

**START-UPS DOMESTIC LOCATION DECISIONS, AND THE ENTREPRENEUR'S
GEOGRAPHICAL ORIGIN**

Octávio Figueiredo

*Faculdade de Economia
Universidade do Porto and CEMPRE
Porto, Portugal
E-mail: octavio@fep.up.pt*

Paulo Guimarães

*Escola de Economia e Gestão
Universidade do Minho and CEMPRE
Braga, Portugal
E-mail: paulog@eeg.uminho.pt*

The authors would like to express their appreciation for a grant from the *Fundação para a Ciência e a Tecnologia*, Lisbon, Portugal (Praxis/Eco/13134/1998).

Paper to be presented at the European Regional Science Association 39th European Congress, Dublin, Ireland. Preliminary version. Please do not quote.

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Octávio Figueiredo

*Faculdade de Economia
Universidade do Porto and CEMPRE
4200 Porto, Portugal
E-mail: octavio@fep.up.pt*

Paulo Guimarães

*Escola de Economia e Gestão
Universidade do Minho and CEMPRE
4700 Braga, Portugal
E-mail: paulog@eeg.uminho.pt*

ABSTRACT

According to neoclassical location theory, the decision to locate a firm depends on the characteristics of the regions that affect profits. These characteristics can affect profits from both the cost and revenue side. On the cost side of the profit function, one usually considers factors such as the cost of labor, capital and land. On the revenue side, accessibility to the market is the most relevant factor. Empirical work has established the relevance of some of these factors, as well as the importance of different types of agglomeration economies.

These studies have largely ignored factors related to the characteristics of the entrepreneur. Among these, the entrepreneur's geographical origin seems to be a determinant factor in the business location decision. Using a microeconomic approach, we investigate in this paper the contribution of this variable to explain the decision to locate a domestic firm.

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I. INTRODUCTION

Previous empirical research on industrial location links the site selection decision to specific area characteristics [Carlton (1983), Bartik (1985), Hansen (1987), Luger and Shetty (1985), Coughlin *et al.* (1991), Woodward (1992), Head *et al.* (1995)]. These approaches treat the industrial location as an unconstrained decision that, once taken, reveals the decision-maker's preference for the area's attributes. The probability of a new plant being opened at a particular site depends on the relative level of profits that can be derived in this site and hence on the site's attributes compared with those of all other alternatives. Carlton (1983), one of the first attempts to model location selection using discrete choice models, established the importance of localization economies (savings resulting from existing spatial clusters of the same industry which are internalized by firms of that specific industry) in explaining domestic branch plant location across the United States metropolitan areas. Bartik's (1985) approach to the domestic plant location across U.S. states found that higher urbanization economies (i.e. savings that accrue from the agglomeration of general economic activity and are picked up by all firms) as well as lower labor costs and taxes attract new investment. Using Brazilian data for the São Paulo State, Hansen (1987) confirmed the relevance of localization and urbanization economies, but failed to show the importance of land, labor and transportation costs. In the case of foreign-owned firms' location decisions within the host country, there exists a larger amount of empirical work based on discrete choice models, but the essential approach remains the same. Some authors have confirmed the attractiveness of agglomeration economies [Luger and Shetty (1985), Coughlin. (1991), Woodward (1992), Smith and Florida (1995), Head *et al* (1995), Guimarães *et al.* (2000)] and provided mixed evidence on the importance of cost factors. Additionally, Coughlin *et al.* (1991), Woodward (1992) and Smith and Florida's (1995) research indicates that better accessibility to input and output markets have a positive influence on the location of foreign-owned businesses within the U.S.

The above literature conceptualizes the location problem as a process of "random profit maximization" and implicitly assumes that the decision-maker evaluates the potential profit at every possible location with identical knowledge (or equal uncertainty) regarding the impact of the area's attributes on his profit function. While this seems to be a reasonable assumption in analyzing the behavior of an outsider (the foreign investor case), it is a less plausible assumption for the domestic investor. In fact, it is most likely that the later will have different levels of uncertainty with respect

to the pool of available sites. Particularly, when the domestic entrepreneur evaluates potential profits, and compares his own environment with that of all others sites, it is unlikely that he has an equal degree of uncertainty concerning the site with which he is familiar. This is because he has an accumulated stock of knowledge of this particular site's attributes. Thus, lower labor costs or taxes, higher agglomeration economies, or better accessibility to input and output markets in an given outside area, may be insufficient to stimulate the entrepreneur mobility, since information and search costs weigh higher for the "movers", and can outweigh the expected gains coming from the area's attributes. At the same time, in the case of domestic investments, personal factors (e.g. the upheaval of a household relocation or personal ties and friendships that tie investors to a given area) must be taken into account, because they also increase the costs of localization outside the entrepreneur's own environment. Therefore, in the case of domestic firms' location decisions, there is a tradeoff between expected benefits coming from the site attributes and these personal, information and search costs that the "movers" will incur.

This paper investigates the location choices of newly established domestic plants in the Portuguese manufacturing sector for the years of 1995 and 1996. To address the fore-mentioned problems, we explicitly introduce into conventional analysis the entrepreneur's geographical origin. This will allow us to test our central hypothesis that the additional costs of an outside localization (associated with entrepreneur's personal factors and asymmetric information about the area's attributes) are reflected on the profit function, and impacts significantly on the decision to locate a domestic plant.

The organization of the paper is as follows. In the next section we examine this later hypothesis in more detail and present our model and data. In section III we discuss the traditional location determinants tested in this research. Section IV presents empirical findings, while the last section (section V) summarizes the main conclusions of the paper.

II. MODEL AND DATA

The Model

Given its sound theoretical underpinning, McFadden's conditional logit formulation has been the econometric tool of choice in empirical industrial location studies. The basic

approach, developed by Carlton(1983), consists in treating the investors' decision problem as one of "random profit maximization". Given a set of mutually exclusive regions, investor i weighs in all the regional characteristics of the available spatial choice set and selects the one that will potentially give him the highest profit. More formally, he assigns to each region j a potential profit of,

$$p_{ij} = \mathbf{v}_{ij} + \mathbf{e}_{ij},$$

and elects to place his new investment in the region m such that,

$$p_{im} > p_{ij} \quad \forall j, j \neq m.$$

The two components of his profit are quite different. The first is the systematic part and consists of a deterministic function of all observable characteristics that impact on profit. The second, \mathbf{e}_{ij} , captures the stochastic nature of the process by absorbing all non-observed heterogeneity as well as the intrinsic randomness associated with the investor and the choice *per se*. Typically, one specifies \mathbf{v}_{ij} as a linear combination of the area characteristics and estimate a set of coefficients which translate the way different factors affect potential profits. Usually, the set of explanatory variables comprises those related to the choice characteristics. However, this approach assumes that the investor is indifferent between two alternatives, which are identical with respect to their objective characteristics. Yet, such an approach largely disregards the fact that an investor may have an additional incentive to locate the investment in his environment, not only due to personal factors but also because he should have less uncertainty regarding the general business conditions of that area as compared to others. Put differently, it is not credible that everything else constant, the entrepreneur is indifferent between the place where he has been carrying out his normal activity and has his roots established and a location in which he may be a complete stranger.

To address this potential shortcoming, we included an explanatory variable that allows the entrepreneur to value differently the potential profit associated with each choice in accordance with his geographical origin. The variable is introduced as an alternative specific constant set to one if the entrepreneur originates from that area and zero otherwise. We will test two specifications. The first is of the type,

$$\mathbf{v}_{ij} = \sum_{r=1}^k \mathbf{b}_r X_{rj} + \mathbf{g}O_{ij},$$

where, the summation terms includes the explanatory variables and \mathbf{g} is a coefficient

associated with the entrepreneur's geographical origin. If positive, it signals that there is a discrete jump in profit accruing to the entrepreneurs' origin. This effect may be large enough to discourage investor mobility, in which case he will be a "stayer". In contrast to this, a "mover" will find that the appeal of the attributes of other areas outweigh the inertia factor associated with the advantages of not relocating.

An alternative specification admits that the entrepreneur values differently the impact of relevant factors. By admitting that,

$$v_{ij} = \sum_{r=1}^k \mathbf{b}_r X_{rj} + \sum_{r=1}^k \mathbf{g}_r X_{rj} O_{ij},$$

we implicitly assume that the potential profit associated with any particular choice is given by the first summation term of the above equality. However, if the area being considered coincides with the entrepreneur's geographical origin then there is an additional effect and,

$$v_{ij} = \sum_{r=1}^k (\mathbf{b}_r + \mathbf{g}_r) X_{rj}.$$

With this specification we allow the entrepreneur to value differently factors associated with his profit. It is credible that those factors that affect potential profit indirectly, by signaling the existence of favorable general or specific business conditions, are not as significant when the choice under consideration is the entrepreneur's geographical origin. The relevance of any of the above formulations can be easily tested because they nest the simpler model as a special case.

The model is easily operationalized by defining a distributional assumption for the stochastic terms. As McFadden pointed out, if we assume the error terms to be distributed independently and according to a Weibull distribution we end up with the logistic formulation. Because we have a set of 275 spatial alternatives, consisting of all the existing *concelhos* in Portugal¹, it is impractical to implement estimation by traditional methods. Fortunately, McFadden (1978) showed that when working with a random sample of choices, one can still obtain consistent estimators for the unknown parameters. Consequently, we assume that each investor faces a set of 6 choices consisting of the actual selected choice, the *concelho(s)* from where the entrepreneur(s) originated, and the rest drawn randomly.

Identification of Greenfield Plants and Entrepreneurial Geographical Origin

We use a yearly survey collected by the Ministry of Employment for all the existing companies operating in Portugal (except family businesses without wage earning employees). This survey consists of data on every worker as well as some basic information on each company such as location, sector of activity and number of employees. Most importantly, since 1995, firms have been required to provide information on the year they started their activity. This allowed us to exactly identify all newly created manufacturing companies for 1995 and 1996, the last available year in the dataset. Because our focus was on private domestic investment we excluded companies that were totally or partially owned by foreign or public investors.

For each company we have available detailed information on every worker including their professional status², birth date and social security number. Thus, we were able to identify the owners of all newly created companies. With this information in hand, we merged the collected data with the records for all the workers in the two previous years. We used as a matching key the worker's social security number as well as his birth date and were thus able to find the *concelho* where he was exerting his economic activity prior to creating the new firm (the entrepreneur geographical origin)³. Thus, our final data includes the 547 new start-ups that fully satisfied the above mentioned criteria. The spatial distribution of these investments is shown in figure 1 displayed in the appendix. As can be seen, the pattern of spatial distribution shows a great concentration in the more urbanized side of the country and particularly in the coastal corridor between the Portuguese largest cities of Porto and Lisbon.

III. LOCATION DETERMINANTS

The empirical research summarized earlier emphasizes three different sets of location determinants: external economies, costs of production factors and market accessibility. The importance of external economies seems to be now well established. From a theoretical point of view we can essentially distinguish two types of externalities. Firstly, localization economies, which result from the spatial concentration of firms of a particular sector. The existence of those spatial clusters signal a pool of favorable conditions (e.g. output and input intermediate markets, natural resources, specialized labor, knowledge spillovers) that are internalized by firms of a specific industry. Secondly, urbanization economies which are externalities accruing from the clustering of

general economic activity and that benefit all plants locating in a particular area. As in Bartik (1985) and Coughlin *et al.* (1991) we measure urbanization economies as the total manufacturing employment per square kilometer and for the localization economies we use the share of manufacturing employment in the same 3-digit standard industrial classification (SIC) as the investor.

The evidence concerning the impact of factor prices on location, i.e. the cost of labor, land and capital, is mixed. Most studies have tested for the relevance of labor costs, but only a few were able to statistically validate this variable. In the case of domestic location, Bartik (1985) found that higher wages deterred investment, a conclusion not found by others studying the same phenomena [Carlton (1983); Hansen (1987)]. Similar ambiguous evidence was found for the foreign-owned firms location decisions within the host country. While Woodward (1992) did not find a significant relationship, Luger and Shetty (1985) and Coughlin *et al.* (1991) provided evidence on the relevance of this factor to explain industrial location decisions. In our study, labor costs are measured by an index of the *concelho's* average manufacturing base wage rate.

Despite the prominence of land costs in the neoclassical economic theory of location, previous empirical research failed to establish its relevance. This failure was partially credited on the unavailability of reliable data by Bartik (1985), who used state population density to “proxy” industrial land prices, arguing that population density should reflect the price of this factor, because residential and industrial users compete for land. However, Hansen (1987), using data on prices for unserviced industrial land, was also unable to confirm the relevance of this factor. Because we did not have such data available for the Portuguese *concelhos*, we followed Bartik’s suggestion, which is much more relevant for the present study, given the smallest dimension of the regional level employed.

In this research we do not consider the cost of capital because it is almost invariant across alternatives. Interest rates do not differ nationally, and despite some minor differences in municipal taxes, the overall tax burden on manufacturing activity comes mostly from taxes set at the national level.

TABLE 1

Independent Variables: Definitions, Expected Effects, and Sources

Variables	Definition	Expected Effect	Source
Localization Economies	Share of manufacturing employment in the same 3 digit SIC as the investor	+	DEMESS, Lisbon, Portugal–1995
Urbanization Economies	Log of Total Manufacturing Employment per square km	+	DEMESS, Lisbon, Portugal–1995
Labor Costs	Index of <i>concelho</i> manufacturing wage (base = national average)	-	DEMESS, Lisbon, Portugal–1995
Land Costs	Log of population density	-	National Institute of Statistics (INE) , Lisbon, Portugal- 1991
Large Scale Accessibility	Log of distance by road in time to Porto and Lisbon	-	CCRC, Lisbon, Portugal– 1986
Small Scale Accessibility	Log of distance by road in time to the <i>distrito</i> ⁴ administrative center	-	CCRC, Lisbon, Portugal– 1986
Entrepreneur Geographical Origin	Dummy: 1 if the entrepreneur geographical origin is that <i>concelho</i> ; 0 otherwise	+	DEMESS, Lisbon, Portugal–1993 to 1995

The independent variable commonly used to measure the dimension of consumer markets is *per capita* regional income. As pointed out early in the introduction, Coughlin *et al.* (1991) and Woodward (1992) found a significant relationship between this variable and the location of investment across U.S. states. However, as also suggested by Coughlin *et al.* (1991), from a theoretical point of view, one must take into account that the market targeted by the firms can take many configurations that deviate from the considered area boundaries. In particular, when the analysis is performed at a small regional level, as it is in our study, the explanatory performance of this indicator must be low. First, firms can easily gain market access to neighboring *concelhos*. Second, the dimension of the *concelho* market seems to be too small to attract industrial investments. To account for final demand markets accessibility, and address the above concerns, we enter two variables in the model. Large scale accessibility, i.e. access to the largest markets, is measured by the road time distance to the Porto-Lisbon corridor, the more urbanized coastal side

of the country. Small scale accessibility , i.e., access to regional markets, is “proxied” by the distance in time by road from each *concelho* to the administrative center (the capital) of the related *distrito*. Moreover, these two variables also pick up transportation costs and the availability of regional and national road infrastructures in each *concelho*.

As argued above, there exist entrepreneur’s personal factors, as well as asymmetric information about the areas attributes, that increase the costs of relocating and so deter firm creation outside the entrepreneur’s environment. For this reason, lower labor or land costs, higher agglomeration economies, or better accessibility to markets in a given external area, may be insufficient to stimulate the entrepreneur mobility. Additional costs for the “movers” can outweigh the expected gains coming from this area’s attributes. To account for this problem we introduce into conventional analysis the entrepreneur’s geographical origin. This will allow us to test our central hypothesis that the additional costs of relocating are reflected on the profit function, and impacts significantly on the decision to locate a domestic plant.

IV. EMPIRICAL RESULTS

Table 2 presents the results of our estimations. The model performed well as can be seen from the chi-square statistics for the likelihood ratio tests of overall significance. The appropriateness of the model is confirmed by the remarkable stability of the coefficients and the individual t-values across specifications.

Specifications I and II show that the location factors tested in earlier empirical studies are also appropriate to explain the locational determinants of domestic start-ups in Portugal. In fact, when compared with other studies we find stronger evidence of their relevance. Both measures of agglomeration economies are statistically significant and have the correct sign, confirming Hansen’s (1987) results on domestic firm creation in São Paulo, Brazil, and Guimarães *et al* (2000) study on FDI location decisions within Portugal. In contrast with this later study, we find evidence that for domestic investors labor costs are a relevant factor. While similar results for the signal of the coefficient associated with this variable were obtained on all the above reviewed studies, only Bartik (1985) was able to statistically confirm the relevance of this factor for domestic decision location within a country. As pointed out before, previous empirical research failed to confirm the importance of land costs. Most likely because we were operating with small area choice sets the

“proxy” used for land costs had the expected sign and was statistically significant. The inclusion of market accessibility variables in specification 2 increased marginally the explanatory power of the model⁵. Road time distance to the Porto-Lisbon corridor has the expected sign, although the coefficient associated with this variable is not statistically different from zero. The evidence is stronger for the importance of regional market accessibility. This may be due to the fact that most of the investments considered in our study are of a relatively small scale⁶.

TABLE 2

Regression Results (N=547)

Variables	Specification 1	Specification 2	Specification 3	Specification 4	
				I	II
Localization Economies	3.723* (8.615)	3.877* (8.841)	2.358* (4.784)	3.902* (6.557)	
Interacted	-	-	-	-3.186* (-3.915)	0.715 (0.675)
Urbanization Economies	0.780* (10.731)	0.774* (10.147)	0.513* (5.954)	0.501* (4.137)	
Interacted	-	-	-	-0.357** (-1.793)	0.144 (0.165)
Labor Costs	-0.914* (-3.091)	-1.250* (-3.854)	-1.448* (-3.904)	-1.054** (-2.079)	
Interacted	-	-	-	-0.614 (-0.764)	-1.669* (-2.572)
Land Costs	-0.302* (-3.033)	-0.356* (-3.468)	-0.242** (-2.056)	0.104 (0.638)	
Interacted	-	-	-	-0.500*** (-1.914)	-0.396*** (-1.892)
Large Scale Accessibility	-	-0.296 (-1.084)	-0.454 (-1.471)	-0.852*** (-1.825)	
Interacted	-	-	-	1.647** (2.216)	0.795 (1.301)
Small Scale Accessibility	-	-0.136* (-3.167)	-0.067 (-1.322)	-0.113 (-1.578)	
Interacted	-	-	-	0.032 (0.290)	-0.081 (-0.969)
Entrepreneur Geographical Origin	-	-	1.678* (14.743)	3.976* (2.596)	-
Log-Likelihood	-613.713	-608.026	-491.472	-412.139	-
Chi-Squared	732.758*	744.132*	977.240*	1135.91*	-
McFadden R ²	37.38%	37.96%	49.85%	57.95%	-

Notes: t-values are in parentheses. The symbols *, **, and *** denote significance at the 1%, 5% and 10% levels, respectively.

Specification 3 and 4 include the entrepreneur's geographical origin as an explanatory variable. In the first of these specifications we include an alternative specific constant to measure the impact of this factor. The significance of our specification greatly increases as shown by the jump in the log-likelihood value. Notwithstanding, the estimated coefficients of the remaining variables maintain their signs and magnitude, and practically all are still statistically significant. Consequently, the inclusion picks up a significant amount of unaccounted for variability in the earlier specifications. The identified effect may be associated, as argued before, with asymmetric information and the entrepreneur's personal factors that diminish the potential profit of alternative choices in relation to his *concelho* of origin. Note also that the coefficient associated with the entrepreneur's geographical origin indicates that, for equal levels of the others variables across choices, there exists an increase in the potential profit for those who create near their own environment.

Moreover, when we consider the possibility of interaction effects between traditional variables and the entrepreneur's origin, we find evidence that investors weigh differently the importance of conventional factors in accordance with the environment where they plan to invest. This effect can be seen in specification 4⁷. Again, once we add this new set of variables, the log-likelihood experienced a significant increase, supplying evidence of differentiated profit functions for "movers" and "stayers". "Movers", in contrast with "stayers", tend to value higher localization and urbanization economies. This certainly arises because agglomeration, as indicated by Webber's (1972) work, tend to reduce the uncertainty associated with change by signaling a pool of favorable conditions in a given area. Not surprisingly also, because uncertainty tends to increase with greater economic distance to the market [Webber (1972)]⁸, "movers" weigh more than "stayers" the accessibility to the markets, and especially the accessibility to the biggest markets of the more urbanized coastal side of the country. Those who invest near their own environment, as show by the results in column II, are, in contrast, fully concerned with the production factors costs. Indeed, among the conventional factors considered in our study, only the cost of labor and land significantly impacts on the "stayers" location decision.

V. CONCLUSIONS

Discrete choice theory has provided an adequate framework to model industrial location. The few empirical studies in this line that addressed the topic of domestic industrial location have relied heavily on neoclassical location theory. The probability of a new plant being opened at a particular site depends on the relative level of profits that can be derived in this site and hence on the site's attributes compared with those of all other alternatives. However, such an approach largely disregards the fact that an investor may have an additional incentive to locate the investment in his own environment, not only due to personal factors but also because he should have less uncertainty regarding the general business conditions of that area as compared to others. Therefore, as pointed out by Webber (1972), uncertainty associated with entrepreneur mobility translates into additional costs. In this study we argue that these costs deter firm creation outside the entrepreneur's own environment and investigate if the traditional model still applies once we explicitly introduce the entrepreneur's geographical origin into the analysis.

Our empirical results show that traditional location factors are also appropriate to explain the location determinants of domestic start-ups in Portugal and that these factors still apply once the entrepreneur's geographical origin is accounted for. Moreover, the explanatory power of the regressions is greatly increased suggesting that earlier studies have overlooked a factor that may be key to explain the actual location decisions. That is, even if the levels of the conventional factors remain invariant across choices, there exists a potential increase in the profit function for those who create near their own environment. The identified effect can be associated with asymmetric information as well as the entrepreneur's personal factors which render other alternatives less attractive.

When we consider the possibility of interaction effects between traditional variables and the entrepreneur's origin, we find evidence that investors weigh differently the importance of conventional factors in accordance with the environment where they plan to invest. Uncertainty, as indicated by Webber's (1972) work, makes external economies and proximity to the market more important than would be the case under an economic system with perfect knowledge. Thus, "movers", in contrast with "stayers", valued factors that reduce the uncertainty associated with change (i.e. agglomeration economies and market accessibility). On the other hand, "stayers" are mostly concerned with the cost of production factors.

Despite the crudeness of the approach, we believe that the strength of our results merits some attention. Future research should focus on the policy implications of this finding as well as on its relevance for other industrialized countries.

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FOOTNOTES

¹ The *concelho* is a fairly small regional level in the Portuguese administrative system. The 275 Portuguese *concelhos* (mainland) have an average area of 322.5 km².

² Each worker is uniquely classified as: owner, non-wage earner family worker, wage earner and a residual category comprising rare special situations.

³ A substantial amount of information was lost due to several factors. First the dataset does not allow us to identify entrepreneurs which previous activity was on family businesses without wage earning employees or on the public administration, because these activities are not represented in the survey. Second, those who were not before in the labor force can not also be identified. Finally, the information on social security numbers is not validated because it is not used for the production of official statistics and consequently there is a significant amount of coding errors and missing observations. That is why we also used as a matching key the birth date of investors. Even though this is a rather restrictive criteria it ensures the quality of our data.

⁴ The *distrito* is an higher administrative region level, witch is composed by several adjacent *concelhos*. The Portuguese main-land is divided in eighteen *distritos*.

⁵ The log likelihood ratio test has a chi-square value of 11,374. significant at.1%.

⁶ In average each investment has 9.5 employees and 93% has less than 20 employees.

⁷ In Table 2, while column I shows the individual coefficients, column II indicates the sum of the coefficients ($\mathbf{b}_r + \mathbf{g}_r$) and their associated t-values.

⁸ This later effect occurs because, as argued by Webber (1972), price variability rises with greater separation from the market. Increased distance from the final market, as well as from suppliers, also increases firm's uncertainty in relation to the flow of products and materials.