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Local Integration Determinants of Upstream and Downstream Firms' Transactions in Six Portuguese Small and Medium-Sized Marketowns

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Local Integration Determinants of Upstream and Downstream Firms' Transactions in six Portuguese Small and Medium-sized Marketowns ♦ **

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The first step will be to measure the firms sales and purchases economic impact based on small and medium-sized towns and to 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 areas, in six Portuguese small and medium-sized towns.

In this paper a series of Ordinary Least Squares (OLS) Regressions will be presented in such a way as to examine the key characteristics of entity and local environment associated with strong local economic integration, using firm sales and purchases Local Integration Indicators as dependent variables.

Each independent variable compared sub-sets of towns and firms to examine the influence of a range of characteristics and distinctions between entities on local economic integration.

In order to explain the level of local integration of the sales and purchases of firms, three sets of explanatory variables were taken into consideration. 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 also 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, as well as 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 were computed.

Through these, one will 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.

Keywords: Local Integration; Small and Medium-sized Towns; Regional Development.

Theme: Q. Rural and local development

* The Role of Small and Medium-sized Towns in Rural Development – Marketowns (EU RTD Project QLRT-2000-01923). The Portuguese team is co-ordinated by the author and also integrates Poeta, A; Silva, C; Pinto, L; António, P and Abreu, S.

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INTRUCTION

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.

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:

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;

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);

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.

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.

According to the methodology of the Marketowns' project, six small and medium sized Portuguese towns were chosen as a study area:

Selected Towns	Small (5,000 – 20,000 Pop.)	Medium (20,000 – 40,000 Pop.)
Area where employment in Agriculture is well above national average (<i>Portugal: 10.8%</i>)	1- MIRANDELA (41.1%)	2- VILA REAL (20.1%)
Area where employment in Tourism is well above national average (<i>Portugal: 6.5%</i>)	3- TAVIRA (21.9%)	4- SILVES (28.6%)
"Accessible" peri-urban area within daily commuting distance of metropolitan center	5- LIXA	6- ESPOSENDE

The first step will be to measure the firms sales and purchases economic impact based on small and medium-sized towns and to 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 six Portuguese small and medium-sized towns.

In this paper a series of Ordinary Least Squares (OLS) Regressions will be presented in such a way as to examine the key characteristics of entity and local environment associated with strong local economic integration, using firm sales and purchases Local Integration Indicators as dependent variables.

SURVEY PROCEDURES

The sample frame reproduces the population structure for the concelho's territorial unit.

The business sample frame took into account the distribution of the businesses according to the Economic Activity Classification (NACE codes) and was divided into businesses based either on urban or rural areas, as indicated on the following table:

Table 1. Sampling frames used

<i>Questionnaires to be done</i>	1 Mirandela		2 Vila Real		3 Tavira		4 Silves		5 Lixa		6 Esposende	
	<i>Urban area</i>	<i>Rural area</i>	<i>Urban area</i>	<i>Rural area</i>	<i>Urban area</i>	<i>Rural area</i>	<i>Urban area</i>	<i>Rural area</i>	<i>Urban area</i>	<i>Rural area</i>	<i>Urban area</i>	<i>Rural area</i>
Fishing and Forestry	15	4	8	3	17	8	19	10	3	2	13	7
Mining	-	-	0	0	0	0	0	0	-	-	1	1
Manufacturing	10	3	6	2	5	3	6	4	28	14	15	7
Energy and water	-	-	0	0	0	0	0	0	-	-	-	-
Construction	10	3	15	4	19	10	17	7	11	6	15	7
Wholesale and Retail and car repairs	40	12	38	12	34	15	35	16	38	17	34	17
Hotels and restaurants	11	3	12	3	13	7	13	7	8	4	9	5
Transport, storage and communications	2	1	3	1	1	1	1	1	2	1	1	1
Banking, finance, insurance, etc.	2	2	5	1	1	1	1	1	3	1	3	1
Real estate, renting and business activities	6	1	8	3	6	3	5	2	4	3	5	2
Public administration, education, health	4	1	5	1	4	2	3	2	3	2	4	2
Total	100	30	100	30	100	50	100	50	100	50	100	50

Source: 1) Northern Region Statistic Yearbook 2000, INE (2001); (2) Statistic Yearbook of the Algarve Region 2000, INE (2001).

In each town, contacts were made with important local institutions (Town Halls, Managerial Associations, Commercial and Industrial Associations, Regional Agriculture Boards and Regional Tourism Boards). Such contacts supplied the team with information regarding potential interviews in the form of lists of businesses and farm businesses and were extremely useful to make the research project known and to impart information as to the actual limits of the town. It was possible, then, to adequately 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 as concerns non-farm businesses for it made contacts between team members and businessmen a lot easier.

The methodology used in the surveying process was the direct approach, that is, the face-to-face interviews. In Mirandela, Vila Real, and Lixa, the team members travelled to and fro every day, starting at 8.00 a.m. and returning between 7.00 and 8.00 pm. Eventually, in order to maximize information collecting team members were allotted different tasks having to drive two cars. In the three towns, two in Algarve and in Esposende, due to their being far away from Vila Real, the team had to stay there for some time.

Surveying to businesses implied going to each one separately, sometimes by appointment through telephone call but mostly on a door-to-door approach. Each interview lasted an average of 20 minutes, depending on the business dimension, but especially on the owners' willingness to give access to their bookkeeping. In some business firms those responsible saw no problem in providing us with information concerning their balance sheets. In business firms where bookkeeping is done by an independent accountancy firm the results of the interviews tended to slow down the surveying process.

The methodology used was the face-to-face questionnaire in an average of ten questionnaires a day per researcher. From the beginning of the survey process it was stipulated that questionnaires not fully filled in would not be usable; therefore, we ended up with no incomplete or unusable questionnaires. The adopted methodology resulted in fully complete questionnaires.

Table 2. Usable questionnaires done

<i>Questionnaires done</i>	1 Mirandela		2 Vila Real		3 Tavira		4 Silves		5 Lixa		6 Esposende	
	<i>Urban area</i>	<i>Rural area</i>	<i>Urban area</i>	<i>Rural area</i>	<i>Urban area</i>	<i>Rural area</i>	<i>Urban area</i>	<i>Rural area</i>	<i>Urban area</i>	<i>Rural area</i>	<i>Urban area</i>	<i>Rural area</i>
Fishing and Forestry	0	1	4	2	16	8	19	2	1	2	2	7
Mining	-	-	-	-	-	-	-	-	-	-	1	0
Manufacturing	13	5	9	2	6	4	7	4	21	15	13	12
Energy and water	-	-	1	0	-	-	-	-	-	-	-	-
Construction	5	2	9	4	12	6	11	7	6	5	15	5
Wholesale and Retail and car repairs	52	15	43	14	36	17	34	20	51	18	43	17
Hotels and restaurants	15	3	13	4	13	11	16	10	8	4	9	5
Transport, storage and communications	3	1	1	1	2	1	1	3	3	-	1	1
Banking, finance, insurance, etc.	3	2	4	2	2	-	1	1	4	1	5	2
Real estate, renting and business activities	6	0	9	1	10	2	9	1	3	3	7	1
Public administration, education, health	4	1	7	1	3	-	3	2	3	2	4	1
Total	101	30	101	30	100	50	101	50	100	50	100	51

The choice of criteria to define the sampling frame took into account the possibility of an immediate identification and classification of the units to survey. This helped make the

survey process a lot easier, and avoid unnecessary deviations from the previously defined samples. It also helped guarantee its representativeness. Some discrepancies observed between some of the sample frames and the number of questionnaires actually done were caused by difficulties in approaching the firms and the owners' unwillingness or lack of time to answer the questionnaires. The random survey process constant monitoring was also rendered more difficult due to there being several members of the team on the field at the same time.

FINDINGS

Firms involved in this survey were asked to detail the value and location of their sales and purchases during the last complete financial year. 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.

Table 3. 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 (NUTS IV level). For example, the value of firms' 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 firm inputs, or LIIfi. There are equivalent indicators for businesses' sales, LIIs. 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.

Businesses' sales

Table 4 shows the degree of integration of businesses' sales with the local economy and wider regions of Portugal. There is considerable variation in levels of local integration both between and within different types of towns.

Firms based on rural towns register a higher sales integration level with the local economy, unlike those which develop their productive activity in predominantly tourist areas, which have a lower local integration. In the latter, as well as in peri-urban towns, the town size is determinant for a stronger local integration of the firms.

The sales of firms in rural and peri-urban towns are mainly conducted with the rest of the country but for small tourist towns whose sales are mainly targeted to the rest of the European Union.

Table 4. Local integration indicators for sales of non-farm businesses by country and type of town

Zone	Small town	Medium-sized town
Agriculture		
(Town+7km) LII	50.0	60.0
(Town+16km) ELII	62.0	71.0
Elsewhere in country	36.0	26.0
Elsewhere in EU	1.0	3.0
Outside EU	1.0	0.0
Tourism		
(Town+7km) LII	8.0	20.0
(Town+16km) ELII	13.0	34.0
Elsewhere in country	22.0	52.0
Elsewhere in EU	65.0	13.0
Outside EU	0.0	1.0
Peri-urban		
(Town+7km) LII	16.0	43.0
(Town+16km) ELII	21.0	56.0
Elsewhere in country	51.0	44.0
Elsewhere in EU	25.0	1.0
Outside EU	3.0	0.0

Businesses' purchases

Table 5 shows the degree of integration of businesses' purchases with the local economy and wider regions of Portugal. It is apparent from it that a smaller proportion of businesses' purchases (averaged over all types of towns) are derived from the local economy rather than from 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 5. Local integration indicators for purchases by non-farm businesses by country and type of town

Zone	Small town	Medium-sized town
Agriculture		
(Town+7km) LII	18.9	31.5
(Town+16km) ELII	22.3	40.2
Elsewhere in country	45.2	49.7
Elsewhere in EU	32.5	7.6
Outside EU	0.0	2.6
Tourism		
(Town+7km) LII	4.7	18.2
(Town+16km) ELII	7.4	36.0
Elsewhere in country	44.8	55.5
Elsewhere in EU	47.8	8.5
Outside EU	0.0	0.0
Peri-urban		
(Town+7km) LII	23.9	45.3
(Town+16km) ELII	25.6	56.9
Elsewhere in country	64.8	42.5
Elsewhere in EU	8.7	0.6
Outside EU	0.9	0.0

In rural towns, the purchases integration level drops to less than 50% when compared to sales and even reaches 25% when the extended area is considered in the case of a smaller size.

In tourist towns, purchases local integration of small towns is below 10% even in the extended area and drops to 5% when the territorial area is the NUT IV. The tourist town size increases the local integration level but its value is still insignificant though.

Finally, in peri-urban towns, purchases local integration follows the sales pattern regardless of the town size, reaching values a little over the ones found for sales, in any case, not over 60%.

ORDINARY LEAST SQUARES (OLS)

Regression is employed to help identify key characteristics of towns and firms, associated with strong local economic integration. The basic model can be expressed as:

$$y_i = X_i \beta + u_i$$

where $i = 1, \dots, n$, representing the number of firms in the model (also serving as number of observations), y_i is the respective dependent variable (as set out in Table 6), X_i is a vector of independent variables representing the relevant firm 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 four dependent variables of interest for firms. 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 6.

Table 6 Derivation of dependent variables for the Phase I analysis

Data set	Linkage	Variable name	Variable definition*
Firm	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	puralsin	(arcsin) % of purchases 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 1 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.

Results from OLS regressions I: factors explaining the local integration of firms

Results from the OLS regressions for firms, are given in Tables 7 and 8 for local sales and local purchases , respectively.

With the main purpose of explaining the level of local integration of the sales and purchases of firms, three sets of explanatory variables were studied. The first set concerns the characteristics of the local context, including 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 1 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.

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) will be the aim and object of further research. The results indicate some interesting differences between sales and purchases degree of integration. The factors which influence local integration of Portuguese firms in the study area are:

Firms - downstream

The model for local sales by firms in Portugal is presented in Table 7. The proportion of local sales is explained by included predictors, with a R-square value of .263.

Table 7. Firms: Local Sales

Explanatory variables	Portugal
Constant	1.481*** (.229)
Agri_small	.07332 (.118)
Agri_med	.137** (.055)
Tour_small	
Tour_med	-.07865 (.053)
Peri_small	.141** (.059)
Peri_med	.0459 (.056)
Loc_hinter	-.04862 (.033)
Ty_indep	
Ty_natbran	-.118* (.065)
Ty_internat	.0284 (.070)
Sec_agri	.03996 (.085)
Sec_manuf	-.257*** (.078)
Sec_const	.08195 (.105)
Sec_prodserv	-.140* (.083)
Sec_conserv	-.00005689 (.075)
(ln)Age_firm	.03377** (.015)
(ln)Workforce	-.202*** (.023)
Ind_AB	.143*** (.047)
Ind_CD	-.05339 (.092)
Ind_EH	.3566 (.076)
Unskilled	-.0001725 (.001)
IGI	-.0001845 (.001)
Lab_prod	-.03757** (.019)
Loc_comp	.01981 (.013)
Lab_mark	-.001631*** (.001)
SLGM	.006459 (.011)
IPI	-.001634*** (.001)
Adj. R-squared	.263
F-value	13.667
Residual <i>d.f</i>	864

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

The analysis of the OLS model results with respect to firms will take into account the above mentioned three sets of explanatory variables.

According to the type of towns, in Portugal, both medium-sized rural and peri-urban towns are the only ones which have a strong downstream linkage. 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 and in small, peri-urban ones. The fact that the firm is located in a rural area does not influence sales local integration.

As regards firm type and owner/manager related variables, firms established as branches of national firms suggest a weak downstream linkage. The same applies to manufacturing firms and the producer services sector whenever their size in terms of the equivalent number of full-time workers is taken into account. On the other hand, the firm indigeneity and the fact that the owner/manager has been living in zone A+B for over ten years cause a strong downstream linkage

Examining the relationship between the firm (according to its own characteristics) and the integration with local markets of final and intermediate goods and labour, the index of potential skilled matching on the local labour market and Index of potential intensity of local vertical linkages play an important role on the strong downstream linkage. The remaining variables of this third set are not significant in explaining firms' local sales.

Firms - upstream

Turning now to the upstream models, which examine the role of potential predictors of local purchasing the strength of local integration is more readily influenced by included predictor variables than in the case of the the local sales. The R-square value is higher than the one for the down stream evaluation.

Examining the effects of town type and size on local input markets, we again find that local linkages are stronger in and around the larger areas of high agricultural employment. Unlike the sales of small town firms where tourism is the main economic activity in terms of employment purchases point to a strong up-stream integration in the local economy.

Table 8. Firms: Local purchases

Explanatory variables	Portugal
Constant	.821*** (.244)
Agri_small	-.02323 (.054)
Agri_med	.191*** (.056)
Tour_small	.119** (.054)
Tour_med	
Peri_small	.01001 (.056)
Peri_med	-.05584 (.055)
Loc_hinter	.0202 (.033)
Ty_indep	.116* (.066)
Ty_natbran	
Ty_internat	-.08716 (.094)
Sec_agri	-.0808 (.086)
Sec_manuf	-.08191 (.079)
Sec_const	.325*** (.107)
Sec_prodserv	.454*** (.084)
Sec_conserv	.01291 (.076)
(ln)Age_firm	.01838 (.015)
(ln)Workforce	-.01985 (.023)
Ind_AB	.0856* (.047)
Ind_CD	-.01643 (.094)
Ind_EH	.03154 (.077)
Unskilled	-.00004422 (.001)
IGI	-.003792*** (.001)
Lab_prod	-.02084 (.019)
Loc_comp	.006352 (.013)
Lab_mark	-.0004478 (.001)
SLGM	.04502*** (.011)
IPI	-.004081*** (.001)
Adj. R-squared	.326
F-value	18.190
Residual <i>d.f</i>	864

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

When we look into the firm type and owner/manager related variables, the independent firms point to a strong upstream linkage.

As regards the activity sector, and as it happened with sales, producer services continue to be extremely relevant for a strong up-stream linkage but the manufacturing industry is now replaced by construction.

The indigeneity measured by the fact that the owner has lived in the A+B for 10 years or more has also a positive effect on the upstream linkage.

The intermediate goods intensity - purchases/sales*100 - and the index of potential intensity of local vertical linkages (IPI) have a negative influence on the local integration of the purchases of Portuguese firms.

Finally the size of the local final good markets (SLGM) has a positive influence on the local integration of the purchases of Portuguese firms.

SUMMARY OF OLS RESULTS

A summary of the results from the three sets of OLS regression analysis is presented in Table 9.

Table 9. Summary of OLS regression results for local economic integration: firms

Strong integration (Sales)	Weak integration (Sales):	Strong integration (Purchases):	Weak integration (Purchases):
Medium agricultural towns	National branches	Medium agricultural and small tourist towns	High intermediate goods intensity
Small peri-urban towns	Manufacturing firms	Construction firms	Smaller final goods market
Older firms	Producer services	Producer services	Input demand exceeds local supply
Larger firms	Younger firms	Indigenous owner/managers	
Indigenous owner/managers	Smaller firms	Low intermediate goods intensity	
Lower labour productivity	Higher labour productivity	Lower labour productivity	
Local supply of skilled labour exceeds demand	Demand for skilled labour exceeds local supply	Strong local competition	
Local input supply exceeds demand	Input demand exceeds local supply	Demand for skilled labour exceeds local supply	
		Smaller final goods market	
		Local input supply exceeds demand	

Medium-sized rural towns suggest a strong local integration both of the sales and purchases of those firms which develop their productive activity therein and the same applies to the sales of firms based on small peri-urban towns as well as the purchases of those located in small tourist towns.

The fact that they are larger, older firms whose owner/manager was born in the locality also contributes to a strong local integration of the firms' sales and purchases.

Sales from the manufacturing industry and from the producer services sector have a weak integration in the local economy of the firms. The higher the work productivity of the firms and the skill of their workers, the weaker the local integration of its sales and the same follows for the sales and purchases when the demand for production factors exceeds the offer.

As regards purchases, the sectors pointing to a strong integration in the local economy are construction and producer services.

High intermediate goods intensity, and a smaller final goods market are also associated with a weak local integration of the purchases.

FINAL REMARKS

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).

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 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 20-40,000), 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;

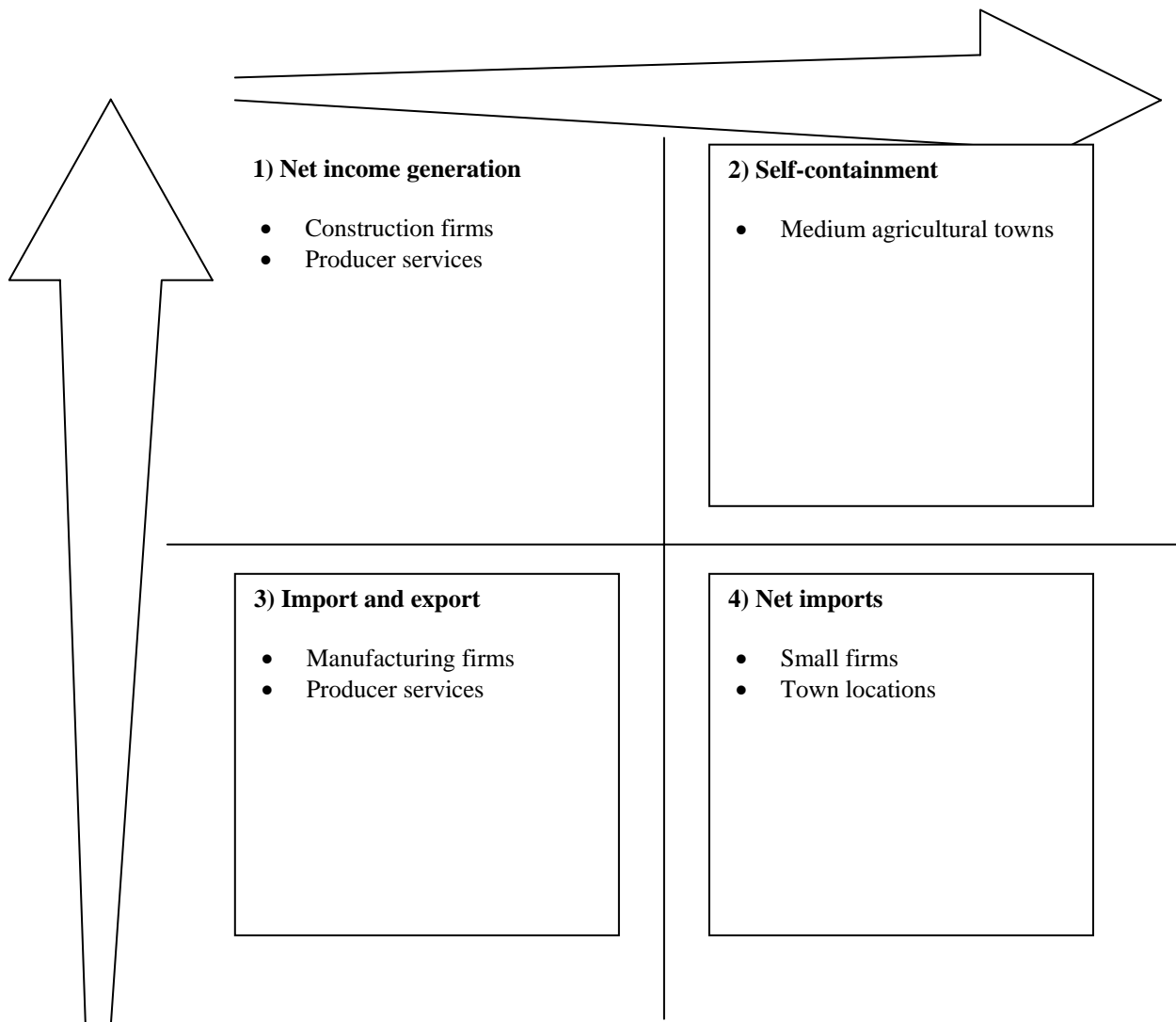
- Promote residential and business development in town locations, whilst facilitating targeted business growth in hinterland locations; and
- Foster 'locally grown' business start-ups.

One 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 Figure1 contains four cells which result from the interaction between relative strengths of first round upstream and downstream transactions. **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.

Figure 1 Local economic development model for small and medium-sized towns based on interactions between upstream and downstream transactions



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APPENDIX 1

Specification of all explanatory variables for OLS regression model

Variable name	Type	Description
Dependent variables		
(arc)Sales_AB	Continuous [0-100,arc-sin]	Proportion of Sales by value in zones A and B
(arc)Sales_ABC	Continuous [0-100,arc-sin]	Proportion of Sales by value in zones A, B and C
(arc)Purch_AB	Continuous [0-100,arc-sin]	Proportion of purchases by value in zones A and B
(arc)Purch_ABC	Continuous [0-100,arc-sin]	Proportion of purchases by value in zones A, B and C
Town size and type		
Agri_small	Dummy	1 = Small agricultural towns
Agri_med	Dummy	1 = Medium agricultural towns
Tour_small	Dummy	1 = Small tourist towns
Tour_med	Dummy	1 = Medium tourist towns
Peri_small	Dummy	1 = Small peri-urban towns
Peri_med	Dummy	1 = Medium peri-urban towns
Location		
Loc_hinter	Dummy	1 = hinterland location (Zone B)
Firm characteristics		
Ownership		
Ty_indep	Dummy	1 = Independent firms with no other sites
Ty_natbran	Dummy	1 = National branch plants
Ty_internat	Dummy	1 = International and HQ's
Sector		
Sec_agri	Dummy	1 = Agricultural firms
Sec_manuf	Dummy	1 = Manufacturing firms
Sec_const	Dummy	1 = Construction firms
Sec_prodserv	Dummy	1 = Producer services
Sec_conserv	Dummy	1 = Consumer services
Sec_therserv	Dummy	1 = Public, personal and other services
AGE & SIZE		
(ln)Age_firm	Continuous (log)	Age of firm in years, limited to 50
(ln)Workforce	Continuous (log)	Number of Full-Time equivalent employees
Indigeneity		
Ind_AB	Dummy	1 = Own/man has lived in A + B for 10 years or more
Ind_CD	Dummy	1 = Own/man has moved from C + D to A + B in last 10 years
Ind_EH	Dummy	1 = Own/man has moved from E + H to A + B in last 10 years
Ind_no	Dummy	1 = Own/man doesn't live in zones A + B
Prod & technology		
Unskilled	Continuous [0-100]	Proportion of employees that are partly or unskilled
IGI	Continuous [0-100]	Intermediate goods intensity = purchases/sales*100
(ln)Lab_prod	Continuous (log)	Labour productivity = Sales-purchases / Workforce (min>0)
Firm - Environment		
(ln)Loc_comp	Continuous [0-100, log]	Local competition index ¹
(ln)SLGM	Continuous (log)	Size of local final goods markets ²
IPI	Continuous [-100 - +100]	Index of potential intensity of local vertical linkages ³
Lab_mark	Continuous [-100 - +100]	Index of potential skilled matching on the local labour market ⁴

1. Local competition index:
$$LCI_i^r = \frac{Sa_{i,s}^r}{\sum_j Sa_{j,s}^r}$$

where $Sa_{i,s}^r$ is the total sales of firm i located in study area r and belonging to sector s . This index measures the weight of the firm i in the local sector s . If the ratio is weak, the local context presents a

strong local competition within the local output market and, if the ratio is equal to 100%, the context presents a monopolistic situation compared to the other firms located on the zone.

2. Size of final goods market:
$$SLGM_i^r = \frac{\sum_j HhPurch_{j,s}^r}{Sa_{i,s}^r}$$

where $HhPurch_{j,s}^r$ is the local purchases in study area r and sector s made by the households j , and $Sa_{i,s}^r$ the total sales of firm i located in study area r and belonging to sector s . This index measures the local household purchases in the firm i sector weighted by the firm's sales. If the ratio is higher than 1, the local market is more important than the firm's sales. If the ratio is lower than 1, the local market is less important than the firm's sales which thus has to export its outputs.

3. Index of potential intensity of local vertical linkages:

$$IPI_i^r = \sum_{s'} \frac{Purch_{i,s'}^r}{\sum_{s'} Purch_{i,s'}^r} \left(\frac{Purch_{i,s'}^r}{\sum_{s'} Purch_{i,s'}^r} - \frac{\sum_j Sa_{j,s'}^r}{\sum_{s'} \sum_j Sa_{j,s'}^r} \right)$$

where $Purch_{i,s'}^r$ is the total purchases made in sector s' by firm i located in study area r and $Sa_{j,s'}^r$ the sales of firms j belonging to sector s' and located in study area r . This index corresponds to the weighted sum of the tensions between the firm's demand in sectors s' and the local supply in the same sectors. If the index is higher than 0, the vertical linkages tensions are unfavourable with the firm's needs which requires more than the study area can provide (the firm needs to buy inputs outside the study area). If the value is equal to or lower than 0, the firm can find the inputs it needs locally. The structure of the firm's inputs is close to the study area structure when the sum of the tensions is minimal.

4. Index of potential skilled matching on the local labour market:

$$LLM_i^r = \frac{SkiLD_i^r}{LD_i^r} - \frac{\sum_j SkiLHhS_j^r}{\sum_j LHhS_j^r}$$

where $SkiLD_i^r$ is the need in skilled workers of firm i located in r , LD_i^r the need in total workers of firm i , $SkiLHhS_j^r$ the number of skilled workers in households living in study area r , $LHhS_j^r$ the number of workers in households living in study area r . We measure the difference between the share of firm's skilled employees and the share of skilled workers living in the study area. When the index approaches -100, the firm needs a lower level of skilled work than what the local labour force can provide. When the index approaches +100, the firm needs a higher level of skilled work than what the local labour force can provide. Therefore the firm has to seek its skilled workforce elsewhere. Finally, there is perfect adequacy between the firm's needs and the local supply when the index tends towards 0.