier, we are left with the impact within the region from household income and wage income change (induced impact). The induced impact certainly is not negligible. However, there does appear to be a noticeable difference between the sectors. The agricultural and manufacturing industries have a relatively large proportion of the multiplier made up from the inter-regional linkages (i.e. low intra-regional impact) and less from the induced intra-regional impact (for example in zone B for Textiles 6% in Dalfsen, for Chemicals and glass 10% in Oudewater). On the other hand, the service type key sectors have a

greater induced impact than the other key sectors (for example, 94% for public business in the town location of Gemert, 93% for Hotels and catering in the hinterland of Schagen). This illustrates the importance of looking at different types of multipliers to understand the linkages within the local economy, and how the importance of the service sector to the local economy might have been overlooked had it just been the input-output multipliers that were being examined.

Table 3.85. SAM output multipliers and intra-regional multipliers of key sectors in Dutch towns from output shock in Zone A on Zone A and B

Key sector/ town	SAM output multiplier	Intra-regional multiplier	Intra-regional impact as % of SAM multiplier	IO multiplier	IO impact as % of SAM multiplier
Dalfsen: agricultural town – small					
Construction	2.062	1.739	70%	1.485	46%
Transport services	1.769	1.575	75%	1.321	42%
Public administration	1.647	1.603	93%	1.011	2%
Schagen: agricultural town - medium					
Transport services	1.9584	1.842	88%	1.360	38%
Construction	1.8635	1.674	78%	1.403	47%
Banking, financial	1.750	1.500	67%	1.244	32%
Bolsward: tourist town – small					
Hotels, catering	2.1743	1.761	65%	1.050	4%
Construction	1.7305	1.473	65%	1.331	45%
Banking, financial	1.7223	1.613	85%	1.214	30%
Nunspeet: tourist town – medium					
Hotels, catering	2.6893	2.026	61%	1.379	22%
Banking, financial	2.1692	1.024	2%	1.024	2%
Textiles, wood, leather	1.8445	1.437	52%	1.110	13%
Oudewater: urban town – small					
Public administration	2.632	2.376	84%	1.038	2%
Construction	1.6589	1.393	60%	1.054	8%
Hotels, catering	1.5662	1.453	80%	1.000	0%
Gemert: urban town – medium					
Hotels, catering	2.3707	2.010	85%	1.054	4%
Public administration	1.6517	1.564	95%	1.008	1%
Wholesale,retail	1.4676	1.375	94%	1.026	6%

Table 3.86. SAM output multipliers and intra-regional multipliers of key sectors in Dutch towns from output shock in Zone B on Zone A and B

Key sector/ town	SAM output multiplier	Intra-regional multiplier	Intra-regional impact as % of SAM multiplier	IO multiplier	IO impact as % of SAM multiplier
Dalfsen: agricultural town – small					
Hotels, catering	1.946	1.516	55%	1.160	11%
Textiles, wood, leather	1.874	1.065	7%	1.008	1%
Mixed	1.832	1.423	51%	1.161	19%
Schagen: agricultural town - medium					
Hotels, catering	2.037	1.973	94%	1.013	1%
Livestock	1.969	1.611	63%	1.128	13%
Horticulture	1.793	1.689	87%	1.264	33%
Bolsward: tourist town – small					
Livestock	1.875	1.721	92%	1.311	36%
Banking, financial	1.842	1.375	75%	1.004	0.5%
Hotels, catering	1.808	1.684	93%	1.030	4%
Nunspeet: tourist town – medium					
Public administration	2.100	1.442	40%	1.051	5%
Other business	2.024	1.580	57%	1.006	1%
Transport services	1.930	1.723	78%	1.196	21%
Oudewater: urban town – small					
Chemicals, glass	1.478	1.078	16%	1.027	6%
Livestock	1.459	1.328	71%	1.148	32%
Textiles, wood, leather	1.398	1.070	18%	1.015	4%
Gemert: urban town – medium					
Hotels, catering	2.334	1.969	73%	1.034	3%
Mixed	2.137	1.605	53%	1.325	29%
Public administration	1.970	1.010	1%	1.009	1%

3.10.6.4 Poland

The intra-regional impacts are high in zone A, with the majority of the key sectors having over 75% of their impact within the town location. Only in Ozarow, the small peri-urban town, is this not the case. For its Other business sector, only 10% of the impact is felt within the town location, and for Chemical, glass, plastics and rubber, the figure is 52%. Following a similar trend to that in the other countries, the zone B intra-regional impacts are often smaller than those in zone A, again leading to the same conclusion that the hinterland industries are more reliant upon goods and services from the town than vice versa**.** This is in contrast to the results found by Roberts (1998) where her study of the Grampian region in Scotland found that the intra-regional multipliers were actually lower in the urban area than the rural area. The input-output multipliers show the share of inter-industrial linkages in zone A to be very variable, ranging from 0 to 67% of the multiplier impact, and in zone B, the importance of the inter-industrial linkages is reduced in most cases (with the exception of Transport services in Ozarow, where 74% of its multiplier impact is felt in the hinterlands industrial sectors. In zone A, however, there are still 11 out of the 18 key sectors where more than 50 % of the multiplier impact is the induced impact, and in zone B, the equivalent figure is 15 key sectors. This highlights once more the important part the induced linkages play in creating multiplier effects.

Table 3.87. SAM output multipliers and intra-regional multipliers of key sectors in Polish towns from output shock in Zone A on Zone A and B

Key sector/ town	SAM output multiplier	Intra-regional multiplier	Intra-regional impact as % of SAM multiplier	IO multiplier	IO impact as % of SAM multiplier
Glogowek: agricultural town – small					
Public administration	1.677	1.657	97%	1.216	32%
Construction	1.657	1.635	97%	1.096	15%
Wholesale,retail	1.397	1.342	86%	1.056	14%
Jedrzejow: agricultural town - medium					
Hotels, catering	1.7993	1.735	92%	1.505	63%
Transport services	1.6989	1.527	75%	1.167	24%
Banking, financial	1.5213	1.510	98%	1.109	21%
Duszniki: tourist town – small					
Chemicals, glass	2.3567	2.304	96%	1.902	66%
Transport services	2.2021	2.147	95%	1.480	40%
Public administration	2.1396	2.051	92%	1.491	43%
Ustron: tourist town – medium					
Wholesale,retail	2.4849	2.067	72%	1.373	25%
Public administration	1.9711	1.803	83%	1.175	18%
Hotels, catering	1.9001	1.776	86%	1.599	67%
Ozarow: urban town – small					
Public administration	1.4111	1.350	85%	1.042	10%
Other business	1.373	1.039	10%	1.019	5%
Chemicals, glass	1.3302	1.173	52%	1.128	39%
Lask: urban town – medium					
Transport services	2.0953	1.987	90%	1.536	49%
Other business	1.6401	1.619	97%	1.256	40%
Public administration	1.6045	1.583	96%	1.114	19%

Table 3.88. SAM output multipliers and intra-regional multipliers of key sectors in Polish towns from output shock in Zone B on Zone A and B

Key sector/ town	SAM output multiplier	Intra-regional multiplier	Intra-regional impact as % of SAM multiplier	IO multiplier	IO impact as % of SAM multiplier
Glogowek: agricultural town – small					
Banking, financial	2.161	1.726	63%	1.000	0%
Livestock	2.037	1.738	71%	1.214	21%
Transport services	1.879	1.774	88%	1.073	8%
Jedrzejow: agricultural town - medium					
Horticulture	3.253	2.701	75%	1.138	6%
Mixed	3.119	2.329	63%	1.195	9%
Banking, financial	2.887	1.945	50%	1.302	16%
Duszniki: tourist town – small					
Food, drink	4.783	3.735	72%	1.242	6%
Arable	2.461	2.213	83%	1.094	6%
Livestock	2.165	2.024	88%	1.121	10%
Ustron: tourist town – medium					
Mixed	3.009	2.725	86%	1.332	17%
Livestock	1.999	1.775	78%	1.260	26%
Horticulture	1.766	1.002	0%	1.002	0%
Ozarow: urban town – small					
Mixed	2.064	1.967	91%	1.171	16%
Horticulture	1.808	1.617	76%	1.182	23%
Transport services	1.709	1.666	94%	1.526	74%
Lask: urban town – medium					
Mixed	3.706	2.756	65%	1.320	12%
Horticulture	2.628	2.058	65%	1.244	15%
Public administration	2.508	2.014	67%	1.002	0%

3.10.6.5 Portugal

Table 3.89. SAM output multipliers and intra-regional multipliers of key sectors in Portuguese towns from output shock in Zone A on Zone A and B

Key sector/ town	SAM output multiplier	Intra-regional multiplier	Intra-regional impact as % of SAM multiplier	IO multiplier	IO impact as % of SAM multiplier
Mirandela: agricultural town – small					
Hotels, catering	2.216	2.103	91%	1.436	36%
Public administration	2.077	2.002	93%	1.057	5%
Other business	1.791	1.745	94%	1.382	48%
Vila Real: agricultural town - medium					
Hotels, catering	2.0503	1.818	78%	1.359	34%
Construction	2.0347	1.738	71%	1.514	50%
Other business	2.0296	1.846	82%	1.527	51%
Tavira: tourist town – small					
Public administration	1.7958	1.773	97%	1.074	9%
Forestry,fishing	1.757	1.496	66%	1.086	11%
Hotels, catering	1.5797	1.494	85%	1.230	40%
Silves: tourist town – medium					
Public administration	2.8033	2.596	89%	1.377	21%
Forestry,fishing	2.0542	2.008	96%	1.198	19%
Construction	1.6949	1.582	84%	1.105	15%
Lixa: urban town – small					
Hotels, catering	1.8693	1.396	46%	1.108	12%
Public administration	1.8548	1.617	72%	1.307	36%
Forestry,fishing	1.4995	1.379	76%	1.000	0%
Esposende: urban town – medium					
Construction	1.8291	1.713	86%	1.637	77%
Machinery, computing	1.6115	1.514	84%	1.349	57%
Other business	1.5765	1.433	75%	1.320	56%

Portugal's towns again have high intra-regional impacts ranging between 46% and 97% in the town location, and 25% and 96% in the hinterland location. However, a marked pattern emerges in that in five out of the six towns the intra-regional impacts in zone B are considerably less than that in zone A. The only town where this does not occur is Lixa, the small peri-urban town. This means that for most of the towns, the hinterlands industries are more reliant upon the town than vice versa. In general, the input-output multipliers are smaller than in the previous countries (UK, France, the Netherlands), showing that a smaller percentage of the total multiplier impact is generated within the industrial sectors in the location of the key sector itself. By subtracting the intra-regional percentage from the input-output percentage, we are left with the percentage created by the induced impact from changes in wages and household income. This is very substantial for many of the key sectors, and for three, namely Forestry and fishing in Lixa town location, Public administration in Tavira's hinterland and Other business in Esponsende hinterland, accounted for the total intra-regional impact, i.e. there was no impact felt in the local industrial sectors other than in the key sector itself, all the impact in the key sector zone was due to changes in household income and wage income. It is noticeable that the service and agriculturally-related sectors have larger induced impacts than the industrial sectors.

Table 3.90. SAM output multipliers and intra-regional multipliers of key sectors in Portuguese towns from output shock in Zone B on Zone A and B

Key sector/ town	SAM output multiplier	Intra-regional multiplier	Intra-regional impact as % of SAM multiplier	IO multiplier	IO impact as % of SAM multiplier
Mirandela: agricultural town – small					
Livestock	2.727	1.817	47%	1.209	12%
Horticulture	2.491	2.018	68%	1.013	1%
Construction	2.321	1.544	41%	1.018	1%
Vila Real: agricultural town - medium					
Transport services	3.233	2.777	80%	1.684	31%
Construction	2.352	1.614	45%	1.065	5%
Arable	2.159	1.844	73%	1.020	2%
Tavira: tourist town – small					
Public administration	2.263	1.573	45%	1.004	0%
Forestry,fishing	2.027	1.688	67%	1.086	8%
Textiles, wood, leather	1.827	1.133	16%	1.000	0%
Silves: tourist town – medium					
Hotels, catering	1.966	1.741	77%	1.181	19%
Public administration	1.932	1.809	87%	1.175	19%
Textiles, wood, leather	1.928	1.714	77%	1.116	13%
Lixa: urban town – small					
Construction	2.156	2.106	96%	1.799	69%
Transport services	1.935	1.399	43%	1.064	7%
Public administration	1.915	1.735	80%	1.481	53%
Esposende: urban town – medium					
Hotels, catering	2.060	1.543	51%	1.016	2%
Other business	1.808	1.206	25%	1.000	0%
Arable	1.670	1.460	69%	1.025	4%

3.10.6.6 Summary of results for decomposition of multipliers

All towns show high intra-regional proportions for their total multipliers. This means that most of the transactions are taking place within the region (town or hinterland) rather than from one region to another. These figures are however slightly lower for the Netherlands, Portugal and Poland, where there are more inter-regional linkages.

The results from zone B in all five countries, but more markedly in the Netherlands, Portugal and Poland show a reduced proportion of intra-regional multiplier making up the total, compared to

zone A, implying that the hinterlands are more reliant on the towns for goods, services and factor payments than vice versa.

In the UK towns, the intra-regional proportion of the multiplier is even higher than in the other countries. The French towns also tend to have very high intra-regional proportions of the SAM multiplier with the exception of Ballancourt town location and Prades hinterland.

The input-output multipliers show that although in the UK and France, a large proportion of the SAM multiplier originates from the inter-industrial linkages, the impact from flows of factor payments and household consumption is also very important. However, in the Netherlands, Portugal and Poland, the induced impact of the multiplier is usually greater than the inter-industrial impact, particularly so within the service sector in the Netherlands, and the agricultural and service sector in Poland and Portugal. In some cases, it comprises the whole of the intra-regional impact and can also be over 80% of total multiplier impact. It also seems that the impact is greater in the hinterlands than in the town location

4 DISCUSSION OF METHODS

4.1 Research design and data collection

In addition to producing a wealth of local financial, social and economic data in each of the five countries, the study has also contributed to the methodological debate and knowledge base with regards to the collection of such data. Over many years, the potential difficulties and associated costs of collecting primary economic data at the local level have led economic analysts to rely on the disaggregation of national and regional data in an attempt to model the local economy. This, in turn, has led to a number of shortcomings in terms of local development policies, including, for example, those relating to growth pole settlements. Detailed analyses of local and regional economies have often been deemed too expensive and time-consuming, leading to an inevitable short-circuiting in the decision-making process. Whilst the present study has not relied wholly on the collection and analysis of primary data, the evidence based findings that is has produced would not have come to fruition without it.

The study has therefore developed and tested a comprehensive methodology that could readily be applied to local economies in other countries, and not necessarily restricted to small and medium-sized towns. However, there are a number of important issues worth discussing which will aid in future applications of this methodology. The points raised in this, and the subsequent, section should also be borne in mind when interpreting the findings of the present study.

An inherent problem in the interpretation of first round linkages by the respondent is the distinction between production and distribution in the supply chain, a problem which was revealed by all research teams following contact with respondents. For example, a common source of potential error was the case where a respondent would attribute purchases to the manufacturer, as opposed to wholesaler or distributor, which is more often the case in rural areas. A second related point is that the business questionnaires did not gain information on sub-contracting between firms, and thus overlooked a secondary impact of local business activity. Finally, and of less consequence, is the point that the questionnaires may have benefited from a specific section or reference to the role of grants and subsidies in the economic activity patterns of the firm, a point which is particularly relevant to the agricultural sector.

Another source of potential error is the definition and interpretation of geographical boundaries by respondents, central to which is the use of predefined zones in the surveys. The first point to defend is the use of the zonal approach. As with many other aspects of the methodology, a trade off was required between ease of data collection and reliability of data collected. The zonal approach (A-H, see section 2.3.1 for definition) had proved successful in previous studies, both in terms of data collection and analysis, and although the process of collecting spatially referenced data (i.e. attributing actual place names, or even postcodes, to specific transactions) would have been theoretically preferable, it would have been considerably more demanding in terms of the resources of the respondents and researchers. It could also have led to a lower response rate.

Perhaps less easy to defend is the definition of the eight zones, particularly those capturing data at the local and regional level. Resource constraints did not allow prior testing of zones over and above that incorporated into the pilot surveys and, more crucially, a set of zones was required that would allow comparability across the five study countries, and size of town types. Furthermore, policy relevance, which is also reliant on differing contexts and spatial scales, needed to be built into the equation. Given this remit, the use, application and interpretation of the resulting zonal-based information has proved relatively successful. One contributory factor to this success was the use of a map in all the surveys to help respondents accurately identify zones and attribute transactions accordingly.

An important area for discussion centres around the actual means of data collection itself. The methodology was originally designed around the use of self-completion questionnaires to be administered by post. This followed the success of a preliminary study in the UK, which developed and piloted a basic method. However, experience from the pilot survey suggested that face-to-face interviews were required in Portugal and Poland, given inherent problems with sampling and the nature of those two societies which precluded the use of postal surveys as a means of data collection. Further, whilst the majority of data was collected via self-completion methods in the other three countries as originally planned, extra resources needed to be deployed to ensure that sufficient data (both in terms of amount and quality) was collected. This involved chasing non-respondents by telephone and, in a number of cases, visiting firms and farms to collect data in structured interviews. One possible reason for the problems experienced in collecting data was the complexity and length of the questionnaires. For example, the question that requested a sectoral breakdown of purchasing information proved particularly demanding and suffered an above average incidence of missing data. It would also have inevitably deterred a number of would-be respondents from completing and returning the questionnaire.

Farm businesses, in particular, proved to be a problem in all countries, even in Portugal and Poland, where the questionnaires were completed by face-to-face interviews. The result was a shortfall in the amount of farm data collected in all countries. This was compounded by very low numbers of farms within the peri-urban and tourism town hinterlands, reducing the potential sample population. As a result of this, the target sample sizes were reduced following the pilot surveys. Whilst farms proved the most difficult in terms of data collection, households proved to be easiest; the relative ease of obtaining spatial economic data from European households is an important conclusion to the present study, although sample representativeness remains an important issue for discussion and clarification.

In this regard two important questions need to be addressed before considering the wider implications of the study findings. First, were the samples representative of the populations from which they were drawn? Second, can we generalise about the spatial patterns of economic behaviour in un-surveyed towns or for un-surveyed entities? In answer to the first question, sampling techniques employed for firms and households in UK, Netherlands and France ensured that samples were as representative as they could be, although in some cases researchers did need to remain flexible with regard to obtaining information from firms. In all countries, farm samples may not have been wholly representative due to the difficulties in obtaining required information from farms *per se*. Thus, researchers effectively had to access

potential respondents where they could and although attempts were made to systematically select farms, they may not wholly represent the samples from which they were drawn.

Sampling techniques in Portugal and Poland may point to some mis-representation which should be borne in mind when interpreting the data. In Portugal, households were often sampled at their place of work due to unavailability of adequate sampling frames, leading to an under-representation of retired and unoccupied groups, and potentially, an over-representation of some other socio-economic groups. Likewise, in Poland a door-to-door approach was sometimes employed in sampling firms, and although attempts were made to stratify samples, this may have resulted in a degree of misrepresentation in some sectors. More positively, the use of weighting procedures mean that the results of the multivariate and SAM analysis will not be unduly skewed by mis-representation of certain sectors and demographic groups, although the economic footprints and integration indicators may be.

The answer to the second question centres around the use of a case-study approach in the project. Given the inherent differences between all towns and localities (indeed the move towards territorial as opposed to sectoral policies reflects this) we are not currently in a position to generalise about the spatial patterns of economic behaviour in un-surveyed towns. However, some fairly clear patterns have emerged which will provide a useful basis for extending this work. This could be done in two ways; replicating the surveys in other localities or, more favourably, using known variables about un-surveyed towns (such as economic and demographic structure) to predict levels of local economic integration, given present knowledge about sectoral and other independent effects on economic behaviour. Indeed, some clear patterns have emerged regarding the influence of entity characteristics on local integration across the study areas which appear, to varying degrees, to override territorial diversity.

4.1.2 Data analysis

The main strands of data analysis for international comparison were multivariate analyses incorporating regression (OLS) techniques and a series of case study Social Accounting Models (SAMs). Used in tandem these complimentary methods not only reinforce results when they are the same, but also create an extra dimension to the results as they use the data in such contrasting ways. The OLS uses the data in a cohesive manner, and takes account of all the different variables incorporated in the questionnaire. One SAM was created for each separate town and its hinterland (30 models in total) and, whilst the SAMs do not examine so many variables in detail, they do examine the nature and extent of town-hinterland linkages in some detail.

Broadly speaking the OLS investigation arrives at a more detailed explanation of first round impact (expenditure patterns), by relating the impact back to a relatively large number of the variables from the survey. In contrast, the input-output/SAM methods trace all the rounds of transactions through, and across, from one region to another and back again (the accuracy of this does of course depend upon the model). The SAM can only relate the size of the linkages to a few very specific variables - only those which are very explicit within the model, i.e. zone A or B, and a breakdown of industrial sectors (this is more detailed than

within the OLS) and a breakdown of households into income groups and wages into skill levels. As different models are constructed for each town, it is also possible to examine the impact of town size and type. This type of analysis provides the means to estimate the flows of goods, services and labour within an inter-regional framework but it cannot then predict the reasons for the spatial behaviour of firms and consumers. Thus, the two methods used in this project are able to complement one another very well.

4.1.2.1 Multivariate analyses

The study initially employed the use of Ordinary Least Squares (OLS) regression to identify the key characteristics of entities associated with strong local economic integration. This enabled full use to be made of the respective dependent variables and avoided categorisation of the data, which would have been a pre-requisite to employing logistic regression analysis. The amount of data collected, and the incorporation of more continuous variables than was originally anticipated, allowed OLS to be substituted for logistic regression, which was preferable. Whilst data loss was thus kept to a minimum, standard data transformations were required in order to obtain adequate model fit, although the effect on the resulting coefficients should in theory be minimal.

A key consideration in the analysis is the use of proportional dependent variables as opposed to absolute values of the relevant transaction. This approach was selected in order to account for entity factors which may unduly influence the strength of linkage. For example, it is likely that larger firms and higher income households will have stronger linkages to the local economy in absolute terms, even though in relative terms they may trade and spend considerably less locally. Thus, the use of proportional data is not necessarily problematic, although it should be borne in mind when considering the policy relevance of the findings.

Potentially more problematic was the relatively wide use of categorical independent variables in the analysis, and in particular the use of dummy variables. Again, particular care is needed with regard to interpretation of the coefficients as each category is compared to the reference, which invariably contains all other categories of interest. Thus, it was not so easy to directly compare specific sectors in the OLS.

Arguably the most important considerations with regard to the OLS are, first, the proportion of variation in the dependent variables that was explained by the included predictors, and second, the definition of the dependent variables, which in turn represented the definition of the 'local economy' incorporated into the analysis. The reasons why the explanatory power of some models was relatively low could be related to the exclusion of variables from the questionnaire which also helps to explain variations in local integration. However, the research design ensured that a wide range of variables were incorporated into the analysis, and whilst some potential explanatory variables were invariably omitted, survey design allowed inclusion of most variables deemed to affect integration, including measures of productivity and proxies for market size.

Inaccurate measurement of the dependent variable does, however, remain a potential issue, and one which may affect the reliability of our findings despite considerable efforts by

the research team to collect sufficient quality data to achieve the aims of the study. Again, we must refer to the inevitable trade off between spatial detail and the amount of data collected. It is very likely that the explanatory power of the models is simply an indication of the degree to which first round linkages can be influenced by characteristics of environment and entity. Further, if first round linkages can be increased, but only by a few percent, this will have a significant impact on the local economy when multiplier effects are taken into account.

Addressing the second question, that of definition of the dependent variables used in the analysis, essentially relates to the definition of the local economy, which of course has implications for the policy relevance of the findings. There were three main reasons why 'local' was restricted to zones A+B in the separate-country OLS regression. First, there were not substantial differences observed between zones A+B and zones A+B+C in the pooled data set, and carrying out two sets of separate country regressions would have proved unmanageable given resource availability. Second, as the SAM focused only on zones A and B (i.e. the town and its hinterland) it made sense for the multivariate analysis to do the same to allow the two approaches to complement each other. Third, there was opportunity to incorporate further zones in the analysis of spatial behaviour, which aimed to account for variations in local, regional, national and international integration, as well as take account of the relationship between different types of transactions.

On the whole the restriction of the dependent variables to zones A and B did not prove problematic, apart from in the case of the Netherlands. For that country, it would have been prudent to have incorporated zone C into the analysis as this level of the local economy is essentially more relevant in the Netherlands. This manifested itself in the analysis by some incidences of poor model fit and relatively low levels of explanatory power in some models compared to those of the other countries. However, to allow comparability across all the countries, data from the Netherlands was modelled in the same way as for the other four cases.

4.1.2.2 Social Accounting Models

Social Accounting Models have been adopted widely, providing a more comprehensive modelling system than that from input-output accounting models. They do this by not only examining the production linkages between the industrial sectors, but also the production-institutional linkages (payment of households for their provision of labour and capital) and household - production linkages related to household expenditure on goods and services. However, generally they have been used to explore these linkages at a national or sometimes regional level (Roberts, 1998; Psaltopoulos and Thomson, 1993; Pyatt and Round, 1985).

In this study, SAMs have, for the first time, been constructed for relatively small sub-regions which comprise (for most places) a combination of NUTS V regions. There are many benefits to this methodology. It is the only methodology that can provide a framework to capture the web of linkages that exist within an economy. A structure is put into place so that it is possible to trace the sales and purchases of every industrial sector, examine the expenditure patterns of local people to explore the resulting impact of purchasing of local goods and services by households, and also examine the factor payments (wages) from

industries to households, and the impact of commuting patterns. For this project, an inter-regional SAM (or rather town-hinterland SAM, based on the rural-urban SAM created by Roberts, 1998) was created whereby the flows of goods, services and labour from each sub-region were recorded. It was then possible to separate out flows within the town, flows within the hinterland and flows between town and hinterland.

Following construction of the SAM framework, the model then provided a means for more analytical scrutiny. This involved the calculation of multipliers for output, employment and income to estimate the possible impact of any change on the system and to gauge the level of dependencies and integration within the local economy of the different industrial sectors, household groups and skill groups.

By decomposing the multipliers further, it was also possible to determine more precisely where, the linkages were taking place within the local economy. The linkages within the rural economy of the town and hinterland were estimated and subsequently broken down into within town, within hinterland, and between town and hinterland linkages. Industrial multipliers (the input-output multipliers) were also separated out from the household and wage income effects, thus accomplishing a dissection of the whole system of flows.

Data availability

A common problem with this approach is that models are very data hungry. Secondary data of course does exist for employment and industrial output, and national input-output tables provide the average inter-industry sales and purchases and also average sales to final demand. The scale of the models created for this project thus have two problems. First, existing secondary data is not available for the study areas as defined in the study (i.e. town and 7km hinterland). Second, average transactions between the industries will inevitably overstate the magnitude of local linkages because of the inverse relationship between size of the local economy and the requirement for imports and exports.

To overcome the first problem, data from the relevant national census was, as far as possible, tailored to match the study areas and subsequently incorporated into the models. More detail on this can be found in section 2.4.4.

The second problem was more difficult to address. National input-output tables were reduced mechanically to represent the defined study areas and this was supplemented by further secondary data that could be aggregated or disaggregated to the correct spatial requirement. Unlike any previous study, very detailed survey data, particularly examining the local transactions of industries, was analysed and substituted in the resulting model. Household expenditure and income, and employee salary data from the primary survey was also incorporated, and links made between household incomes and firm wages, and industrial purchases and household expenditure to create a Social Accounting Matrix.

Theoretical Considerations

As well as the usual assumptions of input-output analysis that are given in section 2.4.4.3, other important assumptions had to be made. As the data on household expenditure represented the amount spent on a particular good that is produced by a certain industrial sector. On the other hand, our survey extracted information on where goods and services were purchased**.** Given that the assumption of a local purchase representing a locally produced good would undoubtedly lead to an overestimation of locally produced goods, other regional input-output tables were analysed. This revealed that, on average, about 15% of a firm's outputs were purchased locally. Thus, where there had been a purchase made locally and there was an industrial sector that made that type of good, a proportion of this expenditure (50%) was allocated to the local area. Where a purchase had been made locally and there was no related industrial sector, then it was assumed that the purchase would have been made elsewhere (outside the town and hinterland). Where a service has been purchased locally, it was assumed that this had also been created locally. Although a fairly crude adjustment, it does allow for the fact that, although goods may have been purchased locally, they would not necessarily have been manufactured locally.

The problem with trying to model such a small area also means that the technical coefficients (showing average purchasing from the local area) were very small compared to the amount purchased from outside the area. For example, overall, the average Local Integration Index for non-farm businesses purchasing was 22, and for the UK it was as low as 6, which means that only 6% of the UK non-farm businesses bought their inputs locally. This is a small fraction of the total, and may (as was suggested by an expert at the Dijon Colloquium) lead to unstable coefficients if we are using the model to forecast policy changes. However, as a tool to examine the inter-relationships between the different parts of the model, the use of multipliers remains wholly valid.

A further difficulty relates to the aggregation and disaggregation of the industrial sectors. To maximise the survey data[20] the industrial bands used are quite broad. Thus, it is not always easy to establish whether the transaction between two industrial sectors is actually likely to have taken place. For example, if there is a cereal farm selling to an industry in the town, and the industrial sector is 'food and drink', then this sector covers a huge range of options from milling and breadmaking (which may be a suitable option) to meat slaughtering and meat products (a more unlikely option for this particular sale).

Thus, there is a dilemma. The industrial sectors need to be aggregated because of a lack of data and also because (relating back to the previous paragraph), the technical coefficient should not become too small. However, the difficulty of not being able to distinguish sufficiently between the sectors to correctly allocate the inputs and outputs then arises. Nevertheless, all the transactions have been recorded as being in a particular location, so although they may be allocated to the wrong sector, they are not allocated to the wrong place.

[20] At least three firms' responses from each industrial band were required before the survey data was used.

Interpretation of results

To interpret successfully the multiplier results, we need to be able to distinguish between those factors which will inevitably influence the results in a certain way and those which may actually be enlightening. One of these factors is the size of towns. It is very noticeable from our research that the size of the multipliers in the medium-sized towns tends to be larger than in smaller towns and the question is whether the size of towns influences the size of multipliers in an inevitable way. The answer is that the multipliers are not simply a function of the size of place, but are dependent upon the proportion of the total impact of any change in the local economy (direct, indirect and induced) to the impact of the particular industry or household group initially (the direct impact). However, the multipliers are more likely to be larger where there is a greater array of different industries and services, so that the above results are not surprising, but on the other hand, not inevitable, because the multipliers will depend on firm and household behaviour, and the actual range of industries and services present.

The SAM models have in fact provided us with a unique insight into the functioning of the small towns and inter-relations with their hinterlands. No other methodologies are able to incorporate the whole picture of flows and the different nature of linkages in the way that these models can, and thus, so long as the results are interpreted with care, and the assumptions underlying the models borne in mind when using them, then this methodology is currently the best that there is in portraying such linkages and establishing the level of reliance between town and hinterland.

4.2 Discussion of Results

The results presented in section 3 illustrate many different aspects of the case study towns and their local economies. This section attempts to illustrate how the results may be used to advance thinking about the dynamics of local economies, and the relevance of sectoral and territorial policies, for example growth poles and agglomeration strategies. This section first discusses the main findings from the multivariate analyses and the SAM in tandem and attempts to illustrate how, together, they allow further insight into the nature and extent of economic linkages between towns and their hinterlands.

4.2.1 National level differences

An important finding from the multivariate analysis and SAM is the evident difference between local economies in Portugal and Poland and the other three countries. Firstly, towns in Portugal and Poland are found to have stronger local economic linkages with regards to all types of transaction - purchases, sales and employment - carried out by firms, farms and households. The first round linkages and multipliers (with the exception of the town location output multipliers) are larger in all instances in these two countries. The town location output multipliers are similar sizes to those in the other countries, but the hinterland output multipliers are much larger, illustrating a substantial difference between town and hinterland location for the Portuguese and Polish towns. This may be related to the relative greater difference between rural and urban in these countries, and also to greater isolation of rural areas because of a relatively low population density. Secondly, the multivariate analysis finds

these countries unique with regard to characteristics of entity associated with strong local economic integration. For example, older and smaller firms are consistently associated with relatively strong downstream linkages across all the five countries, whilst in Portugal and Poland local sales linkages are also fostered in medium-sized agricultural towns and by owner managers who are indigenous to their local area.

In the farming sector, it is workforce size that most consistently predicts the degree to which farms sell their produce locally, with smaller farms significantly more integrated than larger farms. In Portugal and Poland, relatively strong downstream linkages in the farming sector are also fostered to a greater degree in medium-sized agricultural towns and in peri-urban towns. A further characteristic unique to these two countries is the reliance on agricultural income. With respect to both sales and purchases, it is those farms which derive a greater proportion of their income from non-agricultural sources that are most strongly integrated into their locality. This could either be income derived from off-farm sources or from diversification projects on the farm. Further characteristics associated with strong local sourcing in Portugal and Poland are smaller land areas, indigenous farmers and towns in agricultural areas. In the remaining three countries it is only the latter which is consistently associated with strong local upstream integration.

Essentially, the present findings indicate that, all things being equal, development initiatives focused on small and medium towns in Poland and Portugal are more likely to benefit surrounding rural communities through trickle-down effects. In principle, the findings from this study also imply that there is more scope to influence the degree to which income can be retained and generated in the local economy of Polish and Portuguese towns. Of course, this assumes that appropriate mechanisms are available in these countries to influence the spatial distribution of economic activity. The fact that this study has identified such a marked division between the countries under study poses some important challenges for European policy makers. We return to this point in section 5.

4.2.2 Consumption linkages

If we begin to examine the influence of individual sectors on the potential for containing and developing economic benefits, an important area is the role of consumer services, a sector which is seen to be especially important to the continued survival, and functioning, of small and medium-sized towns, certainly in the UK. Compared to other sectors, consumer services are found to sell more locally in the UK and Poland. It is possible, therefore, that the sector has a more central role to play in the functioning of towns in these countries. However, the first round linkages of retail outlets were not analysed separately for the OLS at this stage in the study, and the SAM models concentrate on the backward linkages. For the Netherlands, the multipliers for consumer services are relatively large, especially in the tourism towns and in the medium-sized peri-urban town. Both the peri-urban towns and to a lesser extent the tourism towns in France show strong linkages for consumer services, The medium-sized tourism town in Poland also shows strong backward linkages for consumer services with the local economy, but the other Polish towns and the towns in Portugal and the UK do not appear to have strong backward linkages. This is a potential drawback as they can prove crucial to a town's survival. Nevertheless, strong local sales linkages in this sector show that a

significant proportion of household incomes is being spent locally Whether such income is derived from local employment or not, it implies that this sector can be central to preventing income leakage, and to securing a viable role for more small and medium-sized towns in the future.

The ability of consumer services to capitalise on their local markets further signifies the importance of recognising the types of households that are most likely to shop locally. The results of the household analysis indicate which socio-economic groups have the greatest potential to support consumer services in their local area. Most conclusively, a stronger degree of local low order consumption expenditure is fostered by households who live in town locations, are on lower incomes, work within the local area and, to a lesser degree, live in areas of relatively high agricultural employment. In all cases, it is evident that people who commute outside of their local area tend to combine the work journey with their low order shop and, as one might expect, peri-urban towns tend to suffer a higher degree of income leakage than do other town types.

Income level is also the most important predictor of high order integration across the countries and higher income multipliers are, in general, found in the town locations as opposed to hinterland, confirming the analysis of first round linkages. This means that when a change is initiated by a shock to household income or wages, the impact is greater within the town, and is more likely to leak out of the local economy when generated within the hinterland. The household income and wage income multipliers tend to be larger than the output multipliers, stressing the importance of the 'induced' linkages relating to local household consumption and wage income.

When the impact of the household income multipliers is broken down, it can be seen that the largest multipliers are derived from the lowest income groups and the lowest multipliers from the highest income group, again confirming the results of the multivariate analysis. This means that low income households are more likely to consume locally produced goods than those on higher incomes, and implies that a stimulation to the incomes of this low paid group is more likely to retain income within the locality.

Commuting plays a lesser role in predicting the location of high order shopping in comparison to low order. This implies that the journey to work is more likely to be associated with the low order shop, which in turn has implications for sustainable planning policies. For example, combining business and residential land use to reduce commuting may result in increased demand for low order consumer services, but may not increase the range of town centre functions because people will continue to access high order services in larger settlements (which benefit from economies of scale and can therefore offer goods and services at cheaper prices).

In-migration, however, is found to be an important driver of high order spending patterns. The choice of a five year cut-off point to examine the relevance of in-migration patterns has proved fruitful. In four out of the five countries in-migrants who have moved into the local area within the last five years are found to spend proportionally less on high order goods and services in their local area. A possible explanation is that newcomers retain their previous

lifestyles and shopping habits for a period of time, in this case it seems for up to five years. It would therefore be useful to examine the reasons behind patterns of migration in and out of rural areas, as well as the reasons why there is a time lag between moving into a rural community and the use of local consumer services.

The division of households according to occupational group has no significant effect in the UK or Netherlands. However, in France, Portugal and Poland, lower occupational groups (namely unskilled) show relatively strong levels of integration, in terms of both low and high order expenditure. The results of the SAM serve to reinforce this finding for the latter two countries. A breakdown of the wage income multipliers in Portugal and the town locations in Poland shows that in general, the low skill workers have the highest multipliers. However, in the hinterlands in Poland, it is frequently the higher skill groups which have the higher multipliers. In France and the hinterlands of the UK, the highest multipliers come from the management and professional groups. This contradicts the findings of the French multivariate analysis which indicates that it is unskilled occupations which tend to have more localised spending patterns. In the UK, a marked difference is revealed between residents living in the town and those residing in the surrounding area. The Netherlands shows very little differentiation. One question here is whether these are related to the sector in which people work. For example, it is possible that the relatively high multipliers from management/professional groups in the hinterlands relate to the presence of the agricultural industry, where the farmer would classify him or herself in the management/professional group.

4.2.3 Production linkages

Returning to other sectoral differences in terms of first round transactions, some findings emerge which are interesting to consider in the context of net income (determined by total external income, times a multiplier - larger the more self-reliant the economy - minus total external spending). If imported goods and services begin to be produced locally then net income may be increased without a rise in exports. Since small towns contain both producers and consumers, there is a clear case for fostering not only ‘basic’ sectors which generate external income, but also those which source locally and serve both intermediate and final demand so helping to prevent leakages and increasing the size of local multipliers. Of course, both sectors will help to stimulate local multipliers through induced effects if their employees live locally.

Following this logic, it would preferable to strike a balance between those sectors which draw in external income through exporting out of the area, those which generate income through local sourcing, and those which are able to do both. The findings clarify the export base role of producer services and manufacturing firms. In terms of first round linkages, both sectors obtain relatively little sales revenue from within the local area, and thus draw in external income from outside the local economy. In Portugal and Poland, producer services are also found to source more locally than other sectors, which means they are a potential generator of net income generation. In all countries, construction firms have consistently strong upstream linkages which makes them a potentially useful target for national and European policies aiming to stimulate local income generation in and around small towns.

Examining sectoral multipliers derived from the SAM, it is shown that in the nearly all the UK and French towns, the Banking and financial services are key sectors, both for output and employment. This is interesting as the analysis of first round linkages showed business services (defined more broadly) to be less important in terms of local outputs. The service sectors are most important for output multipliers in France, Portugal and Poland. But whereas in France, it is the Banking and financial services that have the highest multipliers, in Portugal the most important sectors are Other business services, Hotels and catering and Public administration, and in Poland the most important sector is Hotels and catering.

On the other hand, the industrial sectors predominate in the Netherlands, in the Polish town locations and the UK towns, with Chemical, rubber, plastics and glass, and Metals, machinery and computing sectors being most important. Construction is an important sector in many of the French, Dutch and Portuguese towns for output, but seems less important as regards employment multipliers. Agricultural sectors also have an important output impact in many of the Dutch and Polish hinterlands, but less so regarding employment.

Employment multipliers are very high for the Food and drink sector in all towns except those in Portugal. Transport services are key for employment in many French and Portuguese towns.

The role of the construction sector in generating local economic benefits is therefore reiterated, in terms of sales, purchases and direct employment for many of the French, Dutch and Portuguese towns. However, the strong upstream first round impacts from construction seen in the other countries must leak out of the economies further up the chain, as their construction multipliers are not very significant. What is interesting though, is that although many of the construction multipliers are not among the top three, when the 'impact on the other zone' is examined, the construction sector (and food and drink, and agriculture) frequently have the largest impact on the other zone.

Likewise, although the SAM clarifies the importance of consumer services in a few of the towns in the Netherlands, France and Poland, it appears less important in other towns, particularly in the UK. It must be remembered however, that the two types of analysis are examining different things, and the results show therefore that although consumer services have strong local first round upstream linkages, subsequent linkages are not very localised. Whilst the multivariate analysis shows the relatively strong levels of upstream integration for agricultural firms in UK, France and Poland, the multiplier analysis only supports this strongly for the UK peri-urban towns, French agricultural towns and the Polish towns.

4.2.4 Locational factors

In general, town locations (zone A) are shown to have stronger downstream and consumption expenditure linkages than hinterland locations (zone B), findings which are shown clearly by the analysis of both first and subsequent round linkages. This means that firms in the towns tend to sell more locally, and town households consume more locally than the firms and households in the hinterlands. This may well be related to the existence of a wider industrial base within the towns, and the fact that many of these hinterlands are not that isolated from

other large towns, which may also have a wide service and productive base. It does, however, imply that there is not a great reliance of the hinterlands on their towns as a demand centre for productive goods and household expenditure.

However the SAM analysis shows that for the majority of towns, the output and employment multipliers in the hinterland are larger than those in the towns. The multipliers are based on upstream linkages, i.e. the purchases of inputs by the industries. It would therefore appear that the hinterlands are more dependent upon the towns for purchases of goods and services, but that town industries tend to look further a field. One question here is whether this is related to the types of industries and services that locate in the towns and hinterlands respectively, or whether it is more owing to different behaviours of the same types of firms. The results show both situations. Frequently, the key sectors in the hinterland are different to those in the towns, but where they are similar (for example in many of the UK towns) those sectors have larger multipliers than the same sector in the town (this applies particularly to the Banking and financial sector). The OLS, however, does not show the location of the firm for purchases as being significant.

If the impact of a shock in one of the zones on the other zone is analysed, it becomes apparent that both the output and employment impacts on zone A from an initial impact to zone B are greater than from zone A to zone B with the exceptions of two towns (Saffron and Towcester). In fact the output impacts from zone A to B tend to be very small (less than 10%). From this, we can conclude that even when the multipliers for industrial sectors within the towns are large, very little of that impact will reach the hinterlands. One reason for the two town exceptions may be that their hinterland employment (and population) is actually greater than the town employment and population. There are, however, sectors in the towns which consistently have larger impacts on their hinterland. These include Food and drink, Construction and some of the services (particularly Banking and finance, and Transport services).

On the other hand, shocks to the industrial sectors in the hinterland frequently have the majority of their indirect and induced impact in the town. The output and employment impacts from Food and drink, and Construction and Textiles sectors in zone B appear to create the largest output and employment impact for most Dutch and Portuguese towns, although the service industry creates a larger impact in the town of Gemert and the two Portuguese peri-urban towns. Food and drink, Construction and Banking and financial services are important in the UK and French towns. Particularly in the Polish towns, but also in the UK and French towns, Nunspeet and Oudewater in the Netherlands, and Vila Real in Portugal, the agricultural sector in the hinterlands has a large output and employment impact.

An important aspect of the study is the identification of town types which are most likely to generate trickle-down effects in the local economy. In other words, which types of town are likely to prove most beneficial in stimulating rural development through growth-pole (or sub-pole) type policies? Examining first round linkages, it is evident that towns in areas where employment in agriculture is above the national average tend to foster stronger levels of local economic integration than those in tourism dominated areas or peri-urban locations. This finding is broadly consistent across both production and consumption linkages, although there

are some variations with respect to town size, and between the countries under study. Most commonly, stronger linkages tend to be found in medium sized towns in such areas, a pattern which is most prevalent in the case of production linkages in Portugal and Poland. The SAM models for Portugal also show the largest output multipliers for the agricultural medium-sized town and also relatively large multipliers of the hinterlands of the Polish agricultural medium-sized town. However, the SAM models also show that, although firms in these towns purchase locally, the transactions are actually taking place within the towns themselves, and the impact on the hinterland economy is very small. Thus, even the largest multipliers, created within the town, appear to have relatively little impact on the hinterland.

However, there are exceptions to this finding on agricultural towns. For example, in France, tourism towns are more commonly associated with strong upstream and downstream linkages and although small peri-urban towns act as a relatively small market to non-agricultural firms, larger towns in these areas do account for a greater proportion of local sales than other town types.

Across four of the countries, (UK, the Netherlands, Poland and Portugal) the medium-sized towns have higher multipliers than the small-sized towns. This is not unexpected (although not given), as a larger town is likely to contain a greater mix of industries and services and thus, the opportunity for more local purchasing. What are interesting though, are the exceptions to this pattern, for example, wage income multipliers in France, which are all larger in the smaller towns. This may well relate to commuting patterns, where fewer may commute into work from outside in the smaller towns.

4.2.5 Inter and intra-regional impacts

The SAM also allows decomposition of the multipliers to examine inter- and intra-regional impacts. The intra-regional multipliers are generally a very high proportion of the total multipliers, which means that most of the linkages are taking place within, rather than between, the regions. This is very marked in the UK, where this proportion rarely dips lower than 85%.

However, in the hinterlands of the Dutch, Portuguese and Polish (and to a lesser extent French and UK) study areas, the results show an intra-regional multiplier that is a reduced proportion of the total, compared to the proportion in the town location, implying that the hinterlands are more reliant on the towns for goods, services and factor payments than vice versa. Among the UK and French towns, we can identify a difference in hinterland populations (relative to the town) that may account for some of the differences between the linkages. For example, both the UK peri-urban towns, and the medium-sized French peri-urban town have a large percentage of their town location multipliers impacting on the hinterland and have relatively densely populated hinterlands, with a greater population and employment than the town itself. This would obviously create more opportunities for linkages with the town firms than are perhaps available for less densely populated hinterlands. .

Decomposing the intra-regional multiplier further, we can identify how much of each SAM multiplier is made up from the input-output multiplier (inter-industrial linkages) and

how much from the induced impact of the linkages through household consumption and wages. It is very noticeable that the proportion of the multiplier from the inter-industrial linkages is higher in the UK and France, and the induced impact appears to be greater in the towns in the Netherlands, Portugal and Poland. There also appears to be a sectoral difference, whereby the induced impact is greater for the service sector in the town locations and the agricultural sector in the hinterlands. This illustrates the importance of including the induced impact when considering the service and agricultural sectors.

4.2.6 Application of the study findings

This study has analysed the data from thirty case study towns from five different countries, a geographical diversity which must be considered when the implications of the findings are examined. As a case study approach was used, care must be taken when drawing conclusions. Essentially, we are not in a position at present to generalise with any certainty to unsurveyed towns and the limitations of the analyses must be borne in mind when interpreting the findings. Nevertheless, a number of interesting patterns have emerged which enable us to draw some firm conclusions. Ultimately the data will allow us to try and predict the answers to some of the pertinent rural policy questions that apply to small and medium-sized towns.

To provide a framework for this process, the research team began by considering some current rural policy questions that are relevant to this study, and to use the findings to make some policy suggestions in response to these. The policy questions used are as follows, and our response to these is given in section 5.

1. What are the key sectors in small and medium-sized towns that can help achieve economic growth through local multipliers?

2. Which are the sectors which help support local employment?

3. In planning for sustained growth in rural areas, what is the appropriate spatial distribution of development in rural areas (i.e. in towns or the surrounding countryside)?

4. Should local development agencies be promoting inward investment into small towns or fostering local business start-ups?

5. Is combining business and residential development likely to help foster sustainable economic development?

6. Do the relevant local actors have a realistic appreciation of the functioning of rural economics in and around small towns?

7. Is the CAP likely to provide a useful method of supporting rural economies in the future?

8. Are small and medium-sized towns an appropriate foci for rural development initiatives, and if so which types and in what areas?

5 CONCLUSIONS

5.1 Policy implications

The Marketowns research team identified eight questions arising from the research that are of current relevance to European rural policy. This chapter uses the results from the project, detailed above, to advance policy thinking in the domain of local economic development.

(1) What are the key industrial sectors in small and medium-sized towns, the promotion of which can best help achieve economic growth through local multipliers?

By identifying the key industrial sectors within the local economies of the small and medium-sized towns under study, it is possible to suggest which sectors are most likely to establish local linkages and thus help generate income locally. It should also be possible to identify the sectors that might be useful in the promotion of business clustering[21], thus providing a critical mass of supporting activities which would enable advantage to be taken of economies of scale.

The results of the project show that, in general, the key industries in this respect belong almost entirely to the service sector, irrespective of town type. This would imply that development of the service sector is likely to help the local economy more than investment in the manufacturing sector. In the UK and France, the key sectors are less varied from town to town, and it is Banking and financial services that stand out as important in most of the towns as being strongly tied to the local economy, both from the point of view of output generation and also employment provision. Other sectors of importance were Chemicals, glass and machinery, Computing and Oil and gas, all of which come under the EU defined 'knowledge-intensive' industries (those which are likely to employ more than 25% graduates). This is an interesting finding as the promotion of the 'knowledge-intensive' industries can now be further justified by this evidence of strong local linkages. Construction is also important, particularly in the Portuguese and the Dutch towns where they appear as one of the top three key sectors in nearly every town for output. The Hotels and catering sector is important in Poland and Portugal, and in Portugal alone, also the Other business sector. In the hinterlands of the Netherlands and Poland, agriculture appears as a key sector, especially in Poland, which is not surprising given the high percentage of its population still employed in agriculture. However, when the impacts on the 'other zone' are examined in isolation, it is interesting that agriculture in the UK becomes the hinterland sector with the largest impact on the local town. Other sectors which have important 'other zone' impacts are similar to those with the highest multipliers, namely Banking and financial services, Food and drink and Construction.

[21] A cluster can be defined as a group of industries and organisations that are linked together in buying and selling relationships, or who share the same infrastructure, customers or skills base and whose linkages enhance competitive advantage. Whilst informing cluster development may be a useful application of the Marketowns study findings, it is not an aim of the project to suggest specific clustering scenarios.

(2) Which are the sectors which best support local employment?

Large employment multipliers indicate that for every person employed in certain sectors, this particular industry supports jobs elsewhere in the economy. For example, an employment multiplier of 1.5 in the Food and drink sector, implies that for every person working in the food and drink industry, there is supporting employment amounting to 0.5 of a Full-time Equivalent (FTE) in ancillary industries. Thus, sectors that support local employment may have relatively large local employment multipliers. However, it is also necessary to examine the ratio of employment to output. If the industrial sector has a very low employment to output ratio, then substantial investment in that industry may not necessarily result in a large employment impact. If we examine the employment to output ratio, the direct employment coefficient, and then we calculate the indirect and direct employment coefficient, we can estimate the actual amount of employment that will be created from a certain investment, which gives the total employment impact. In the UK and France, the sectors with the highest output multipliers also seem to generate the most employment (in particular, the Banking and financial service sector, but also Machinery, metals and computing, and Food and drink industries). Food and drink industries are also key for the Netherlands, Portugal and Poland. In France and Portugal, transport services also seem very important. Where employment generation is of key importance, therefore, the promotion of these types of industries with their large employment impacts should be considered. However, the actual employment impact of a single sector is very variable and will depend upon the linkages within the particular locality. The importance of business clustering thus arises again.

The table below summarises the important key sectors for employment and output in each country.

Table 5.1. Table showing key sectors for employment and output in each country

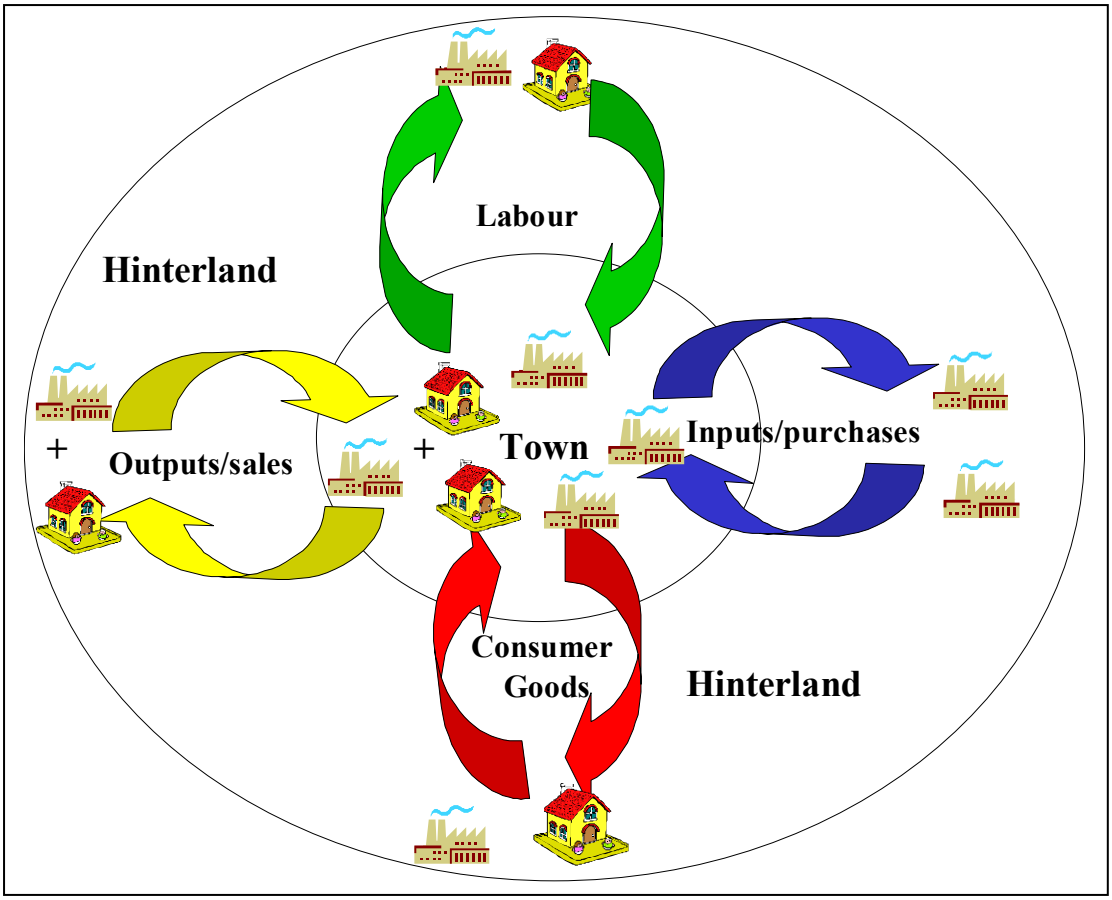
	Agric.	Food and drink	Chemical, rubber, plastics and glass	Mach, metals computing	Construction	Transport services	Banking and finance	Other bus. services	Hotels and catering	Public admin.
UK	Io, Ie	OE, Ie	OE	O			OE, Io, Ie			
FR		E, Io, Ie		E		OE	OE, Io		Io	
NL	O	OE, Io, Ie	OE	OE	O		Ie			
PO	O,Io	OE,Io, Ie	OE	E		Ie			O	
PR					O, Io, Ie	OE		OE,Io, Ie	O	O

Key: O represents sector with high output multiplier
E represents sector with high employment multiplier
Io represents sector with high output impact on other zone
Ie represents sector with high employment impact on other zone

(3) In planning for sustained growth in rural areas, what is the appropriate spatial distribution of development in rural areas, i.e. in towns or the surrounding countryside?

Whilst the retention and generation of income within the local economy is an important element of a sustainable growth model, we can only address this question in the context of minimising income leakage and maximising growth multipliers through local sourcing. This, of course, leaves many aspects of the sustainable development stone unturned including, for example, the environmental impacts of travel and transport and the sharing of local knowledge. The economic linkages of interest in the context of income retention and generation, and those which have been quantified in the 30 case study towns, are illustrated in Figure 5.1. Quantification of the illustrated linkages allow an estimation of the magnitude of town-hinterland and hinterland-town spill-over effects. Of course, equivalent linkages will also be found within the town and hinterland respectively (intra-town and intra-hinterland linkages).

Figure 5.1. Model of possible town-hinterland relationships



Planners will often argue that development within towns is preferable, i.e. the use of existing brown field sites in town centres, as this effectively conserves land in the surrounding countryside and, if local employment opportunities exist, and services are available, residents will, in theory, travel less, thus reducing pollution and the use of

fossil fuels. The present findings of our research suggest that firms located within the town sell more locally than those in the hinterland, and that households residing in the town tend to consume more locally than those in the hinterland. Therefore, in the context of the provision of, and access to, local services, and the minimisation of income leakage (whether such income is earned within or outside the locality) as well as the positive externalities that may result, town locations for new industry and residential developments are favourable. However, the multipliers indicate that, even when the town multipliers may be larger than those in the hinterlands, often very little of the multiplier impact is felt in the hinterlands. Thus, although more impact may be retained within the local economy, it is retained within the town, rather than stimulating the hinterland economy. However, town-hinterland spill-over effects do appear greater in the Portuguese and Polish study areas and also in peri-urban towns of the other countries where often the hinterland population is more dense.

Thus, if a pre-requisite of sustainable growth is indeed the generation of local multipliers, then fostering hinterland development is also likely to be beneficial, providing that the appropriate sectors are targeted. As the majority of study areas were found to have larger output multipliers in the hinterland then, in order to foster local sourcing, confining new development within the town is less likely to lead to sustained growth. Of course, some may also argue that sustainable development inherently means a return to the town-hinterland relationship that existed historically; whilst farms may no longer provide the mainstay of this relationship, other sectors and demographic groups do appear to have the potential to do so.

The results of the SAM analysis allow us to quantify the magnitude of the relevant linkages shown in Figure 5.1. In general, it appears that the flows of output and employment from town to hinterland are of lesser magnitude than those from hinterland to town. Thus, town firms do not depend as much upon their hinterlands for purchases and employment, as the hinterland firms depend upon the towns.

There is a similar pattern with respect to household income, whereby household income earned in the hinterland has a greater impact on the town than vice versa. On the other hand, household income multipliers are greater in the towns than they are in the hinterlands, implying that more of the income derived from town employment is spent locally. Again, however, intra-town flows remain greater than town to hinterland flows because more is spent within the town than the hinterland. Thus, in most of the towns, the spill-over effects of an income change in the town are relatively small. The effect of an income change in the hinterland on the town will, however, be much greater.

Ultimately then, the size of the flows of output, inputs, employment and income will usually be greater from the hinterland to town, rather than from the town to the hinterland. Flows within the town will also be greater than those from town to hinterland.

In summary, therefore, we can say that although the multipliers and therefore the greatest potential growth occurs when the development is in the towns, little of this development will impact on the hinterland. This suggests that in order to maximise potential development, a balance needs to be struck between town and hinterland development; a balance between developing brown field and green field sites; between retaining income and generating local economic growth; and between providing local services and generating income through the export of goods and services.

(4) Should local development agencies be promoting inward investment into small towns or fostering local business start-ups?

The study did not reveal as many differences between locally-owned, single-site firms and the branches of national and international companies as was originally anticipated. No clear differences emerged with respect to sourcing patterns and whilst in the UK national retail firms tend to serve local markets, national branches in Portugal are not strongly tied to local markets. What did prove more influential as a driver of local integration was the indigeneity of owner/managers and local residents. In four out of the five countries, indigenous owner/mangers were found to source more locally than those who had not lived in the local area all of their lives, a fact which points to the need for further research into the dynamics and motivations of rural-in-migration. In this sense, we can suggest that fostering 'locally grown' business start-ups is likely to be more beneficial to local income generation, although we need to better understand why this group tends to operate more locally, and how the economic behaviour of in-migrants can be influenced.

The study has also revealed some very interesting relationships between in-migration and local consumption patterns. There appears to be a time lag between the point when households move into an area and when they begin to make significant use of local services. Again, further research into the reasons that lie behind this phenomenon is required before policy implications can be drawn, although there may be some implications for town centre marketing strategies.

(5) Do the relevant local actors have a realistic appreciation of the functioning of rural economies in and around small and medium-sized towns?

On the whole, the impressions gained from the local workshops are that stakeholders are generally well-informed about the structure and dynamics of small town economies, and that the results of the survey were consistent with their expectations. This not only reinforces the validity of the survey design and its conduct, but also leads to the conclusion that relevant local actors do have a reasonably realistic appreciation of the functioning of the rural economies in and around the small towns. There are exceptions, however. Some surprise was expressed in the UK at the extent to which local business drew labour from the local area, a misconception possibly fuelled by the media coverage given to issues surrounding high levels of commuting.

Human nature being what it is, it is understandable that stakeholders would not wish to be seen to be surprised by these survey findings. However, clues to possible widespread misconceptions can be gleaned by contradictions between groups in their understanding of issues and, in particular, in their practical proposals for dealing with problems. A good case in point is the proposal by some of our respondents that policies should be developed to encourage higher paid workers to live in the town or its surroundings. This is understood to be a means of encouraging more local purchasing of high order goods. However, it is clear from our survey results that high-income households tend to have lower levels of integration, in proportional terms, for all classes of purchase than do low wage households. There are some obvious reasons why this should be so, some evidenced by the survey itself - for example higher levels of car ownership in high income households, and some evidenced by stakeholder comment - for example that high wage earners are more likely to be out-commuters. This misconception was highlighted by the Tiverton (UK) stakeholder group, who suggested that rather than attempt to attract high wage earners into the town, it might be better for the local economy to improve the earnings of established low wage households, as their levels of local integration are more favourable.

Given that local actors appear to have a realistic impression of the functioning of their towns' economy means that it is likely that this research will only reinforce the validity of policies being undertaken currently. However, the research findings will no doubt reinforce understandings of situations, and also prompt stakeholders to reconsider the reasons behind the findings. For example, highlighting the low integration of purchases from high wage households has prompted stakeholders to consider why this might be so and identify commuter shopping (where shopping is combined with the non-local work journey) as a likely cause. This has led to a greater emphasis being placed on existing policies that promote more local working, including teleworking, and the establishment of local business parks and other desirable commercial workspaces, including the conversion of redundant buildings, especially former agricultural buildings. This was an important issue in many of the towns in the UK, France and the Netherlands, where there is perceived to be a need to attract more high-skilled jobs to these rural areas. The survey results[22] also provide supporting evidence for stakeholder groups who are seeking to make applications for public funding.

(6) *Is combining business and residential development likely to foster sustainable economic development?*

A subsidiary aim of the study was to assess the relationship between the workplace and shopping patterns of local residents in an attempt to identify the local economic impacts of commuting patterns. Analysis of first round linkages indicate that the

[22] The contact that the research team had with these stakeholder groups occurred before the modelling phase of the project. It would be interesting to go back to these groups with the results of the more sophisticated analysis that has been undertaken since this time and see if this too is what they would have expected.

journey to work is often combined with low order shopping, which in turn suggests that combining business and residential development is likely to help foster income retention and support local low order retail services. Of course, this assumes that such development will create a wide range of employment opportunities within the local area. It also assumes that low order shopping will not be combined with journeys for other purposes, whereas in reality this is likely to happen.

Indeed, travel patterns and traffic volumes are an important consideration in the context of sustainable development, and decisions based on economic aims should ideally be made in accordance with environmental concerns. Whilst fostering more local employment (and in turn consumer expenditure) may help foster a more vibrant and self-contained local economy, it may also lead to considerably more car journeys within the local area, resulting in environmental degradation. In turn, this points to a possible drawback of the present study, which did not collect information about the number (or volume) of transactions. If it had, this would have provided an indication of the likely number of trips associated with various types of transaction.

(7) Is the CAP likely to provide a useful method of supporting rural economies in the future?

Through the Fischler 2003 reforms, the CAP has undergone a significant shift in emphasis, from supporting production to supporting producers' income directly and towards an objective of sustainable agriculture. As a result of Agenda 2000 and the Fischler reforms, there is currently new emphasis on assisting wider rural areas, and their economies and communities, and not just on assisting farming. One of the two 'pillars' of the CAP now brings together a host of measures directed at rural development. This rural development policy offers a menu of 22 measures (covering investment in farm businesses, human resource enhancement including training, less favoured areas, agri-environmental measures, processing and marketing of agricultural products and forestry). Individual member states then select those measures that they feel are most relevant to the needs of their rural areas.

Our research shows that in many of the rural areas under study, the agricultural industry remains an important sector, with relatively strong links to neighbouring town still a feature of the sector. This is especially so in Poland, but also in Portugal, the Netherlands and France. Our research also indicates that, not only do the agricultural sectors have large first round impacts and large multipliers, but much of this impact is transferred to the town. It appears that in general the agricultural industry has a tendency to purchase locally, so changes in agricultural policy that affect the agricultural sectors in the hinterlands of these towns are likely to have an impact on the towns themselves. Permanent crops farming in particular is highlighted as a key sector in this respect in Portugal, horticulture and mixed farming in Poland, mixed and livestock in the Netherlands and the UK, and horticulture in France. All of

these sectors will be affected in the future by changes in agricultural support payments emanating from the Fischler reforms[23].

The second pillar of the CAP, which covers all the direct rural development policy measures will, however, be of greater relevance to all rural towns. Stakeholder groups representing market towns may apply through local government for funding from Europe, and programmes such as LEADER + are well-placed to assist such bottom-up community-led initiatives. As the emphasis is currently on locally-led initiatives, a policy to help in the formulation of these, by putting in place a support framework, would be useful. There is such an example in England where, in May 2001, the Market Towns Initiative was launched by England's Countryside Agency in association with the Regional Development Agencies. This continues, now renamed the *Market and Coastal Towns Initiative,* and it has given many market towns new dynamism. It encourages a baseline survey of the town (a 'health check') to provide a knowledge base to help local people identify the economic, environmental and social strengths and weaknesses and to act as an evidence base to support applications for funds to promote economic development initiatives.

(8) Are small and medium sized towns appropriate foci for rural development initiatives, and if so, which town types and in what areas?

On the face of it, this is the most straightforward question to answer, and has been central to the aims of the study. The case-study approach employed in the project, which encompassed six categories of town, has proved useful. The majority of towns where local income is being retained, retain most within the town itself and therefore can be said to have very little impact on their immediate hinterlands. However, this does not mean that the small and medium towns do not have the potential to be the foci for rural development initiatives in the future. We can use the findings from the study to identify which town types are more likely to foster local linkages. Compared to towns in peri-urban and tourism areas, towns in areas where employment in agriculture is above the national average are more likely to be an appropriate focus for rural development initiatives, because first and subsequent round linkages will generate the greatest trickle-down effects in the local economy (both the town and surrounding area). In particular, larger towns in such areas are likely to generate the greatest multiplier effects. In tourism and peri-urban areas, the benefits of development initiatives are more likely to impact on the surrounding areas of medium-sized towns, as the larger[24] towns in all areas tend to generate the highest multipliers.

Of course, this is a somewhat simplified view and whilst the study has provided quantified clarification of the potential role of small and medium-sized towns in rural development, one would also need to take a number of other variables into consideration. Not least, the economic, human and social capacity of towns to

[23] i.e. the introduction of the Single Farm Payment.
[24] Those with a population of 15-20,000.

implement and deliver the appropriate initiatives. However, the findings from the present study indicate that, other things being equal, local economic development in and around small and medium sized towns is likely to be best served by policies which:

- Focus on larger market towns (those with a population of 15-20,000), particularly those in areas where employment in agriculture is above the national average
- Foster growth of service based industries, in particular Banking and financial services, Construction and Food and drink.
- Promote residential and business development in town locations, whilst facilitating targeted business growth in hinterland locations.
- Foster 'locally grown' business start-ups.

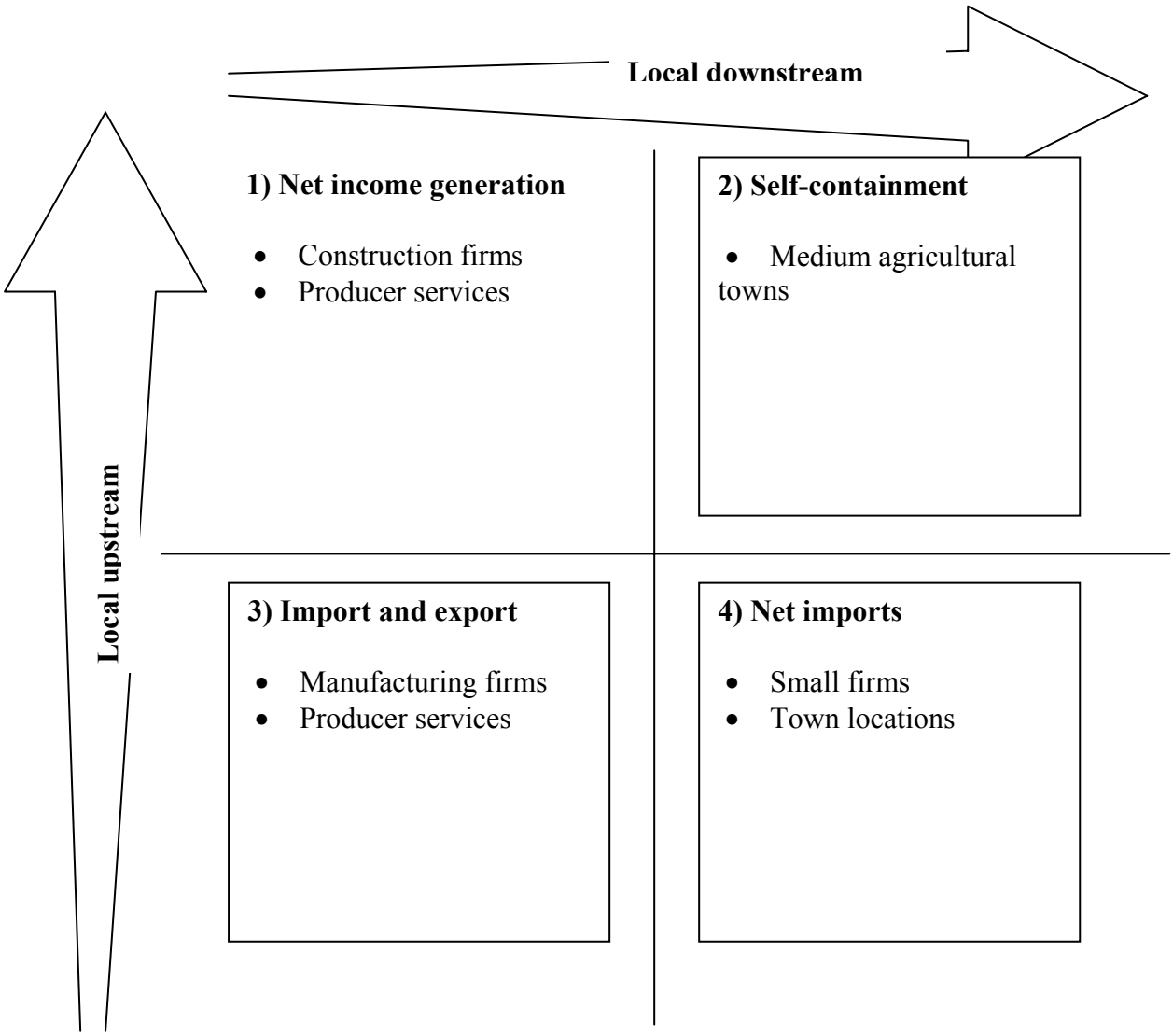
We can take this a step further by applying the above policy considerations to a framework which takes into account the relative strength of upstream and downstream linkages in the local economy. As such we can suggest the following local development model to assist planners and policy makers who might be considering options with regard to developing local economies in and around small and medium towns, or simply considering the potential of such towns to stimulate wider rural development through economic benefits.

The matrix in Figure 5.2 contains four cells which result from the interaction between relative strengths of first round upstream and downstream transactions[25]. Cell 1 indicates those attributes of towns and entities that could be used to generate net income, and thus economic growth, through relatively strong local sourcing and the external injection of income through export base activities. Cell 2 contains attributes associated with strong local purchasing and selling, in other words those which could be used to develop a self-contained local economy, where both income leakage and the external injections of income is minimised. This may be of interest to those wishing to promote sustainable development policies.

Cell 3 contains the importers and exporters, those towns and entities associated with relatively weak levels of local integration. Arguably they could be suited more to towns with a dormitory or commuting function, whereby development of a sustained local economy is not the primary focus. Alternatively, firms which operate with little regard to territorial space can sometimes provide environmental benefits, and in any case the injection of income through extra-local sales can be of benefit to local economic development if combined with a significant amount of local employment. Cell 4 contains the net importers, those towns and firms associated with local sales combined with non-local sourcing. Whilst the latter implies minimal benefits for growth through indirect effects, the potential for growth in multipliers through induced effects is significant if incomes are spent locally.

[25] Employment linkages are not included in the present model.

Figure 5.2. Local economic development model for small and medium-sized towns based on interactions between upstream and downstream transactions



6 EXPLOITATION AND DISSEMINATION OF RESULTS

The project team has undertaken to disseminate the results of this project as widely as possible. Some dissemination has already taken place and more is planned.

One of the main means of dissemination of our results to interested parties was through a colloquium was held in Brussels on Thursday 4 November 2004 to which a number of delegates (including those from the EU Commission) with an interest in rural development were invited. The project presentation was well received, we have had many requests for copies of our final report, and there was a write up in Agra-Europe the following week. Members of the Marketowns team have also presented papers at conferences and seminars, and written papers and journal articles for publications and reports. Those completed are listed below. There are also others underway and planned for the future. A website has been set up (www.reading.ac.uk/AgriStrat/marketowns) to give access to information, reports, papers and the database.

6.1 Publications

Czarnecki, A. (2001) Uwarunkowania rozwoju wielofunkcyjnego na obszarach wiejskich aglomeracji lodzkiej. *Wieś i Rolnictwo* no. 4, Warszawa, 164-181. *(The terms of multifunctional development of rural areas in urbanised zone of Łódź agglomeration*).

Czarnecki, A. and Heffner, K. (2003) *Pozarolnicza działalność gospodarcza w strukturze funkcjonalnej wsi aglomeracji łódzkiej*. Wieś i Rolnictwo no. 1, Warszawa 2003, 86-99. (Non agricultural activities in the functional structure of rural settlements in Lods Agglomeration).

Diniz, F., Poeta, A., Silva, C. and António, P. (2002) O Papel das Pequenas e Médias Cidades no Contexto do Modelo de Desenvolvimento Rural: Uma Primeira Abordagem, at Actas do IX Encontro Nacional da Associação Portuguesa de Desenvolvimento Regional, Nova Economia e Desenvolvimento Regional, March 2002, Volume 2, ed. APDR - Coimbra, 1237-1249.

Diniz, F. (forthcoming) A Integraçäo Local dos Agentes Económicos de Pequenas e Médias Cidades e o Seu Papel No Desenvolvimento Rural – Estudo de Caso de Vila Real. Submitted to Revista de Turismo e Desenvolvimento.

Diniz, F. And António, P. (2003) A Integraçäo nas Economias Locais dos Agentes Económicos, Famílias e Empresas de Pequenas e Médias Cidades Sediadas e m Meio Rural – Resultados de Um Estudo Piloto. Actas do X Encontro Nacional da APDR, Évora, 2003.

Heffner, K (2002) Czynniki osadnicze wpływające na potencjał rozwojowy obszarów wiejskich, *Wieś i Rolnictwo* no. 2, Warszawa, 27-48. (*Settlement Factors Externing Influence on the Development Potential of Rural Areas*).

Heffner, K (2002) Rola małych miasteczek w rozwoju terenów wiejskich. In: Klodzinski, M. (ed) *Małe miasta w kreowaniu przedsiębiorczości na obszarach wiejskich w Polsce Instytut Rozwoju Wsi i Rolnictwa*. Warszawa. *(Small towns in creation of development of rural areas)*

Heffner, K. (2003) *Małe miasta a rozwój obszarów wiejskich*. In: Stasiak, A. (ed) Problemy zagospodarowania terenów wiejskich w Polsce, Biuletyn KPZK PAN. Vol. 207, Warszawa 2003. 227-246. (Small towns and the development of rural areas).

Poeta, A., Silva, C. and Abreu, S. A Envolvente Rural das Pequenas e Médias Cidades: Um Estudo Piloto. In: Comunicaciones 3 - 8º Congreso de Economía Regional de Castilla y León, Grupo de trabajo 15 - Desarollo Rural II, in Valladolid (Spain) 28, 29 and 30 November 2002, ed. Junta de Castilla y León, 1348-1360.

6.2 Presentations

The Plymouth team contributed a poster on the Marketowns study to the annual meeting of the UK Agricultural Economics Society Conference 8-11 April 2002.

Paul Courtney and Andrew Errington gave a paper at the AES conference, April 2003 entitled ‘Market towns - policy, theory and methodology’.

The Dutch team presented the project to practitioners associated to the pilot study (Chamber of Agriculture, Chamber of Industry and Commerce, Chamber of Crafts, Municipality and local community of Genlis) and they received a presentation of the project.

The Dutch team presented the project to practitioners associated to each area study (Chamber of Agriculture, Chamber of industry and commerce, Chamber of crafts, Municipality and local community of area studies) and they received a presentation of the project.

The Dutch Team released six press releases in the local press during the survey, and local TV and radio diffused reports with interviews of researchers.

The Dutch team organised one public meeting in each study area for surveyed people. The audience was between 8 and 40 participants. Researchers have presented the project using a poster and the practitioners have exposed their interests for the study.

The Dutch team issued press releases in the local press of the study towns during the survey (between 2 and 5 press releases per town) and some radios diffused reports with interviews of researchers (2 towns).

The Dutch team organised a workshop in the pilot zone of Genlis, bringing together 11 people (local authorities, professional organisation, heads of firms). The meeting made it possible to test the management of the workshops, which will be carried out in the studies area (unfolding and contents). The meeting allowed interesting discussion on the factors of economic development of the zone and on the economic actions led by the public and deprived actors of the zone.

A paper was presented at AES conference April 2004 on the 'Local inter-dependencies of small and medium-sized towns in the Netherlands; and inter-regional SAM by M. van Leeuwen (Dutch team) and L. Mayfield (Reading team).

Professor Rosner was invited to present the main issues of the Marketowns study during the meeting of IA&RD PAS (Warsaw) Managers with the journalists of the Polish Radio Program in Warsaw on 10 August 2002, devoted to the economic problems of rural areas connected to the accession of Poland to EU.

Professor Heffner made a presentation to the group of researchers in the Institute of Geography of the University of Łódź, interested in the economic and spatial development of rural areas in the sub-urbanised zones of main urban agglomerations in Poland (Warsaw, Łódź and Katowice), in 16 February 2002.

In the Polish local press an informative paper on the Marketowns study's goals and future achievements was published (*Merkuriusz*, Mszczonów, no. 3, 2002).

Professors K. Heffner and A. Rosner made a presentation of main issues of the Marketowns study during the Seminar held in IA&RD PAS (Warsaw) in December 2002.

Professors K. Heffner and A. Rosner presented some of the results of the Polish part of the Marketowns study during the Annual British Agricultural Economics Conference in Plymouth in April 2003. The most important results and findings of the full-scale survey was presented and discussed in the suite of workshops with local practitioners of each of six towns in Poland.

Papers were given at the conference 'Small towns in local and regional development' at the Economic University of Katowice, Poland, 23-24 November 2004 by K Heffner and A Czarnecki.

K. Heffner, A. Rosner and A. Czarnecki presented papers at the conference 'Role of the small and medium sized towns in the development of rural areas' in IRWiR PAN Warsaw, Poland, 15 November 2004

Dr Francisco Diniz was invited to present the study's aims and objectives in the annual workshop of the Department of Economics and Sociology of the University of Trás-os-Montes and Alto Douro that took place on 12 April 2002. This was done by a power-point presentation.

Francisco Diniz, Alexandre Poeta, Conceição Silva and Patrícia António presented a paper 'O Papel das Pequenas e Médias Cidades no Contexto do Modelo de Desenvolvimento Rural: Uma Primeira Abordagem' at IX Encontro Nacional da Associação Portuguesa de Desenvolvimento Regional that took place in Lisbon 27-29 June 2002. This paper was presented in Sessão paralela G - Iniciativa Empresarial e Desenvolvimento Local/ Local Development and Entrepreneurship.

Francisco Diniz and Patrícia António presented a paper 'A Integração Local dos Agentes Económicos de Pequenas e Médias Cidades Sediadas em Meio Rural: Resultados de um Estudo Piloto - Peso da Régua' at X Encontro Nacional da Associação Portuguesa de Desenvolvimento Regional, Demografia e Desenvolvimento Regional, that took place in Évora (Portugal) 26-28 June 2002. This paper was presented in Sessão paralela B – Espaços Urbanos e Espaços Rurais / Urban and Rural Areas.

Alexandre Poeta, Conceição Silva and Sónia Abreu, presented a paper 'As Ligações a Montante e a Jusante dos Empresários Agrícolas e Respectivas Famílias à Economia de uma Pequena Cidade Sediada em Meio Rural Desfavorecido - O Caso do Peso da Régua' at X Encontro Nacional da Associação Portuguesa de Desenvolvimento Regional, Demografia e Desenvolvimento Regional, that took place in Évora (Portugal) 26-28 June 2002. This paper was presented in Sessão paralela B - Espaços Urbanos e Espaços Rurais / Urban and Rural Areas.

Alexandre Poeta, Conceição Silva and Sónia Abreu presented a paper 'A Envolvente Rural das Pequenas e Médias Cidades: Um Estudo Piloto' at 8º Congreso de Economía Regional de Castilla y León, Grupo de trabajo 15 - Desarollo Rural II, that took place in Valladolid (Spain) 28, 29 and 30 November 2002.

Francisco Diniz and Patrícia António presented a poster 'Portuguese Market Towns Pilot Survey Results - The case of Peso da Régua' at 77th Annual Conference of the Agricultural Economics Society that took place in Seale-Hayne Campus, University of Plymouth (United Kingdom), 11 - 14 April 2003.

Fransisco Diniz presented a paper on the 'Non-farm businesses local integration level: the case of six Portuguese small and médium-sized Marketowns - a sectoral approach' at the 44th Congress of the European Regional Science Association, Porto, Portugal, 25-29 August 2004.

A paper 'O nível de integração económica local das Empresas não agrícolas: o caso de seis pequenas e médias cidades portuguesas - uma abordagem sectoral'. In 44th Congress of the European Regional Science Association, in REPER - Revista

Portuguesa de Estudos Regionais nº6 pp 43-61 was presented by Francisco Diniz as was the following paper on 'Non-farm businesses local integration level: the case of six Portuguese small and médium-sized Marketowns – a sectoral approach'. In 44th Congress of the European Regional Science Association, in REPER - Revista Portuguesa de Estudos Regionais nº6 pp 129-146.

'Businesses local economic integration level: the case of two touristic Portuguese small and medium-sized Marketowns Sives and Tavira - a sectoral approach' has been submitted by Francisco Diniz to the International Conference on Theoretical Advances in Tourism, Évora 18-19 March 2005

The Dutch and Reading teams presented a paper 'Does CAP boost Rural Development: a SAM analyses of 30 small and medium sized towns' at the AES conference, 4-6 April 2005 in Nottingham, UK.

6.3 Future papers for conferences and publications

'Local economic integration and spatial purchases and sales behaviour of rural firms: evidence from European small and medium-sized towns' prepared for the annual meeting of the European Regional Science Association (ERSA), August 2005, Amsterdam, and planned to be submitted to the *Journal of Regional Science* (The French team with Paul Courtney).

'Local economic integration and spatial purchases behaviour of rural households: evidence from European small and medium-sized towns' prepared for the annual meeting of the next UK-AES, 2005 and planned to be submitted to the *Papers in Regional Science* (The French team with Paul Courtney).

'L'intégration économique locale des entreprises rurales non agricoles : une analyse sectorielle basée sur 12 bourgs et petites villes de France et du Portugal' prepared for the annual meeting of the Association de Science Régionale de Langue Française (ASRDLF), 3-5 Septembre 2005, Dijon (France) and planned to be submitted to the *Revue d'Economie Régionale et Urbaine* (The French team with the Portuguese team).

The French team plan to organise a second workshop in one of study towns (Douarnenez) to disseminate final results about spatial behaviour and SAM modelling and to have discussion on interpretation of results for this town.

The French team plan to disseminate the final report to the people interested (invited to workshop) in each study area (approximately 40 people).

K. Heffner from the Polish team plans to write a book called 'Role of the small and medium-sized towns in the development of rural areas in Poland' issued by IRWiR PAN Warsaw (2005)

The Polish and Portuguese teams are discussing a joint paper on possible non-farm businesses local economic integration level: the comparison between Portuguese and Polish small and medium-sized towns a sectoral approach. This would be for the *Geographical Bulletin*, Poland.

The Plymouth team, together with the Reading team plan a number of papers, including 'The role of the local economy: a study of businesses and household integration in two peri-urban market towns' which would be submitted to *Geoforum*; 'Rural crisis - a tale of two agricultural towns' to be submitted to the *Journal of Rural Studies*; 'Economic Linkages in English Coastal Towns' for the *Annals of Tourism Research*; and 'Market towns and the role of the rural economy' to be submitted to the *Journal of Regional Science.*

7 POLICY RELATED BENEFITS

The previous sections have shown how the results can be used to help answer some relevant policy questions. The rural economy is undergoing significant changes at the moment, all over Europe, with a reduction in employment in agriculture and other related sectors. The project indicates the extent to which market towns have the potential to act as foci for rural development, and how they can maximise this potential. It has helped identify key sectors for generating output and employment within the countryside, and not only that, but also pinpointed where impacts from changes to these sectors would be felt. These will be important considerations for helping these rural areas restructure.

Another policy benefit is that relating to the agricultural industry which, until very recently, was the focus of rural policy. Although this is changing, the industry, very much in transition, is still an important one in much of Europe, and the degree to which it is still linked with market towns (be it mainly for purchases rather than markets these days) is a vital question to be recognised by policy makers. Examining this relationship from the other side, i.e. to see how market towns themselves may be influenced by the Common Agricultural Policy is also key.

The four possible growth models for the small and medium-sized towns are identified in section 5, and these provide a framework within which to explore the development possibilities for these towns.

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