Determinants of Firm Relocation—A Study of Agro-Food Processors

By

Vanessa Persillet *

J. S. Shonkwiler**

* INRA SMART-LERECO (UR 1134), Rue de la Géraudière, 44316 Nantes, France, Vanessa.Persillet@nantes.inra.fr

** Agricultural and Applied Economics Department
   University of Georgia
   Athens, GA USA
   jss1@uga.edu
   Corresponding author

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Abstract

The agro-food sector is strategic for the regions of the Great West of France. Based on interviews of 27 companies in the two industrial sectors of poultry and processed food, we show that the internal resources of the firm and its territorial embeddedness may be important factors determining the relocation decision.

INTRODUCTION

Regional economic development policies have largely been oriented to the stimulation of new firm formation as an instrument to spur employment and local economic growth. However public policies which are designed to promote new industries may inadequately address the factors which cause established firms to relocate. Firm relocation can be viewed as a strategy of the firm to remove real or imagined limits to growth and, as such, the migration of a firm from a region can represent the loss of a current and potentially growing employer. Thus understanding those forces which cause a firm to relocate is important in devising a successful regional development strategy. From a policy perspective, programs to improve the competitiveness of existing firms may generate more future employment than the recruitment of new firms.

What explicit features constitute firm relocation depend on the context. From partial to complete, and from regional to international—relocation doesn't necessarily reflect the same managerial strategies or firm-level responses to governmental policies. Cross-border relocation plays a relevant role in the present scientific debate for its social and economic consequences on the countries involved and the role of foreign direct investments. We think that policy measures can be important instruments in order to avoid the risk that peripheral areas suffer due to the competition of foreign countries seeking to recruit firms.

Our main hypothesis is that regional policies should focus more on firms that are 'embedded' in ongoing social institutions or networks (Brouwer *et al.*, 2004) and moreover, firms which are more involved in building 'shared resources and competences' in their

territory (Lambert, Persillet, 2011). Thus we try to characterize the forces which cause a firm to relocate through an "extended resource-based" explanation for relocation.

For most countries there are few firm relocation studies because of the absence of good quality empirical data sources (Mariotti, 2005). Our survey was conducted specifically on certain agro-food processors in the most successful region of France regarding several key economic and environmental factors as number of employees, location, and network. We hypothesize that the desire to relocate is negatively associated with the size of the firms, positively associated with proximity to highly populated areas, and positively associated with their connection to international markets for both inputs and outputs.

After a presentation of the relocation background and our methodology, we will point out the determinants of territorial embeddedness i.e. firms' characteristics that are less likely leading to a relocation.

RELOCATION RESEARCH AND REGIONAL STRATEGIES

Relocation Categories

We begin by clarifying the definition of relocation. Spatial moves by firms and plants can be ordered into three 'spatial' categories: intra-regional, inter-regional and international (Pellenbarg *et al.*, 2002; Mariotti, 2005). Most studies about firm relocation distinguish between two forms at the intra-regional and inter-regional levels. The complete relocation is defined as the movement of one establishment from one location to another. This strategy is mainly adopted by single-site firms and it tends to be executed locally because firms prefer to find a new location that is near their existing site so as to keep their workforce and suppliers (Kemper and Pellenbarg 1997 in Brouwer *et al.*; 2004). The

partial relocation or delocalization is mainly contemplated by larger and/or multi-plant firms whose aim at differentiating their production in space taking advantage of the most favourable locations. Relocation does not necessarily concern the whole production process. It can be linked with a pre-existing unit, which is not abandoned as well, and only affect a segment of the production or it can arise through different types of agreements between partner firms, as joint-ventures or through subcontracting (Brouwer et al., 2004).

In empirical research, a lot of attention has been directed on inter-regional migration. This mainly corresponds with the objectives of regional development policy in the 1970s, which focused on stimulating firms to move to assisted regions. The last two decades have seen a growing body of literature on a third kind of movement: the international firm relocation or delocalization. This level indicates the many ways the pieces of the different processes of the firm (research/production/marketing) can be moved abroad (Mariotti, 2005) through foreign direct investment (FDI) or international strategic alliance (ISA).

In our survey and subsequent analysis we are concerned with these last two levels of relocation: inter-regional and international. We wish to contribute to the understanding of factors leading to the desire for relocation outside the firm's region.

The Extended Resource Based View theory and relocation factors of the firm

Along with economic changes and strategic firm decisions, firm relocation factors have been determined and theorized according to the economics, economic geography, and business literature. The neoclassical explanation is mainly cost-oriented (e.g. transportation costs—both for inputs and outputs—, labor costs, market size, policy incentives) and associated with location theories diffused in the early part of the twentieth

century. In this approach, firms would tend to relocate if changes happened in public policies (e.g. property taxes), labor availability, or the firm's environment (e.g. congestion or pollution) although the theory recognizes the significant costs that relocation generates. The neoclassical explanation rapidly appeared incomplete as not fully reflecting all the real-world circumstances.

Since the 1960's, additional firm relocation factors arose according to behavioral, institutional and evolutionary theories (Hayter, 1997; Pellenbarg *et al.*, 2002; Mariotti, 2005). The behavioral explanation for firm (re)location explores 'internal' factors such as age, size, and managerial expertise that are important in the decision-making process of the firm. The locational decisions of firms can also be characterized by imperfect information, mistaken perceptions, and previous commitments which can lead to sub-optimal outcomes. Most of the time, firms would tend to move to nearer places that are more familiar than distance places. In such cases, the institutional and the evolutionary explanations recognize "external" factors: (re)location behavior is the result of a firm's negotiations with suppliers, government, labor unions and other institutions about prices, wages, taxes, subsidies, infrastructure, and other key factors affecting the firm.

Recently these theories have been combined to some extent in what has been called an "extended resource-based" explanation for relocation (Knoben, 2011). The RBV theory focuses on the internal resources of the firm, that are, in general, either easier to move in a case of relocation or are "lost" anyway (i.e. firm's building). The extended RBV adds the characteristics of the region in which a firm is located and the firm's level of organizational and territorial embeddedness as external resources that influence a firm's performance. The former reflects the firm's unique resources that distinguish the firm from others

(Knoben, 2011). Thus, the extended RBV distinguishes different groups of resources as the (i) internal resources of a firm such as size, age, decision-making paradigms, (ii) the organizational and (iii) the territorial embeddedness which generate relational resources, and (iv) those resources stemming from the region in which a firm is located.

All these groups of resources are, as the ERBV argues, important for the performance of firms and a firm's access to them depends on its position in geographic space. Hence, firms should take the availability of these resources at a given location into account in their decisions to relocate. Our approach follows this line of thought by proposing that the three first groups are important factors determining the relocation decision.

In addition to the commonly used internal resources, we distinguish the firm's willingness to activate external resources. Activation would be facilitated by dynamic behavior and plural proximity between actors. Borrowing from Saives (2002) and the current geographical dynamics of plural proximity (Torre, 2010; Bouba-Olga and Grossetti, 2008), we distinguish two types of activation of the major modes in the description of behaviors which anchor each company. Different types of proximities catalyzing inter-organizational relationships and transactions between businesses, the activation mode is "simple" (authority) where transactions between actors are based on purely geographical proximity, technical and organizational. It will be "complex" (partnership) when relations incur physical, cultural and relational proximity between actors.

Organizational embeddedness (OE) is defined as the firm's participation in external organisations and networks. The primary goal being mutual knowledge exchange or acquisition for its innovative activities. The level of OE is generally measured by the

number and the characteristics of the relationship. The more relationships a firm maintains (Ahuja, 2000) and the stronger these relationships (McFadyen, Semadeni and Cannella, 2009) the higher the firm's level of OE. The territorial embeddedness of a firm refers here to geographic proximity with its partners (suppliers, research lab, institutions, etc.). Thus, dependence on the resources of other firms or partners also leads to dependence on a certain geographic location (Romo and Schwartz, 1995).

Relocation and regional policies

Industrial migration is recognized to have direct influence on the creation of wealth in the region as well as at the local level and thus, as being of great importance for regional and local development. Although firm relocation and regional policy are only partially connected, we think that understanding the forces which cause a firm to relocate may be important to devising a successful regional development strategy.

Successively, two approaches have built an interesting parallel between firm migration explanations and the evolution of regional policies. In line with the neoclassical theory, the traditional approach advocates cost-related measures where firms are 'pushed' to move by government policy through subsidies. This strategy has been adopted in most industrialized countries since the 1950s, mainly to speed the development (income and employment opportunities) of the depressed areas by inducing core-periphery relocation. Instead, the contemporary approach, in line with the behavioral, institutional and evolutionary theories, has emphasized since the mid-80's the role of endogenous local factors in promoting economic growth and focuses on integrated development plans and strategies designed and delivered by a partnership between regional and local players.

There has been a variety of incentives to promote firms' location and growth. The "interventionist" ("top down") approach driven by public institutions (national and regional) often suffers from its own bureaucracy and managerial dogma. The numbers and types of subsidies introduce a complexity which may not promote efficiency and which may act at cross purposes (Marchesnay, 2012).

Despite the debate on the effectiveness of modern location policies, it also has been shown that government measures have something to do with companies' decisions to relocate or not. In some European countries, subsidies have been widely used for decades and, to some extent, still are (Mariotti, 2005). In France where our interviews take place, industrial policies have been progressively transferred to the "regions" (administrative areas of which France counts 22) whereas they were formerly centralized. Regional policies have evolved along with the idea of promoting industrial decentralization, both for social (i.e. employment, development) and practical (i.e. decongestion, pollution) reasons. In the last two decades, France, as other countries in Western Europe, has also been facing cross-border delocalization. Although policy measures supporting the core-periphery relocation are still in place, the amount of subsidies they offer has decreased and firms looking for cost-advantages tend to invest in low-wage countries such as Central Eastern Europe or the Far East.

DATA AND MODEL SPECIFICATION

Most relocation studies based on the contemporary approach or regional policy rely on questionnaires regarding firm intentions than retrospective studies of observed relocation behavior. Consequently, our data consist of in-person interviews of the chief operating

officers of 27 firms in the poultry and processed food industries[1]. They were conducted in the spring and summer of 2010 in four regions of the West part of France ('Basse-Normandie', 'Bretagne', 'Pays de la Loire' and 'Poitou-Charentes'). The 8 poultry industries represented 73% of the total sales of processed poultry in the West region and the 19 processed food industries represented 54% of comparable sales.

These two sectors were chosen for their contrasted characteristics in terms of territorial anchorage and for their great economic importance for this area of France. These specific industries also face issues of relocation linked with the evolution of agricultural production (inputs), trade liberalization (imports), intermediate outputs, supplier location (transportation cost), and the consumption market (transportation costs). Firms were sampled on the basis of the French "Enquête Annuelle des Entreprises[2]" and according to our knowledge of the agro-food sector. More precisely, data collected consisted of firm specific features such as firm size, structure, variety of products and the level of processing (intermediate output only or intermediate output and final output) and the type of management. We also differentiated rural and urban areas of location. Our selection was representative of the West region economic structure for these two types of industries in terms of number of employees, turnover and type of management.

The interviews were conducted following a guide based on five industrial processes covering sourcing, production, logistics, sales and management. The questions were oriented toward on-going issues for the firms such as sourcing (local vs. import), public subsidies (especially export restitution) and sustainable development. As is common in the

analysis of firm relocation, managers were specifically asked if they would relocate outside of the region in which they were located if resources permitted. We assume that the relocation would be 'complete' for single site firms and 'partial' for multi-site firms whose headquarters and/or former plants would stay on site. This intentional measure of relocation is a commonly used measure (vid Knoben, 2011). In order to qualify organizational/territorial embeddedness, a number of questions were asked regarding the firm's collaboration practices i.e. relationships with other firms in the same agro-food sector, strategic synergies, network involvement, collaboration with research labs or colleges ('école d'ingénieurs') regarding innovations, involvement on 'pôles de compétitivité', and relationships with institutional partners. The firms were specifically asked the degree of involvement in their different external relationships and if they qualify their own specific "adhesion" to their territory i.e. their contribution to the local economic space and local development in general. The answers were compiled in a 'simple/complex activation of their external relationship' variable. As internal factors, we also use sourcing and sales (national or international). Moreover, the firms' locations were mapped to determine distances to major cities, roads, and ports.

Our hypotheses refer directly to the groups of resources of the ERBV mentioned above. Specifically for the agro-food processors in our survey, we hypothesize that the desire to relocate is negatively associated (1) with the size, and positively associated (2) with proximity to highly populated areas, (3) with their connection to international markets for both inputs and outputs, and (4) with a limited network.

Hypothesis 1. Firm's mobility decreases with the size of the firm

Hypothesis 2. Firm's mobility increases with proximity to highly populated areas

Hypothesis 3. Firms that serve larger markets are more mobile

Hypothesis 4. Firms that have a limited network are more mobile

Model specification

Four concerns motivate the model specification. They are i) the binary nature of the relocation response variable, ii) the binary nature of the variables denoting international sourcing and international product sales, iii) the notion that an unobservable common factor relates the relocation decision and the degree of involvement in international markets, and iv) the small sample size. The first two concerns can be addressed by adopting latent variable representations of the binary variables, the third concern can be addressed by specifying a common latent factor relating relocation and international involvement, and the fourth concern addressed by adopting a parsimonious structure.

The general form of the model then is represented by the three latent equations:

$$y^* = z_1\beta_1 + \xi\,\lambda_1 + \varepsilon_1$$

$$s^* = z_2\beta_2 + \xi\,\lambda_2 + \varepsilon_2$$

$$x^* = z_3\beta_3 + \xi\,\lambda_3 + \varepsilon_3$$

Here y^* denotes the latent desire to relocate from the region, s^* denotes the intensity of international sourcing, and x^* denotes the intensity of exporting. Because only binary indicators for each latent variable are available (i.e. whether the firm desires to relocate or not; whether the firm sources internationally; whether the firm exports), we have a system of probit equations under the assumption that each ε_j is distributed as N(0,1). The control variables in z_1 may contain measures of firm size, firm age, and location; whereas the control variables in z_2 and z_3 will be related to the firm size and type of processor.

We recognize that the dichotomous variables s and x are imperfect indicators of the operational factors which may be pulling the firm from the region. To close the model we introduce the unobservable factor ξ. This factor has the interpretation of an operational force that acts to pull the firm from the region. Specifically it is associated with the 'internationalization' of the firm under the assumption that $\lambda_2 > 0$ and $\lambda_3 > 0$. As previously mentioned, we have hypothesized that the greater the size of the market the greater the propensity to relocate, for a firm of a given size. Thus internationalization is used both as a proxy for market size as well as its own direct force based on recent findings by Rasmussen et al. (2011). We have a system of three dichotomous variables with a common unobservable factor.

Conditioning variables for the relocation decision consist of a measure of firm size (Employees) which is the logarithm of the number of employees; a location measure (City/Dist^2) which is the size of the nearest major city divided by distance squared (in km.) to that city (i.e. gravity effect); and a network or embeddedness measure (No Network) which distinguishes firms according to the degree of connectedness to their locality. If their proximate relationships are based solely on business operations, these firms are regarded as having limited involvement in their communities. Otherwise firms which develop cultural, civic, and/or philanthropic relationships in their communities are considered to have an active network.

For the indicators of imports and exports, the conditioning variables are the firm size measure (Employees), an indicator if the firm is isolated from other firms, and a dummy variable denoting those firms which process poultry.

Model Estimation

We assume that ξ is distributed as a standard normal random variable and that the ε_j are also standard random normal variables uncorrelated with each other and uncorrelated with ξ.

Let the jth latent equation in the system be denoted

$$u_j^* = z_j\beta_j + \xi\lambda_j + \varepsilon_j = z_j\beta_j + \eta_j$$

The η_j are correlated due to the common element ξ. Estimation proceeds by first defining the binary response variables

$$u_j = 1 \text{ if } u_j^* > 0$$

$$u_j = 0 \text{ otherwise}$$

Then it follows that

$$P(u_j = 1|\xi) = \Phi(z_j\beta_j + \xi\lambda_j)$$

where $\Phi(v)$ represents the standard normal cumulative distribution function evaluated at v.

The likelihood for the ith observation given ξ for the three equation system can be written (Bock and Gibbons, 1996)

$$L_i(\xi) = \prod_{j=1}^{3}\left[\Phi(z_{ij}\beta_j + \xi\lambda_j)\right]^{u_{ij}}\left[1 - \Phi(z_{ij}\beta_j + \xi\lambda_j)\right]^{1-u_{ij}}$$

Since ξ is unobserved it must be integrated out of $L(\xi)$ to obtain the unconditional log likelihood

$$L_i = \int_{-\infty}^{\infty} L_i(\xi)\exp(-.5\xi^2)\,(2\pi)^{-1/2}d\xi$$

Finally to obtain the population averaged effects (Wooldridge, p.485) for the jth binary response we evaluate

$$\int_{-\infty}^{\infty}\Phi(z_{ij}\beta_j + \xi\lambda_j)\exp(-.5\xi^2)\,(2\pi)^{-1/2}d\xi = \Phi[z_{ij}\beta_j/(1 + \lambda_j^2)^{1/2}].$$

The partial derivative of this probability with respect to a z then provides the population averaged marginal effect.

RESULTS

Given this system of three dichotomous variables with a common unobservable factor, we employ the approach of Bock and Gibbons (1996) to achieve maximum likelihood estimates of the unknown parameters. This method requires integrating out the unobserved effect. We use an optimization program written in Matlab to obtain parameter estimates. Identification is possible if some restrictions are put on the λ's (Bock and Gibbons, 1996). We impose the constraint that $\lambda_2 = \lambda_3 = 1$. Parameter covariances are obtained using the Bock and Gibbons technique. Table 1 provides the estimated model.

Table 1. Maximum Likelihood Results

Equation	Variable	Coefficient	Asy. Standard Error	z-Value
Relocation	No Network	7.118	4.920	1.447
	Employees	-2.423	0.842	-2.879
	City/Dist^2	0.129	0.085	1.518
	Latent Factor	10.227	3.389	3.018
Source Internationally	Employees	0.609	0.226	2.697
	Isolated	-0.200	0.885	-0.226
	D-Poultry	-4.953	1.519	-3.260
	Latent Factor	1.000		
Sell Internationally	Employees	0.595	0.265	2.247
	Isolated	-1.586	1.156	-1.372
	D-Poultry	3.621	13.678	0.265
	Latent Factor	1.000		

In the relocation equation, no active network (our 4th hypothesis) acts to increase the probability of relocation. The population averaged marginal effect of this variable is 0.41, which implies that the probability of relocation increases by this absolute amount if the firm has no active network, all else constant. Also the effect of being located near a large city (our 2nd hypothesis) increases the probability of relocation due to the likely increased costs associated with metropolitan areas. Our first key hypothesis is that larger firms are less likely to relocate and this is confirmed by our model. The population averaged marginal effect for this variable is -0.139; but because the Employees variable is the logarithm of total employees it must be adjusted by dividing by the average number of employees to reflect this. So the marginal effect at the average number of employees is -0.0027 which implies that for every 10 additional employees the absolute probability of relocating is reduced by -0.027. Our second key hypothesis that the size of the

market/degree of internationalization tends to increase the probability of relocation is supported by the model. The latent factor associated with the internationalization of the firm has a positive and highly statistically significant effect on the probability of relocation.

In the import and export equations, the number of employees is positive and statistically significant (p<0.05)—suggesting that larger firms are more likely to be involved in international trade. More isolated firms tend to be less involved in international trade, although there is not strong statistical evidence. The dummy variable for poultry processors shows that they are less likely to import. This is reasonable due to the fact that many of these firms only process live birds and typically contract production with area farmers.

The estimated model converges to a -21.728 log likelihood value. From this a general specification test using the deviance statistic can be constructed (Agresti). This statistic compares the estimated model which uses 10 parameters to estimate 3 equations of 27 observations each to a fully saturated model. For the multivariate probit system the deviance is $G^2 = 43.55$ with 3x27-10 degrees of freedom. It is distributed as chi-squared under the null hypothesis that the 71 restrictions are consistent with the data generating process. We find that the probability of a greater deviance statistic is p>0.99, thus indicating a well specified model.

DISCUSSION

While based on a relatively small survey, we feel the results are meaningful due largely to the use of on-site, in-person interviews of the operating officers of each of the firms. The nature of in-person interviews increases the likelihood that the respondents will provide more thoughtful and accurate responses. Specifically, in responding to the question of

relocating, these executives recognized that the consequences of relocation are not trivial and would have an economic impact on their region and have consequences for the firm's image and subsequent profitability.

The econometric results are generally consistent with the hypotheses postulated and previously published empirical findings. Of particular interest is the fact that the unobserved factor associated with internationalization/size of the market has a positive and highly significant coefficient in the relocation equation. An important implication of the study is that regional development policies which promote and facilitate international trade may dissuade some agro-food processors from relocating.

Moreover, the results on the 'network' variable provide some evidence that organizational and/or territorial embeddedness can affect the firm relocation decision. If it is assumed (Persillet and Lambert, 2011) that specialized agro-food 'poles' constitute a real innovative 'milieu' which attracts other industries, the relationships with partners and suppliers working on the same 'pole' can allow scale economies even for very small firms. These 'poles' can also be linked with a willingness to share and build resources and competencies in a territory. Contrary to the 'simple' or limited network activation, key stakeholders (mainly big firms) would search for synergies or active networks with other managers in order to benefit from scale economies and institutional knowledge (Persillet and Lambert, 2011).

CONCLUSION

In depth analysis of on-site interviews among chief operators in the West part of France shows that in two important agro-food sectors—poultry and processed food—firm

relocation can be a desired alternative particularly given the firm's local environment and the opportunities offered by globalization and new technologies during the last decade. External factors like organizational/territorial embeddedness are clearly pointed out in our results as having some importance in decreasing the desire to relocate. The consequence of firm size strongly impacts the propensity to relocate and suggests that policies which foster investment and firm growth can act to retain firms. International involvement appears also to have a very significant impact on the desire to relocate and this result should be useful in developing local policies to facilitate foreign trade.

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