The Use of Public Support for Internationalization Activities: Evidence from a Heckman Selection Model

Miguel Torres *
DEGEI and GOVCOPP
University of Aveiro
miguel.torres@ua.pt

Celeste Varum
DEGEI and GOVCOPP
University of Aveiro
camorim@ua.pt

Mariasole Banno
DMIE
University of Brescia
mariasole.banno@ing.unibs.it

Abstract

An interesting debate is currently taking place among scholars and decision makers about the evaluation of public support targeted to internationalization activities. In order to understand their efficiency, we need first to know more about the determinants of their use.

We developed an econometric model based on the Heckmam method, a two-step statistical approach that corrects for selection bias resulting from non-randomly selected sample of firms' awarenesses. The model is tested on a recent survey that includes 441 firms that used at least one of the 11 internationalization support measures launched in Portugal since 1994.

The empirical results overall show that firm competencies and the requirements of internationalization positively affect the awareness of public support. Analysing the effects on use, we found evidence that firm competencies are negatively related with use, unlike the the requirements of internationalization, which are positively related with the use of public support.

Key words: Use, Awareness, Public Support, Internationalization, Heckman Selection Model

JEL: H23; H54

Contents

1 Introduction

Despite the advantages of embracing internationalization and risks of not doing so, many firms, in particular small and medium enterprises (SMEs), still remain focused on their domestic markets (EURO, 2007, 2010).Firms need strategic resources and competencies to deal with the level of foreignness (Zaheer, 1995; UNCTAD, 2001), barriers, uncertainties, and the complexities of international expansion (Westhead et al., 2001; EURO, 2007).

Several economies have applied public resources to assist the internationalization of their firms, not only in exports but also as to outward foreign direct investments. The importance of internationalization for a home country's competitiveness[1] along with the difficulties experienced by firms might justify the involvement of governments in private activities (Crick, 1997; Krut and Moretz, 1999; EURO, 2004).[2]

Information provision, technical assistance, financial support, investment insurance schemes, fiscal benefits, and measures related with the trade and transfer of technology encompass the main types of measures used to promote or otherwise affect exports and foreign direct investment (FDI) (Brewer, 1993; Duran and Úbeda, 2001; Te Velde, 2007).

Despite their range and importance, some studies have found low levels of use of several measures (Crick, 1997; Moini, 1998; Ahmed et al., 2002; Koksal, 2009; EURO, 2010).

Besides the ineligibility issue, the avoidance of external interference and the bureaucracy, the use of public support depends on two main conditions: awareness, a necessary condition of use;[3] and the importance of support, a sufficient condition of use.[4]

This research was focused on the difficulties experienced by firms during the process of internationalization. These difficulties might emerge from a lack of firm competencies [5] and from the requirements of internationalization [6].

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[1]The engagement of domestic companies in international business is a determinant of competitiveness in developed and developing countries. The literature often indicates that internationalization stimulates foreign exchange revenues, employment, innovatory capacity, and the economic development of home economies (Molnar et al., 2007; Koksal, 2009; EURO, 2010; Falk and Wolfmayr, 2010).

[2]Public support is often condemned by classic economists since the financing of private activities with public resources has distorting effects (Maeseneire and Clayes, 2007), consumes a significant amount of resources (EURO, 2010), has high-opportunity costs (Neary, 1988; Collie, 2000), and affects competition between firms (Brewer, 1993; Nicolaides and Bilal, 1999; Kesner-Skreb and Mikic, 2003). However, the existence of public support is evidence that governments find more pros than cons.

[3]As a firm only use a measure if recognize it existence

[4]As some firms might make use of public support even while considering it of low importance.

[5]A competency for internationalization is a specific factor that a business sees as being important to develop internationalization activities.

[6]Internationalization requirements refers to the issues that may make difficult the internationalization.

The present study establishes, and tests with a Heckman selection model, a general framework for explaining the awareness and use of public support for internationalization activities, based on firm competencies and the requirements of internationalization. Then, using the Heckman method, the econometric model proposed corrects for the selection bias resulting from the firms' awarenesses of public support.

Besides the Introduction, this paper has the following structure: in the next section, we explain the determinants of the awareness and use of public support for internationalization activities. In Sections 3 and 4, we describe the methodology and results. Finally, the conclusions are reported in Section 5.

2 The Use of Public Support for Internationalization

In this section, we develop a framework for explaining the use and awareness of public support for the activities of internationalization. The firm competencies and internationalization requirements are the basis of this framework. Awareness means the extent to which any measure associated with a legal instrument is documented (formally or informally) by potential or existing applicants. Awareness is a necessary condition of use.

The creation of awareness of public support is a goal that governmental agencies pursue, and it depends on efforts of promotion developed by governmental agencies, but also on the firms' capacity or need to access networks (Heckman and Smith, 2003).

This study is focused on firms' environments. At this level, firm competencies and internationalization requirements might be positively related with awareness. Otherwise, firm competencies are negatively related with the perceived importance of public support, and internationalization requirements might be positively related with the perceived importance of public support.

Hence, the role of competencies on awareness and perceived importance is ambiguous. The firm competencies allow the creation of awareness, but an increase in competencies reduces the probabilities of the use of public support. Considering this aspect, the analysis has two steps. In the first step we investigate the role of firm competencies and internationalization requirements in the creation of awareness. In the second step, we examine the role of firm competencies and internationalization requirements in the perceived importance of public support.

2.1 Awareness: A Necessary Condition for Use

If we consider that more competencies may imply a high level of documentation regarding the measures of public support, then, firms with higher competencies (e.g., international experience, age, size, and human capital) as well as firms that face higher internationalization requirements (in particular, a large number of export and FDI markets) have a higher probability of being aware of public support for internationalization activities.

The existence of awareness regarding public support depends on flows of information (mailing lists of governmental agencies, business associations, and other contacts already established). Firms with much experience in international markets have a large number of contacts, and might have a large number of flows of information. The increase in information flows contributes to augment the probability of awareness of public support.

Larger and older firms have a higher probability of being aware of public support (Demick and O'Reilly, 2000; Martincus et al., 2010). At least three reasons support this idea: first, larger and older firms have more interfaces with the external environment; second, these firms have more resources to deal with complexity and pluralistic pattern of promotion programs (Hauser and Werner, 2007); third, size confers information advantages that arise from epidemiological characteristics of information transmission, the larger firms being less numerous and thus easier to reach and inform by governmental agencies. Additionally, larger firms may have a greater number of professional managers and relationships with professional networks, which reduces the difficulties of being reached by governmental agencies (Knott, 2005).

Along with size and age, the existence of skilled human capital may lead to advantages of knowledge that become relevant to the increase of the level of awareness of public support (Kogut and Zander, 1993). A greater qualification of human resources may represent a greater capacity to deal with challenges and more pro-activeness regarding external sources of information. Then, it is expected that more skilled firms have more awareness of public support.

In accordance with these lines of reasoning, firm competencies might have a positive impact on awareness of public support. So the following hypothesis was formulated:

Hypothesis 1A: The awareness of public support (related with internationalization activities) is more noticeable in firms with more competencies.

From the same line of reasoning, a greater involvement in internationalization activities, through a large number of export markets or FDI locations, might increase the number of contacts and networks established (Simões and Biscaya, 1997). An increase in contacts and networks might increase the chance of being aware of public support for internationalization.

According with these lines of reasoning, the requirements of internationalization might have a positive impact on the awareness of public support. So the following hypothesis was formulated:

Hypothesis 1B: Awareness of public support (related with internationalization activities) is more noticeable in firms that face more demanding conditions (requirements) of internationalization.

Besides the aspects mentioned above, other variables, such as innovative intensity, family and foreign ownership, financial constraints, and location, might affect the awareness of public support.

Firms and governments see innovation activities differently; the former see innovation as a demanding activity in terms of financial resources; governments see innovation as a source of positive external effects. In fact, the governments of several countries have traditionally supported more innovative firms. Then, if more innovative firms were also more involved with public support in the past it might increase the probabilities of a greater awareness of public support in the present and future.[7]

In terms of ownership, the issue of foreign and family ownership shoud be considered. Foreign-owned firms (FFs),[8] are more distant cultural and institutionally from national governmental agencies than domestic firms (DFs) are (Slangen and Beugelsdijk, 2010; Yudaeva et al., 2003). Such distance might result in less awareness of the incentives but also in a greater dependence of parent firm assistance.

Family-owned firms[9] are largely SMEs controlled by family members which keep their business under control, avoiding external interference (Kontinen and Ojala, 2010). This behaviour, besides resulting in low levels of perceived importance, might have an important role in awareness.

The existence of financial constraints may lead firms to develop strategies to overcome their difficulties. These strategies include screening external sources of funds, not only private sources, such as banks with which negotiation might be more difficult, but also public sources such as governmental agencies. Thus we expect that the greater the need (i.e., greater the financial constraints) the greater will be the awareness of public sources of external support.

Finally, firms located in central areas benefit from economies of agglomera-

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[7]Moreover, the innovative capacity can be understood as a signal of the pro-activeness of firms. If more innovative firms are more pro-active in searching for solutions (Kickul and Gundry, 2002), they are more documented and more aware of public support.

[8]Firms which at least 50% of the capital is detained by a firm headquarted in a foreign country hold that control over the first

[9]A firm in which one or more members of one or more families have a significant ownership interest (at least 50%) and significant commitments toward the business overall well-being

tion which may increase their awareness of public support for international-
ization activities.

Figure 1: Determinants of Awareness of Public Support
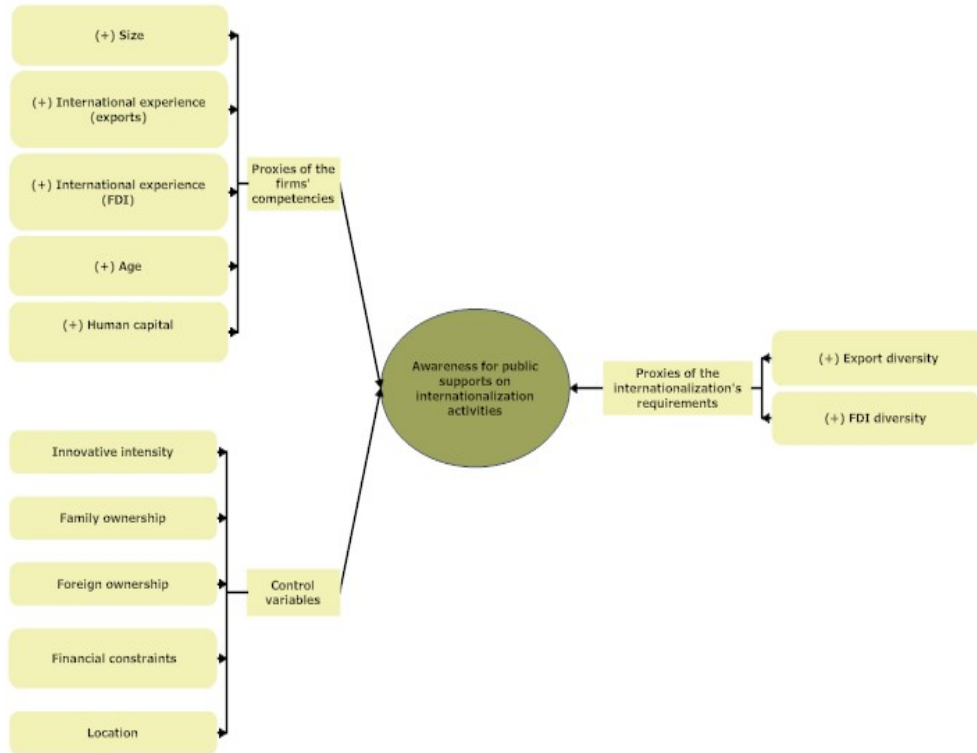
2.2 The Importance of Public Support: The Sufficient Condition of Use

The perceived importance of public support that results from preliminary
information that firm has about public support is a sufficient but not a nec-
essary condition of use of public support at least for two reasons. First,
some firms may use public support even if considering it of low importance.
Second, some firms that might consider public support as important might
not use it. Taking in consideration the hazards associated with international
involvement, firms with high competencies and/or involved in less demand-
ing conditions of internationalization might use relatively small amounts of
public support.
More specifically, older and larger firms might have more competencies, thus
attaching less importance, and using smaller amounts of public support than
younger and smaller firms. In fact, ever since Penrose (1959), it has been

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well accepted by scholars that larger and older firms have competitive advantages over smaller and younger firms, no matter how skilled the management of the latter can be. The market connections of larger and older firms tend to be more extensive, their standing in the capital market better, and their internal funds larger. These firms have accumulated valuable experience and, by virtue of their size, can take advantage of many technological and organizational economies not possible at smaller scales of operation.[10]

Firms with higher international experience as exporter and foreign direct investors are more likely to have the relevant competencies to follow international opportunities autonomously (Koksal, 2009). Hence, is expected that firms with higher international experience attach less importance to public support and make more use of their own competencies (some acquired during this process).

In line with the international experience, firms with higher level of qualifications of their human capital have more competencies to embark on internationalization activities than firms which employees are lower qualified. The higher qualified internal resources can use their own competencies instead of external resources, such as public support that in some cases aims specifically this objective. Therefore, firms with more skilled human capital might give less importance to public support and use it less.

Following these lines of reasoning, firm competencies might impact negatively on the use of public support. So the following hypothesis was formulated:

Hypothesis 2A: Public support for internationalization is more used in firms with low competencies.

In the same line, a greater involvement in internationalization activities, through a large number of export markets and FDI locations, may increase the effort and difficulties of firms in external environments (Simões and Bis-

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[10]One of the most serious handicaps of small and newer firms is access to capital. In fact, as a result of the higher risk of lending, these firms pay a relatively higher rate of interest, and face a lower absolute limit to the amount of capital they can obtain at any rate. When internal finance is insufficient, firms (especially the small and young) have a hard time attracting funds to conduct their activities abroad. Excessive collateral requirements, high interest rates, or an underdeveloped banking system may preclude bank finance to international projects. Banks are often not capable of evaluating the risk of exports or FDI and suffer from a home bias orientation. Furthermore, banks are frequently only willing to finance fixed assets and base credit decisions on a capital gearing approach. Typically, the FDI assets cannot serve as collateral. External equity might be unavailable, too expensive, or require giving up control. Venture capitalists are reported to offer unattractive investment terms. Firms often rely on government grants to alleviate the private market failures to finance their exports and FDI projects. Next to a direct positive effect, government support provides a positive signal to private financiers. Partnerships, both with domestic and local firms are repeatedly utilized, and facilitate the access to finance (Maeseneire and Clayes, 2007).

caya, 1997), and it may increase the chance of some firms relying on public support for internationalization.

In accordance with these lines of reasoning, the requirements of internationalization might impact positively on the use of public support. So the following hypothesis was formulated:

Hypothesis 2B: Public support for internationalization is more used in firms that face more demanding conditions (requirements) during their internationalization.

Besides the above mentioned aspects, other variables such as family and foreign ownership, financial constraints and location might affect the importance of public support and consequently its use. Specifically, aspects related to firm ownership (share of foreign capital and family ownership) are bound to affect the use of public incentives. Family-owned firms pursue more independent strategies than more diversely held private firms (Dunning and Lundan, 2008). There are three main businesses characteristics of family-owned firms that may influence their internationalization strategies and practices: first, a strong desire to keep control and influence; second, a specific attitude toward risk; and third, a specific governance (Gallo et al., 2004). Regarding these characteristics, family-owned businesses may be willing to utilize financial resources of the family for internationalization instead of using public resources (Kontinen and Ojala, 2010).

Foreign-owned firms are more distant cultural and institutionally from national governmental agencies, suffer more from the bureaucratic process of access to public support, and benefit from the external knowledge and resources supplied by parent firms. Based on these issues, we assume that public support is less important and less used in foreign firms.

In line with the difficulties of financing projects of internationalization, firms with greater financial constraints no longer have internal funds to develop international activities (this is an eligibility condition). In order to resolve the financial constraints, more indebted firms often use external support, in particular public support (Maeseneire and Clayes, 2007). Hence, there is a higher probability of the most indebted firms attaching higher importance to public support and using it more.

Another aspect of interest relates to the firms' location. Firms located in central areas benefit from economies of agglomeration, specifically from the flow of knowledge between peers, making imitation and knowledge diffusion about international processes easier (Bennett et al., 2001). Hence, it is expected that firms located in the periphery may attach more value to public incentives and use it more than firms located in central areas.

Figure 2: Determinants of Use of Public Support
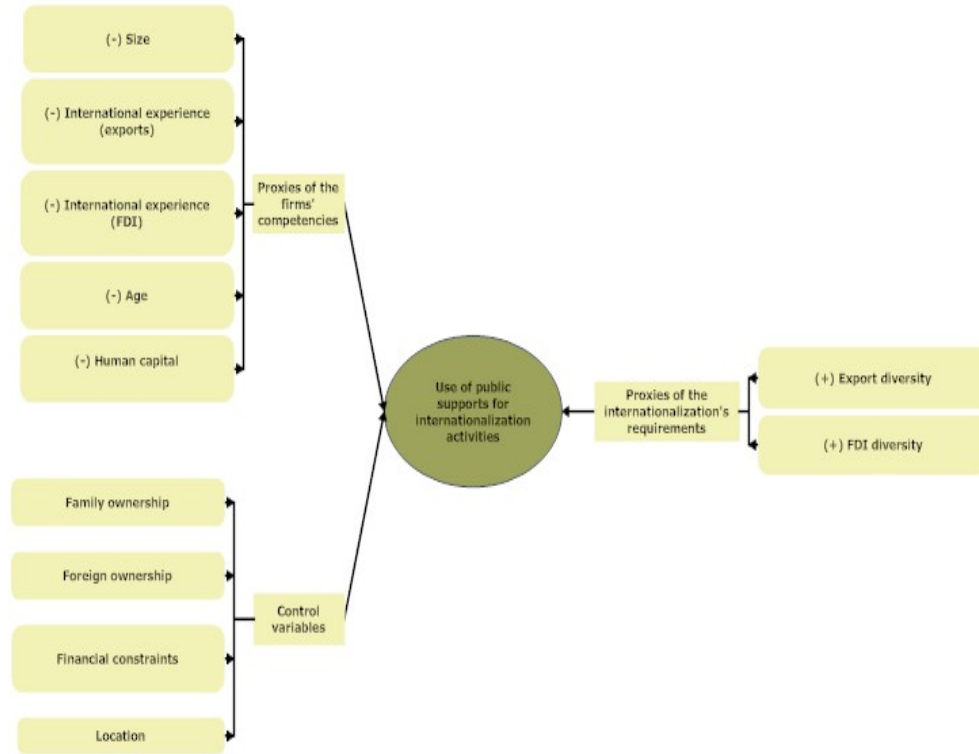
Source: own elaboration

3   Methodology

3.1   Empirical Setting

Considering the hypotheses formulated above, this paper searches for the determinants of the use and awareness of a set of internationalization support measures. We selected data from a small country during a specific period of time to get a pilot sample. We identify all the internationalization support measures (ISMs) with impact on outward FDI launched in Portugal, since 1994[11] until 2009.

The following 11 types of ISMs were identified for further modeling:

- ISM1 -*Public support for participation in trade fairs and state missions* identified in law 560/2004 and law decree 1463/2007;

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[11]Year of the first concrete initiative to promote OFDI-[*Programa de Apoio à Internacionalização das Empresas Portuguesas (PAIEP)*]

- ISM2 -*Public support through training and consulting services* identified in law 560/2004;

- ISM3 -*Public support through informational services* identified in law 560/2004 and law decree 245/2007;

- ISM4 -*Public support through international exchange programs for human resources* identified in law 1103/2008;

- ISM5 -*Public support through international investment agreements (IIAs)* identified in law decree 245/2007 and law 249/2009;

- ISM6 -*Public support through investment and credit insurance or mutual funds* identified in law decree 245/2007;

- ISM7 -*Public support through venture capital (VC)* identified in law decree 245/2007;

- ISM8 -*Public support through fiscal benefits* identified in law decrees 290/1994, 401/1999 and 249/2009;

- ISM9 -*Public support through other public financial support* identified in laws 1254/2003, 560/2004, in the ministerial decree 1998/2006, and in law decrees 187/2007, 1463/2007, 250/2008, 65/2009 and 353-A/2009;

- ISM10 -*Public support through protocols of governmental agencies and banks* identified in law decree 245/2007;

- ISM11 - *Public support for acquiring or developing brands, marketing or sales* identified in laws 1254/2003 and 560/2004, and in law decrees 290/1994, 1463/2007, 250/2008, 353-A and 1020;

These ISMs can be classified into at least two groups, divided between non-financial and financial measures. The non-financial ISMs consist mainly of support for participating in trade fairs or state missions, training and consulting services, informational services, support for hosting trainees in foreign firms, and support through international investment agreements (ISM1

to ISM5). Otherwise the financial ISMs consist of investment and credit insurance and mutual funds, venture capital, fiscal benefits, financial packages, preferential credit conditions through protocols with banks, and support for acquiring or developing brands, marketing or sales (ISM6 to ISM11).

With the information collected concerning public support, we developed a questionnaire to collect information about the use and awareness of the ISMs listed above and regarding the proxies of firm competencies and internationalization requirements.

This questionnaire was administered to a sample of Portuguese firms obtained through 89 business associations proportionally distributed by industry and region. This sample includes 4.637 firms (almost 1% of Portuguese firms in 2009) that were contacted by several modes (e-mail, postal letter and phone) to fill out an on-line questionnaire.[12]

In order to ensure valid and reliable results, the questionnaire development follow three steps: first, the relevant literature was reviewed to identify measures of the constructs; second, to have content validity, two consultants and five managers read the questionnaire and provided inputs for revision; third, the questionnaire was pre-tested by personal interviews with ten firms.

Between December 2009 and May 2010, we received 441 responses (10% of firms contacted).

3.2 Econometric Model

The use of public support for internationalization activities depends on firms' awarenesses of ISMs. Along with awareness, some firm features may contribute towards explaining the use of public support for internationalization activities.

Hence, given the relationship of the dependent variable in the second stage (use) with awareness, the dependent variable in the first stage, we will apply the Heckman selection model (HSM), a two-stage procedure that corrects for sample selection bias in regression analysis (Heckman, 1974, 1979). This model estimates all parameters in two stages, i.e., with two equations: the selection equation and the outcome equation.

The selection equation predicts the likelihood of each independent variable's affecting awareness, and the output equation predicts the use of public support considering the selection equation.

When the error terms from these two equations are significantly correlated, standard regression techniques applied to the outcome equation alone can yield biased results, and it is therefore necessary to correct it (Gronau, 1974; Lewis, 1974; Heckman, 1974).

Based on the HSM, we assume the existence of an underlying regression

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[12]This questionnaire was hosted on the University of Aveiro website and can be retrieved from http://wsl2.cemed.ua.pt/ide/questionario.doc

relationship,

$$U_i = X_j\beta + u_{1j} \qquad \text{outcome equation} \qquad (3.1)$$

The dependent variable, however, is not always observed. Rather, the dependent variable for observation j is observed if

$$A_j\gamma + u_{2j} > 0 \qquad \text{selection equation} \qquad (3.2)$$

where $u_1 \sim N(0; \sigma)$; $u_2 \sim N(0; 1)$ and; $corr(u_1; u_2) = \rho$.
The log likelihood for observation j, $lnL_j = l_j$, is:

$$l_j = \begin{cases} w_j ln\Phi\left(\frac{A_j\gamma + \frac{(U_j - X_j\beta)\rho}{\sigma}}{\sqrt{1-\rho^2}}\right) - \frac{w_j}{2}\left(\frac{U_j - X_j\beta}{\sigma}\right)^2 - w_j ln(\sqrt{2\pi}\sigma) & \text{if U observed} \\ w_j ln\Phi(-A_j\gamma) & \text{if U not observed} \end{cases}$$
$$(3.3)$$

where $\Phi(.)$ is the standard cumulative normal and w_j is an optional weight for observation j.
In maximum likelihood estimation, σ and ρ are not directly estimated. Directly estimated are $ln\ \sigma$ and $atanh\ \rho$:

$$Atanh(\rho) = \frac{1}{2}ln\left(\frac{1+\rho}{1-\rho}\right) \qquad (3.4)$$

The standard error of $\lambda = \rho\sigma$ is approximated through the propagation of error (delta) method; that is,

$$Var(\lambda) \approx DVar\left(atanh(\rho)ln(\sigma)\right)D' \qquad (3.5)$$

where D is the Jacobian of λ with respect to $atanh(\rho)$ and $ln(\sigma)$. The two-step estimates are computed using Heckman (1979)s procedure. Probit estimates of the selection equation are obtained:

$$Pr(U_j observed | A_j) = \Phi(.)(A_j\gamma) \qquad (3.6)$$

From these estimates, the nonselection hazard (what Heckman referred to as the inverse of the Mills ratio, m_j) for each observation j is computed as

$$m_j = \frac{\phi(A_j\hat{\gamma})}{\Phi(A_j\hat{\gamma})} \qquad (3.7)$$

where ϕ is the normal density. We also define:

$$\delta = m_j(m_j + \hat{\gamma}A_j) \qquad (3.8)$$

Following Heckman's procedure, the two-step parameter estimates of β are obtained by augmenting the regression equation with the non-selection hazard m. Thus, the regressors become $[Xm]$, and we obtain the additional parameter estimate β_m on the variable containing the non-selection hazard. Then, we obtain a consistent estimate of the regression disturbance variance using the residuals from the augmented regression and the parameter estimate on the non-selection hazard,

$$\hat{\sigma}^2 = \frac{e'e + \beta_m^2 \sum_{j=1}^{N} \delta_j}{N} \qquad (3.9)$$

The two-step estimate of ρ is then:

$$\hat{\rho} = \frac{\beta_m}{\hat{\sigma}} \qquad (3.10)$$

Heckman derived consistent estimates of the coefficient covariance matrix on the basis of the augmented regression.
Let $W = [Xm]$ and let R be a square, diagonal matrix of dimension N, with $(1 - \hat{\rho}^2\delta_j)$ as the diagonal elements. The conventional VCE (Variance–covariance estimate)

$$V_{twostep} = \hat{\sigma}(W'W)^{-1}(W'RW + Q)(W'W){-1} \qquad (3.11)$$

where

$$Q = \hat{\rho}^2(W'DA)V_p(A'DW) \qquad (3.12)$$

where D is the square, diagonal matrix of dimension N with δ_j as the diagonal elements; A is the data matrix of selection equation covariates; and V_p is the variance–covariance estimate from the probit estimation of the selection equation. In the sections that follow, we apply this framework to analyse the use of ISMs launched in Portugal since 1994 until 2009.

3.3   Dependent Variable

As mentioned in 3.1, the HSM uses two equations: the selection equation and the outcome equation. Here, the outcome equation explains the use of

internationalization support measures (U_ISM_n) and the selection equation explains the firms' awarenesses of ISMs (A_ISM_n).

Table 1 presents a descriptive analysis with levels of use and awareness for all ISMs identified and listed in Subsection 3.1. The descriptive results show high variability between measures. Moreover, as expected, the mean of use in every measure is substantially below the mean of awareness of the same measure.

Table 1: Use and Awareness of ISMs: Summary Statistics

Variable	%	Std. Dev.	Min.	Max.	N
Use					
U_ISM1	0.322	0.467	0	1	441
U_ISM2	0.342	0.475	0	1	441
U_ISM3	0.612	0.487	0	1	441
U_ISM4	0.217	0.413	0	1	441
U_ISM5	0.374	0.484	0	1	441
U_ISM6	0.140	0.347	0	1	441
U_ISM7	0.424	0.494	0	1	441
U_ISM8	0.435	0.496	0	1	441
U_ISM9	0.140	0.347	0	1	441
U_ISM10	0.124	0.330	0	1	441
U_ISM11	0.174	0.380	0	1	441
Awareness					
A_ISM1	0.852	0.354	0	1	441
A_ISM2	0.841	0.365	0	1	441
A_ISM3	0.879	0.325	0	1	441
A_ISM4	0.725	0.446	0	1	441
A_ISM5	0.816	0.387	0	1	441
A_ISM6	0.800	0.400	0	1	441
A_ISM7	0.850	0.357	0	1	441
A_ISM8	0.902	0.296	0	1	441
A_ISM9	0.546	0.498	0	1	441
A_ISM10	0.560	0.496	0	1	441
A_ISM11	0.598	0.490	0	1	441

Source: own elaboration

3.4 Independent Variables

Following the discussion initiated in Section 2, the independent variables included in the model are put into two groups: firm competencies and FDI requirements.

We considered the following proxies of firm competencies: International experience, size, age, human capital, and innovative capacity capture the competencies of firms. The number of export markets and the number of FDI locations capture the requirements of internationalization.

- *International experience (as exporters)* (EXPX) is measured by the years of export activity (difference between the year 2009 and the year when the firm began to export);

- *International experience (as foreign investor)* (FDIX) is measured by the years of foreign direct investment activity (difference between the year 2009 and the year when the firm began foreign direct investments);

- *Size* (SIZE) is measured by the number of employees in the year 2009 (t);

- *Age* (AGE) is measured in years (difference between the year 2009 and the year of establishment);

- *Human capital* (HRQ) is measured by the weight ratio of the number of employees with bachelor's degree (BAs) to the total employees in the year 2009 (SIZE);

$$HRQ = \frac{BAs_t}{SIZE_t} \qquad (3.13)$$

- *Export diversity* (ED) is measured by number of export markets in the year 2009;

- *Investment diversity* (NIM) is measured by the number of FDI locations in the year 2009.

Along with the variables considered above, we included in the model the following control variables:

- *Innovative intensity* (RDI) is measured by the weight ratio of R&D expenditures (RDE) to the total sales (S) in the year 2009;

$$RDI = \frac{RDE_t}{S_t} \qquad (3.14)$$

- *Family ownership* (FAM) is a binary variable (0 if not family-owned and 1 if family-owned);

- *Foreign ownership* (FF) is a binary variable (0 if not foreign-owned and 1 if foreign-owned);

- *Financial constraints* (FCS) is measured by the weight ratio of liabilities to assets in the year 2009;

$$FCS = \frac{LIABILITIES_t}{ASSETS_t} \qquad (3.15)$$

- *Location* (LOC) a binary variable (0 if located in a central region and 1 if located in a peripheral region);

Table 2 shows that firms included in the sample have on average 12 years of export experience, 2 year of FDI experience, and 24 years of existence. The average size is 529 employees. On average, 23% of human resources of the replying firms have a bachelor's degree. The innovative intensity is about 4%. The number of export destinations is about 10 markets and 1 FDI destinations. Regarding the control variables, 28% of the firms are family-owned, 10% are foreign-owned, the ratio of indebtedness is on average 43%, and 76% of firms are located in peripheral regions.

We verify acceptable correlation between all variables (Table 3).

Table 2: Independent Variables: Summary Statistics

Variable	Mean or %	Std. Dev.	Min.	Max.	N
International experience as exporter	12	14	0	133	441
International experience as foreign investor	2	8	0	132	440
Size	529	2024	1	20869	441
Age	24	19	0	133	441
Financial constraints	43%	20%	0%	87%	440
Human capital	23%	29%	0%	100%	440
Number of export markets	10	19	0	193	441
Number of investment locations	1	2	0	22	441
Innovative intensity	4%	9%	0%	90%	422
Family ownership	28%	45%	0%	100%	441
Foreign ownership	10%	43%	0%	100%	441
Peripheral location	76%	43%	0%	100%	440

Source: own elaboration

4 Econometric Findings

The empirical analysis follows a two-step process as used in Plumper et al. (2005). The first step deals with the awareness of firms of public support directed to internationalization activities; the second step (the estimated probability of unawareness) is used as a regressor to analyse the likelihood of using public support for internationalization activities.

The selection character of use gives rise to serious but nevertheless solvable estimation problems. Simply excluding unaware firms would cause a serious estimation bias which might lead to incorrect inferences (Heckman, 1974). To deal with these problems, we ran a dynamic HSM, in which the estimated mean function of the second step is conditioned on the selection process of the first step (Heckman, 1979).

The econometric logic behind the HSM fits our theoretical problem. It reflects well the firms' awareness process in the first stage and also assumes that the probability of a firm's unawareness has an influence on the likelihood of use in the second stage.

Since our dependent variable in the first and second step is binary, a standard Heckman model would be inconsistent and biased. We employ a modified HSM. As in the original approach, it consists of two steps. While the original Heckman selection model employs a probit estimator in the selection equation and an ordinary least squares estimator in the second step, we run a probit estimator in both steps. In the first step, we analyse all possible firms; in the second step we consider the sample of firms that used public support because they were aware of it.

In the next section, for the sake of readability, we report separately the

econometric results obtained for each internationalization support measure.

4.1 Support for Participation in Trade Fairs and State Missions

Table 7 of Appendix B shows that firm competencies, in particular the proxies of export experience and size, are negatively associated with the use of public support for participation in trade fairs and state missions. Additionally, the model shows that foreign-owned firms have a lower probability of using this public support than domestically-owned firms. Otherwise, firm competencies seem to be positively related with awareness. In fact, firms with high export and FDI experience have a high probability of being aware of this support.

The computation of marginal effects reveals the following: an increase of one year in export experience will decrease the probability of using this measure by 0.9%. With an increase of one employee in a firm's size, the probability of using this measure decreases 0.005%. Being a foreign-owned firm will decrease the probability of using this measure by 16.4%.

We are running two models with Heckman selection regression. The first model is a choice model that tests the awareness of public support. The second model computes the effects of the independent variables on the outcome, the use of public support. Each stage has a residual for each observation, or a set of unknown variables for each observation.

In order to test for bias, we examined the relationship between the residuals in both steps. If the unobservable variables in the selection model are correlated with the unobservable variables in the stage 2 model, we have biased estimates without correction (or an OLS model). This is basically saying that unobservable variables in the selection model (or choice) also affect the second model. If the unobservable variables in step 1 are unrelated to the unobservable variables in step 2, then we are saying that step 1 does not affect step 2 results. This is another way of saying that the selection on the sample of step 2 is a random process, unaffected by different unobservable variables.

If we can pick up all the right variables for our models, and leave few unobservable variables that affect our outcome, then chances are good that we will not have selection bias.

When ρ is positive, the unobservable variables are positively correlated. Thus, in using a public support model, if an unobservable variable is positively related with awareness (step 1), and positively related to use (step 2), we will find a positive ρ coefficient in the model of the outcome (as expected by the requirements of internationalization).

Otherwise, when ρ is negative, this indicates that unobservable variables are negatively correlated. Thus, in the outcome model, if some unobserved

variable is negatively related to the choice of use but is positively related to awareness, then ρ will be negative in the outcome model (as expected due to firm competencies).

At the very bottom of our regression output for an HSM examining the use of ISMs we will have estimates as follows: $\lambda = -0.564$; $\rho = -1.000$; $\sigma = 0.564$.

The adjusted standard error (σ) for the outcome equation regression is given by $\sigma = 0.564$, and the correlation coefficient (ρ) between the unobservable variables that determine selection into use with awareness and the unobservable variables that determine the use of this incentive is given by $\rho = -1.000$. The estimated selection coefficient (λ) is $\lambda = \sigma * \rho = 0.564 - 1.000 = -0.564$. Interpreting the estimated selection effect itself, we need to compute the average selection or truncation effect.

The average truncation effect (ζ) is computed by the average Mills value (τ), thus $\zeta = \lambda * \tau = -0.564 * 0.354 = -0.200$. This value gives us by how much the conditional use of this ISM is shifted down (or up if positive) due to the selection or truncation effect.

The interpretation of this value is the following: a firm with the average characteristics of the sample, who selects (or is selected) into awareness, makes ($[\exp(-0.200)1]100$) -18.13% lower probability of use this support than a firm drawn at random from the population with the average set of characteristics. Thus, the numerical values suggest the existence of negative selection or truncation effects in these data and those who select into awareness make less use of this ISM than a random drawing from the population of firms with a comparable set of characteristics would get.[13]

4.2 Support Through Training and Consulting Services

Table 8 of Appendix B shows that firm competencies, in particular the export experience and dimension, are negatively associated with the use of public support through training and consulting services. Additionally, foreign-owned firms have a lower probability of using public support than domestically-owned firms. Otherwise, firm competencies seem to be positively related with awareness. Firms with high export experience and high human capital possess a high probability of being aware of this support.

The computation of marginal effects reveals the following: with an increase of one year in export experience, the probability of using this measure will decrease by 0.6%. With an increase of one employee in firm size, the proba-

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[13]However, this value is dependent on whether or not there is a statistically significant effect of selection or whether the χ^2 value for ρ is statistically significant, as was indeed verified in this case. If it is not, we would find that there are no effects of selection (those who select into the awareness sample have no higher use of ISMs than those with average characteristics drawn at random from the population).

bility of using this measure will decrease by 0.003%. Being a foreign-owned firm will decrease the probability of using this measure by 27.5%.

The adjusted standard error for the outcome equation regression is $\sigma = 0.471$, and the correlation coefficient between the unobservable variables that determine selection into use with awareness and the unobservable variables that determine the use of this measure is $\rho = 0.453$. The estimated selection coefficient is $\lambda = \sigma * \rho = 0.471 * 0.453 = 0.213$.

The average Mills value is $\tau = 0.472$ and the average truncation effect is $\zeta = \lambda * \tau = 0.213 * 0.472 = 0.101$. This value gives by how much the conditional use of this measure is shifted up due to the selection or truncation effect.

Thus, a firm with the average characteristics of the sample who selects (or is selected) into awareness makes $[\exp(0.101)1]100 = 10.63\%$ more use of this measure than a firm drawn at random from the population with the average set of characteristics. Thus, the numerical values suggest that there is a positive selection or truncation effect in these data and those who select into awareness make more use of this measure than a random drawing from the population of firms with a comparable set of characteristics would get.

4.3   Support Through Informational Services

Table 9 of Appendix B shows that firm competencies, in particular export experience, are negatively associated with the use of public support through informational services. Otherwise, the model shows a positive relation between the number of FDI locations, which proxies the internationalization requirements, and the use of public support through informational services. Additionally, the model shows that foreign-owned firms have a lower probability of using public support than domestically-owned firms.

In terms of awareness, the model suggests that firm competencies are positively related with awareness. Firms with much export experience and dimension possess a high probability of being aware of this support. Additionally, the model shows that foreign-owned firms have a lower probability of being aware of this public support than domestically-owned firms.

The computation of marginal effects reveals the following: an increase of one year in export experience will decreases the probability of using this measure by 1%. With an increase of one FDI location the probability of using this measure increases 3.5%. Being a foreign-owned firm will decrease the probability of using this measure by 12.4%.

The adjusted standard error for the outcome equation regression is given by $\sigma = 0.429$, and the correlation coefficient between the unobservable variables that determine selection into use with awareness and the unobservable variables that determine the use of ISMs is given by $\rho = 0.368$. The estimated selection coefficient is $\lambda = \sigma * \rho = 0.429 * 0.368 = 0.158$.

The average Mills value is $\tau = 0.222$ and the average truncation effect is $\zeta = \lambda * \tau = 0.158 * 0.222 = 0.035$. This gives by how much the conditional use of this measure is shifted up due to the selection or truncation effect.

The interpretation of this is that a firm with sample average characteristics who selects (or is selected) into awareness makes $[\exp(0.035)1]100 = 3.6\%$ more use of this ISM than a firm drawn at random from the population with the average set of characteristics. Thus, the numerical values suggest that there are positive selection or truncation effects in this data and those who select into awareness make more use of this ISM than a random drawing from the population of firms with a comparable set of characteristics would get.

4.4 Support Through Programs of Exchanging Human Resources

Table 10 of Appendix B shows that firm competencies, in particular export experience, seem to be negatively associated with the use of public support through programs of exchanging human resources. However, in this measure, the qualification of human resources seems to be related with the use of this measure, eventually because the most qualified employees see in this initiative an opportunity to develop their competencies.

Otherwise, the model shows a positive relation between the number of FDI locations, which proxies the internationalization requirements, and the use of this public support. Additionally, the model shows that foreign-owned firms have a lower probability of using public support than domestically-owned firms, and that firms located in peripheral areas have a high probability of using this type of support.

In terms of awareness, the model suggests that firm competencies are positively related with awareness. More skilled, more innovative, and larger firms possess a high probability of being aware of this support.

The computation of marginal effects reveals the following: an increase of one year in export experience will decreases the probability of using this measure by 0.5%. An increase of 1% in the weight ratio of employees with bachelor's degree to the total number of employees will increase the use of this measure by 0.3%. With an increase by one FDI location, the probability of using this measure increases 3.4%. Being a foreign-owned firm will decrease the probability of using this measure by 13.7%, and being a firm located in a peripheral region will increase the probability of using this measure by 15.1%.

The adjusted standard error for the outcome equation regression is given by $\sigma = 0.475$, and the correlation coefficient between the unobservable variables that determine selection into use with awareness and the unobservable variables that determine the use of ISMs is given by $\rho = 0.591$. The estimated

selection coefficient is $\lambda = \sigma * \rho = 0.475 * 0.591 = 0.281$.

The average Mills value is $\tau = 0.659$ and the average truncation effect is $\zeta = \lambda * \tau = 0.281 * 0.659 = 0.185$. This gives by how much the conditional use of this measure is shifted up due to the selection or truncation effect.

The interpretation of this is that a firm with sample average characteristics who selects (or is selected) into awareness makes $[\exp(0.185)1]100 = 2\%$ more use of this ISM than a firm drawn at random from the population with the average set of characteristics. Thus, the numerical values suggest that there are positive selection or truncation effects in this data and those who select into awareness make more use of this ISM than a random drawing from the population of firms with a comparable set of characteristics would get.

4.5 Support Through Agreements to Promote or Protect Investments

Table 11 of Appendix B shows that firm competencies, in particular export experience, seem to be negatively associated with the use of public support through agreements to promote or protect investments. Otherwise, firms with high financial constraints seem to use this support more (these firms tend to consider less risky markets in countries where diplomacy has already solved some problems). Additionally, the model shows that firms located in peripheral areas have a high probability of using this support. The model also suggests that firm competencies are positively related with awareness. More skilled and larger firms possess a high probability of being aware of this support.

The computation of marginal effects reveals the following: an increase of one year in export experience will decreases the probability of using this measure by 0.4%. An increase of 1% in the weight ratio of indebtedness will increase the use of this measure by 0.3%. Being a firm located in a peripheral region will increase the likelihood of using this measure by 12.8%.

The adjusted standard error for the outcome equation regression is given by $\sigma = 0.490$, and the correlation coefficient between the unobservable variables that determine selection into use with awareness and the unobservable variables that determine the use of this measure is given by $\rho = -0.287$. The estimated selection coefficient is $\lambda = \sigma * \rho = 0.490 * (-0.287) = -0.141$.

The average Mills value is $\tau = 0.291$ and the average truncation effect is $\zeta = \lambda * \tau = (-0.141) * 0.291 = -0.041$. This gives by how much the conditional use of this measure is shifted down due to the selection or truncation effect.

The interpretation of this is that a firm with sample average characteristics who selects (or is selected) into awareness makes $[\exp(-0.041)1]100 = 4\%$ less use of this measure than a firm drawn at random from the population

with the average set of characteristics. Thus, the numerical values suggest that there are negative selection or truncation effects in this data and those who select into awareness make less use of this measure than a random drawing from the population of firms with a comparable set of characteristics would.

4.6 Support Through Investment and Credit Insurance or Mutual Funds

Table 12 of Appendix B shows that family-owned and foreign-owned firms have a low probability of being aware and using public support through investment and credit insurance or mutual funds.

The computation of marginal effects reveals that being a family-owned firm will decrease the likelihood of use this measure by 26%. Otherwise, being a foreign-owned firm will decrease the likelihood of use this measure by 22%. The adjusted standard error for the outcome equation regression is given by $\sigma = 0.567$, and the correlation coefficient between the unobservable variables that determine selection into use with awareness and the unobservable variables that determine the use of this measure is given by $\rho = 1.000$. The estimated selection coefficient is $\lambda = \sigma * \rho = 0.567 * 1.000 = 0.567$.

The average Mills value is $\tau = 0.690$ and the average truncation effect is $\zeta = \lambda * \tau = 0.567 * 0.690 = 0.391$. This gives by how much the conditional use of this measure is shifted up due to the selection or truncation effect.

The interpretation of this is that a firm with sample average characteristics who selects (or is selected) into awareness makes $[\exp(0.391)1]100 = 47.8\%$ more use of this measure than a firm drawn at random from the population with the average set of characteristics. Thus, the numerical values suggest that there are positive selection or truncation effects in this data and those who select into awareness make more use of this measure than a random drawing from the population of firms with a comparable set of characteristics would make.

4.7 Support Through Risk Capital

Table 13 of Appendix B shows that firm competencies, in particular export experience, seem to be negatively associated with the use of public support through risk capital. Otherwise, firms with high financial constraints seem to make more use of this support. Additionally, the model shows that firms located in peripheral areas have a high probability of using this support. The model also suggests that the requirements of internationalization are positively related with awareness. Firms with a large number of export markets possess a high probability of being aware of this support. Other-

wise, family-owned firms seem to be less aware of this type of support.

The computation of marginal effects reveals the following: an increase of one year in export experience will decrease the probability of using this measure by 0.7%. An increase of 1% in the weight ratio of indebtedness will increase the use of this measure by 0.3%. Being a firm located in a peripheral region will increase the likelihood of using this measure by 12.7%.

The adjusted standard error for the outcome equation regression is given by $\sigma = 0.482$, and the correlation coefficient between the unobservable variables that determine selection into use with awareness and the unobservable variables that determine the use of ISMs is given by $\rho = -0.192$. The estimated selection coefficient is $\lambda = \sigma * \rho = 0.482 * (-0.192) = (-0.093)$.

The average Mills value is $\tau = 0.389$ and the average truncation effect is $\zeta = \lambda * \tau = (-0.093) * 0.389 = (-0.036)$. This gives by how much the conditional use of this ISM is shifted down due to the selection or truncation effect.

The interpretation of this is that a firm with sample average characteristics who selects (or is selected) into awareness makes $[\exp(-0.036)1]100 = -3.5\%$ less use of this measure than a firm drawn at random from the population with the average set of characteristics. Thus, the numerical values suggest that there are negative selection or truncation effects in this data and those who select into awareness make less use of this measure than a random drawing from the population of firms with a comparable set of characteristics would.

4.8 Support Through Fiscal Benefits

Table 14 of Appendix B shows that firm competencies, in particular export experience and size, seem to be negatively associated with the use of public support through fiscal benefits. Otherwise, the greater is the number of FDI locations (the proxy of internationalization requirements), the greater is the probability of using this support.

The model also suggests that firm competencies are positively related with awareness. Larger firms and those with low indebtedness possess a high probability of being aware of this support. Additionally, family-owned and foreign-owned firms possess a low probability of being aware of this support. The computation of marginal effects reveals the following: an increase of one year in export experience will decreases the probability of using this measure by 0.7%. With an increase of one employee in firm size, the probability of using this measure decreases 0.004%. With an increase of one export market, the probability of using this measure increases 0.1%.

The adjusted standard error for the outcome equation regression is given by $\sigma = 0.512$, and the correlation coefficient between the unobservable variables that determine selection into use with awareness and the unobservable

variables that determine the use of ISMs is given by $\rho = -0.995$. The estimated selection coefficient is $\lambda = \sigma * \rho = 0.512 * (-0.995) = (-0.509)$.

The average Mills value is $\tau = 0.181$ and the average truncation effect is $\zeta = \lambda * \tau = (-0.509) * 0.181 = (-0.092)$. This gives by how much the conditional use of this ISM is shifted down due to the selection or truncation effect.

The interpretation of this is that a firm with sample average characteristics who selects (or is selected) into awareness makes $[\exp(-0.092)1]100 = -8.8\%$ less use of this measure than a firm drawn at random from the population with the average set of characteristics. Thus, the numerical values suggest that there are negative selection or truncation effects in this data and those who select into awareness make less use of this measure than a random drawing from the population of firms with a comparable set of characteristics would.

4.9 Support Through Other Public Financial Incentives

Table 15 of Appendix B shows that firm competencies, in particular export experience and size, seem to be negatively associated with the use of public support through other public financial support. The model also shows that family-owned firms have a low probability of using this support.

The computation of marginal effects reveals the following: an increase of one year in export experience will decreases the probability of using this measure by 0.7%, and being a family-owned firm will decrease the likelihood of using this measure by 26%.

The adjusted standard error for the outcome equation regression is given by $\sigma = 0.532$, and the correlation coefficient between the unobservable variables that determine selection into use with awareness and the unobservable variables that determine the use of ISMs is given by $\rho = 0.847$. The estimated selection coefficient is $\lambda = \sigma * \rho = 0.532 * 0.847 = 0.451$.

The average Mills value is $\tau = 0.882$ and the average truncation effect is $\zeta = \lambda * \tau = 0.451 * 0.882 = 0.398$. This gives by how much the conditional use of this measure is shifted up due to the selection or truncation effect.

The interpretation of this is that a firm with sample average characteristics who selects (or is selected) into awareness makes $[\exp(0.398)1]100 = 48.9\%$ more use of this measure than a firm drawn at random from the population with the average set of characteristics. Thus, the numerical values suggest that there are positive selection or truncation effects in this data and those who select into awareness make more use of this measure than a random drawing from the population of firms with a comparable set of characteristics would.

4.10 Support Through Protocols Between Governmental Agencies and Banks

Table 16 of Appendix B shows that firm competencies, in particular export experience, seem to be negatively associated with the use of public support through protocols between governmental agencies and banks.

In terms of awareness, the greater the number of FDI locations, the greater will be the probability of a firm being aware of this public support. Otherwise, family-owned firms seem to be less aware of this type of support.

The computation of marginal effects reveals that an increase of one year in export experience will decrease the probability of using this measure by 0.4%.

The adjusted standard error for the outcome equation regression is given by $\sigma = 0.636$, and the correlation coefficient between the unobservable variables that determine selection into use with awareness and the unobservable variables that determine the use of ISMs is given by $\rho = -1.000$. The estimated selection coefficient is $\lambda = \sigma * \rho = 0.636 * (-1.000) = -0.636$.

The average Mills value is $\tau = 0.695$ and the average truncation effect is $\zeta = \lambda * \tau = (-0.636) * 0.695 = -0.442$. This gives by how much the conditional use of this measure is shifted down due to the selection or truncation effect.

The interpretation of this is that a firm with sample average characteristics who selects (or is selected) into awareness makes $[\exp(-0.442)1]100 = -35.7\%$ less use of this measure than a firm drawn at random from the population with the average set of characteristics. Thus, the numerical values suggest that there are negative selection or truncation effects in this data and those who select into awareness make more use of this measure than a random drawing from the population of firms with a comparable set of characteristics would.

4.11 Support for Acquiring and Developing Brands, Marketing or Sales

Table 17 of Appendix B shows that firm competencies, in particular FDI experience, seem to be negatively associated with the use of public support for acquiring and developing brands, marketing or sales.

In terms of awareness, the size of the firm seems to be positively related with awareness of this measure. Otherwise, foreign-owned firms seem to be less aware of this type of support.

In terms of marginal effects, an increase of one FDI location will decrease the use of this measure by 0.9%.

The adjusted standard error for the outcome equation regression is given by $\sigma = 0.447$, and the correlation coefficient between the unobservable vari-

ables that determine selection into use with awareness and the unobservable variables that determine the use of this measure is given by $\rho = 0.060$. The estimated selection coefficient is $\lambda = \sigma * \rho = 0.447 * (0.060) = (0.268)$.

The average Mills value is $\tau = 0.639$ and the average truncation effect is $\zeta = \lambda * \tau = (0.268) * 0.639 = 0.171$. This gives by how much the conditional use of this measure is shifted down due to the selection or truncation effect. The interpretation of this is that a firm with sample average characteristics who selects (or is selected) into awareness makes $[\exp(0.171)1]100 = 18.6\%$ more use of this measure than a firm drawn at random from the population with the average set of characteristics. Thus, the numerical values suggest that there are negative selection or truncation effects in the data and those who select into awareness make less use of this measure than a random drawing from the population of firms with a comparable set of characteristics would.

However, this value is dependent on whether or not there is a statistically significant effect of selection, i.e., whether the χ^2 value for ρ statistically significant. If it is not, we would find that there no effects of selection (those who select into the awareness sample have no higher use of this measure relative to those with average characteristics drawn at random from the population).[14]

5 Conclusions and Discussion of Results

This paper examined the role of firm competencies and requirements of internationalization on the use of public support for internationalization activities, which has not been covered yet.

An interesting result was that competencies increase the awareness, a necessary condition of use, but reduce the perceived importance of public support, a sufficient condition of use. Hence, the existence of firm competencies reduces the need for public support, which is in line with hypotheses that the awareness of public support related with internationalization activities is more noticeable in firms with more competencies, and that the awareness of public support related with internationalization activities is more noticeable in firms that face more demanding conditions of internationalization.

In terms of the requirements of internationalization, the results are not so strong but confirm hypotheses that public support for internationalization is more used in firms with low competencies and that face more demanding conditions during their internationalization. Thus, the requirements of internationalization have a positive effect on the awareness and use of public support.

While this study provides an increased understanding the use of public sup-

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[14]In Appendix C.12 there is a table with the summary of all signals.

port measures for activities of internationalization, it is not without its limitations. First, the study was narrowly focused in terms of the perceived importance and the awareness of public support measures, but there are other variables not yet studied that may have an important role in the explanation of the use of public support. Taking this for lines of future research, we should explore the impacts of ineligibility, bureaucracy, and the wish to avoid external interference, on the use and the awareness of public support measures. On other line of research, we should explore the efficiency and the equity resulting from the application of public support for internationalization activities.

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Appendices

A Cross-correlation Matrix

Table 3: Cross-correlation Matrix

Variables	EXPX	FDIX	AGE	EMP	FCS	HRQ	NEM	NIM	RDI	FAM	FF	LOC
EXPX	1.00											
FDIX	0.01	1.00										
AGE	0.00	0.42	1.00									
EMP	0.00	0.60	0.28	1.00								
FCS	0.00	-0.08	-0.09	-0.07	1.00							
HRQ	0.00	-0.01	-0.14	-0.05	-0.05	1.00						
NEM	-0.05	0.15	0.17	0.06	0.01	-0.05	1.00					
NIM	0.03	0.71	0.31	0.43	0.01	-0.06	0.23	1.00				
RDI	0.12	0.02	-0.02	0.07	0.00	0.07	0.00	0.01	1.00			
FAM	-0.01	0.02	0.05	-0.02	0.02	-0.20	-0.09	-0.00	-0.09	1.00		
FF	0.00	-0.09	0.12	-0.02	0.08	-0.03	0.20	-0.10	0.00	-0.29	1.00	
LOC	0.05	-0.11	-0.23	-0.13	-0.03	0.00	0.02	0.14	-0.01	0.12	-0.27	1.00

Source: Own elaboration

Table 4: Estimation Results for *Public Support for Participation in Trade Fairs and State Missions (ISM1)* with a Heckman Selection Model

Variable	Coefficient	(Std. Err.)
Outcome equation (U_ISM1)		
Firm export experience	-0.009***	(0.003)
Firm FDI experience	0.007	(0.006)
Firm age	-0.002	(0.002)
Number of employees	0.000***	(0.000)
Financial constraints	0.212	(0.145)
Qualification of human resources	0.142	(0.101)
Number of export markets	-0.002	(0.002)
Number of investment markets	0.001	(0.020)
Family ownership	0.007	(0.072)
Foreign ownership	-0.164***	(0.077)
Peripheral location	-0.068	(0.166)
Intercept	0.689***	(0.125)
Selection equation (A_ISM1)		
Firm export experience	-0.021***	(0.007)
Firm FDI experience	0.137*	(0.082)
Firm age	0.006	(0.005)
Number of employees	0.000	(0.000)
Financial constraints	-0.342	(0.402)
Qualification of human resources	0.022	(0.264)
Number of export markets	-0.001	(0.004)
Number of investment markets	0.141	(0.118)
Family ownership	-0.183	(0.193)
Foreign ownership	0.009	(0.209)
Peripheral location	0.303	(0.191)
Intercept	0.511	(0.315)
The inverse Mills ratio		
Estimated selection coefficient (λ)	-0.564	(0.171)
Correlation coefficient (ρ)	-1.000	
Adjusted standard error (σ)	0.564	
Average Mills value (τ)	0.354	
Average truncation effect (ζ)	- 0.200	
N	419	
$\chi^2_{(11)}$	37.79	

Significance levels : $*: 10\%$ $**: 5\%$ $***: 1\%$

Table 5: Estimation Results for *Public Support Through Training and Consulting Services (ISM2)* with a Heckman Selection Model

Variable	Coefficient	(Std. Err.)
Outcome equation (U_ISM2)		
Firm export experience	-0.006***	(0.002)
Firm FDI experience	0.005	(0.005)
Firm age	-0.002	(0.002)
Number of employees	0.000***	(0.000)
Financial constraints	-0.033	(0.129)
Qualification of human resources	0.016	(0.090)
Number of export markets	0.001	(0.001)
Number of investment markets	0.015	(0.017)
Family ownership	-0.043	(0.062)
Foreign ownership	-0.275***	(0.067)
Peripheral location	0.080	(0.064)
Intercept	0.452***	(0.127)
Selection equation (A_ISM2)		
Firm export experience	-0.003	(0.005)
Firm FDI experience	0.042	(0.047)
Firm age	0.003	(0.005)
Number of employees	0.001***	(0.000)
Financial constraints	-0.488	(0.393)
Qualification of human resources	0.448*	(0.266)
Number of export markets	-0.014	(0.005)
Number of investment markets	0.078	(0.098)
Family ownership	0.256	(0.190)
Foreign ownership	-0.081	(0.209)
Peripheral location	0.194	(0.196)
Intercept	0.566*	(0.309)
The inverse Mills ratio		
Estimated selection coefficient (λ)	0.213	(0.213)
Correlation coefficient (ρ)	0.453	
Adjusted standard error (σ)	0.471	
Average Mills value (τ)	0.472	
Average truncation effect (ζ)	0.101	
N		419
$\chi^2_{(11)}$		46.15

Significance levels : $*: 10\%$ $**: 5\%$ $***: 1\%$

Table 6: Estimation Results for *Public Support Through Informational Services (ISM3)* with a Heckman Selection Model

Variable	Coefficient	(Std. Err.)
Outcome equation (U_ISM3)		
Firm export experience	-0.010***	(0.002)
Firm FDI experience	0.000	(0.004)
Firm age	-0.001	(0.001)
Number of employees	0.000	(0.000)
Financial constraints	0.001	(0.113)
Qualification of human resources	0.079	(0.079)
Number of export markets	-0.001	(0.001)
Number of investment markets	0.035**	(0.014)
Family ownership	-0.065	(0.056)
Foreign ownership	-0.123**	(0.066)
Peripheral location	0.033	(0.057)
Intercept	0.800***	(0.097)
Selection equation (A_ISM3)		
Firm export experience	0.018**	(0.008)
Firm FDI experience	5.098	(0.000)
Firm age	0.000	(0.006)
Number of employees	0.003***	(0.001)
Financial constraints	-0.398	(0.443)
Qualification of human resources	0.210	(0.296)
Number of export markets	-0.006	(0.006)
Number of investment markets	0.025	(0.129)
Research and development intensity	-0.448	(1.139)
Family ownership	-0.220	(0.217)
Foreign ownership	-0.520**	(0.259)
Peripheral location	0.221	(0.225)
Intercept	0.713**	(0.364)
The inverse Mills ratio		
Estimated selection coefficient (λ)	0.158	(0.147)
Correlation coefficient (ρ)	0.369	
Adjusted standard error (σ)	0.429	
Average Mills value (τ)	0.222	
Average truncation effect (ζ)	0.035	
N		419
$\chi^2_{(11)}$		65.16

Significance levels : $* : 10\%$ $** : 5\%$ $*** : 1\%$

Table 7: Estimation Results for *Public Support Through Programs of Exchanging Human Resources (ISM4)* with a Heckman Selection Model

Variable	Coefficient	(Std. Err.)
Outcome equation (U_ISM4)		
Firm export experience	-0.005**	(0.002)
Firm FDI experience	0.001	(0.005)
Firm age	-0.002	(0.002)
Number of employees	0.000	(0.000)
Financial constraints	0.032	(0.137)
Qualification of human resources	0.269***	(0.102)
Number of export markets	0.000	(0.001)
Number of investment markets	0.033*	(0.018)
Family ownership	0.009	(0.066)
Foreign ownership	-0.137*	(0.081)
Peripheral location	0.151**	(0.071)
Intercept	0.071	(0.148)
Selection equation (A_ISM4)		
Firm export experience	-0.004	(0.005)
Firm FDI experience	0.039	(0.034)
Firm age	-0.002	(0.004)
Number of employees	0.000**	(0.000)
Financial constraints	-0.411	(0.350)
Qualification of human resources	0.686***	(0.247)
Number of export markets	0.005	(0.005)
Number of investment markets	0.133	(0.088)
Research and development intensity	1.967*	(1.176)
Family ownership	0.195	(0.170)
Foreign ownership	-0.258	(0.181)
Peripheral location	0.267	(0.173)
Intercept	0.194	(0.276)
The inverse Mills ratio		
Estimated selection coefficient (λ)	0.281	(0.188)
Correlation coefficient (ρ)	0.591	
Adjusted standard error (σ)	0.476	
Average Mills value (τ)	0.659	
Average truncation effect (ζ)	0.185	
N	419	
$\chi^2_{(11)}$	24.28	

Significance levels :　　$* : 10\%$　　$** : 5\%$　　$*** : 1\%$

Table 8: Estimation Results for *Public Support Through Agreements to Promote or Protect Investments (ISM5)* with a Heckman Selection Model

Variable	Coefficient	(Std. Err.)
Outcome equation (U_ISM5)		
Firm export experience	-0.004**	(0.002)
Firm FDI experience	-0.004	(0.005)
Firm age	0.002	(0.002)
Number of employees	0.000	(0.000)
Financial constraints	0.285**	(0.134)
Qualification of human resources	0.009	(0.095)
Number of export markets	0.002	(0.001)
Number of investment markets	-0.009	(0.017)
Family ownership	-0.090	(0.071)
Foreign ownership	-0.039	(0.072)
Peripheral location	0.128*	(0.068)
Intercept	0.283**	(0.130)
Selection equation (A_ISM5)		
Firm export experience	0.008	(0.006)
Firm FDI experience	0.026	(0.045)
Firm age	0.000	(0.001)
Number of employees	0.002***	(0.001)
Financial constraints	-0.177	(0.389)
Qualification of human resources	0.701**	(0.277)
Number of export markets	0.001	(0.005)
Number of investment markets	0.105	(0.113)
Research and development intensity	-0.162	(0.962)
Family ownership	-0.233	(0.180)
Foreign ownership	-0.297	(0.222)
Peripheral location	0.182	(0.199)
Intercept	0.334	(0.321)
The inverse Mills ratio		
Estimated selection coefficient (λ)	-0.141	(0.175)
Correlation coefficient (ρ)	-0.287	
Adjusted standard error (σ)	0.490	
Average Mills value (τ)	0.291	
Average truncation effect (ζ)	-0.041	
N		419
$\chi^2_{(11)}$		16.90

Significance levels : $*: 10\%$ $**: 5\%$ $***: 1\%$

Table 9: Estimation Results for *Public Support Through Investment or Credit Insurance and Mutual Funds (ISM6)* with a Heckman Selection Model

Variable	Coefficient	(Std. Err.)
Outcome equation (U_ISM6)		
Firm export experience	-0.001	(0.003)
Firm FDI experience	-0.004	(0.006)
Firm age	0.000	(0.002)
Number of employees	0.000	(0.000)
Financial constraints	0.086	(0.153)
Qualification of human resources	-0.106	(0.118)
Number of export markets	0.000	(0.002)
Number of investment markets	0.014	(0.022)
Family ownership	-0.256**	(0.140)
Foreign ownership	-0.219**	(0.130)
Peripheral location	0.045	(0.073)
Intercept	0.040	(0.261)
Selection equation (A_ISM6)		
Firm export experience	0.007	(0.006)
Firm FDI experience	0.013	(0.029)
Firm age	0.004	(0.004)
Number of employees	0.000	(0.000)
Financial constraints	-0.215	(0.365)
Qualification of human resources	0.311	(0.261)
Number of export markets	0.006	(0.005)
Number of investment markets	0.081	(0.080)
Research and development intensity	0.256	(0.947)
Family ownership	-0.443***	(0.171)
Foreign ownership	-0.381**	(0.190)
Peripheral location	0.030	(0.184)
Intercept	0.756**	(0.299)
The inverse Mills ratio		
Estimated selection coefficient (λ)	0.566	(0.640)
Correlation coefficient (ρ)	1.000	
Adjusted standard error (σ)	0.566	
Average Mills value (τ)	0.690	
Average truncation effect (ζ)	0.391	
N		419
$\chi^2_{(11)}$		12.05

Significance levels : $*$: 10% $**$: 5% $***$: 1%

Table 10: Estimation Results for *Public Support Through Risk Capital (ISM7)* with a Heckman Selection Model

Variable	Coefficient	(Std. Err.)
Outcome equation (U_ISM7)		
Firm export experience	-0.007***	(0.002)
Firm FDI experience	-0.004	(0.005)
Firm age	0.002	(0.001)
Number of employees	0.000	(0.000)
Financial constraints	0.300**	(0.137)
Qualification of human resources	-0.087	(0.114)
Number of export markets	-0.001	(0.002)
Number of investment markets	0.003	(0.016)
Family ownership	-0.030	(0.110)
Foreign ownership	0.108	(0.067)
Peripheral location	0.127**	(0.064)
Intercept	0.338	(0.207)
Selection equation (A_ISM7)		
Firm export experience	-0.005	(0.005)
Firm FDI experience	0.000	(0.289)
Firm age	0.000	(0.004)
Number of employees	0.000	(0.000)
Financial constraints	0.160	(0.400)
Qualification of human resources	0.480	(0.296)
Number of export markets	0.022**	(0.010)
Number of investment markets	0.002	(0.065)
Research and development intensity	0.473	(1.027)
Family ownership	-0.401**	(0.178)
Foreign ownership	0.008	(0.231)
Peripheral location	0.002	(0.208)
Intercept	0.869***	(0.322)
The inverse Mills ratio		
Estimated selection coefficient (λ)	-0.092	(0.553)
Correlation coefficient (ρ)	-0.193	
Adjusted standard error (σ)	0.482	
Average Mills value (τ)	0.389	
Average truncation effect (ζ)	-0.036	
N		419
$\chi^2_{(11)}$		29.16

Significance levels :　　$*:10\%$　　$**:5\%$　　$***:1\%$

Table 11: Estimation Results for *Public Support Through Fiscal Benefits (ISM8)* with a Heckman Selection Model

Variable	Coefficient	(Std. Err.)
Outcome equation (U_ISM8)		
Firm export experience	-0.007***	(0.001)
Firm FDI experience	0.004	(0.005)
Firm age	0.000	(0.001)
Number of employees	0.000**	(0.000)
Financial constraints	0.195	(0.132)
Qualification of human resources	-0.077	(0.090)
Number of export markets	0.000	(0.001)
Number of investment markets	0.054***	(0.017)
Family ownership	0.013	(0.070)
Foreign ownership	-0.085	(0.071)
Peripheral location	-0.004	(0.067)
Intercept	0.594***	(0.108)
Selection equation (A_ISM8)		
Firm export experience	0.011	(0.008)
Firm FDI experience	0.000	(0.000)
Firm age	0.003	(0.006)
Number of employees	0.003***	(0.001)
Financial constraints	-0.846*	(0.492)
Qualification of human resources	0.086	(0.321)
Number of export markets	0.008	(0.008)
Number of investment markets	0.067	(0.145)
Research and development intensity	-1.467	(0.993)
Family ownership	-0.608***	(0.228)
Foreign ownership	-0.742**	(0.290)
Peripheral location	0.343	(0.246)
Intercept	1.141***	(0.419)
The inverse Mills ratio		
Estimated selection coefficient (λ)	-0.509	(0.186)
Correlation coefficient (ρ)	-0.995	
Adjusted standard error (σ)	0.512	
Average Mills value (τ)	0.181	
Average truncation effect (ζ)	-0.092	
N		419
$\chi^2_{(11)}$		48.16

Significance levels : $*: 10\%$ $**: 5\%$ $***: 1\%$

B Results of Heckman Selection Model

B.1 Public Support for Participation in Trade Fairs and State Missions

B.2 Public Support Through Training and Consulting Services

B.3 Public Support Through Informational Services

B.4 Public Support Through Programs of Exchanging Human Resources

B.5 Public Support Through Agreements to Promote or Protect Investments

B.6 Public Support Through Investment or Credit Insurance and Mutual Funds

B.7 Public Support Through Risk Capital

B.8 Public Support Through Fiscal Benefits

B.9 Public Support Through Other Public Financial Support

B.10 Public Support Through Protocols Between Governmental Agencies and Banks

B.11 Public Support for Acquiring and Developing Brands, Marketing or Sales

B.12 Coefficient Signals

Table 12: Estimation Results for *Public Support Through Other Public Financial Support (ISM9)* with a Heckman Selection Model

Variable	Coefficient	(Std. Err.)
Outcome equation (U_ISM9)		
Firm export experience	-0.007***	(0.003)
Firm FDI experience	0.007	(0.006)
Firm age	0.000	(0.000)
Number of employees	0.000	(0.000)
Financial constraints	0.256	(0.161)
Qualification of human resources	-0.145	(0.125
Number of export markets	0.001	(0.002)
Number of investment markets	0.008	(0.027)
Family ownership	-0.266***	(0.104)
Foreign ownership	-0.180	(0.112)
Peripheral location	0.124	(0.084)
Intercept	-0.068	(0.438)
Selection equation (A_ISM9)		
Firm export experience	0.003	(0.004)
Firm FDI experience	0.006	(0.019)
Firm age	-0.001	(0.004)
Number of employees	0.000	(0.000)
Financial constraints	0.024	(0.314)
Qualification of human resources	0.184	(0.217)
Number of export markets	0.005	(0.004)
Number of investment markets	0.069	(0.049)
Research and development intensity	0.979	(0.797)
Family ownership	-0.179	(0.151)
Foreign ownership	-0.190	(0.168)
Peripheral location	0.053	(0.158)
Intercept	0.133	(0.251)
The inverse Mills ratio		
Estimated selection coefficient (λ)	0.451	(0.554)
Correlation coefficient (ρ)	0.847	
Adjusted standard error (σ)	0.532	
Average Mills value (τ)	0.882	
Average truncation effect (ζ)	0.398	
N		419
$\chi^2_{(11)}$		30.23

Significance levels : $\quad * : 10\% \quad ** : 5\% \quad *** : 1\%$

Table 13: Estimation Results for *Public Support Through Collaboration Protocols Between Governmental Agencies and Banks (ISM10)* with a Heckman Selection Model

Variable	Coefficient	(Std. Err.)
Outcome equation (U_ISM10)		
Firm export experience	-0.004	(0.003)
Firm FDI experience	0.007	(0.007)
Firm age	0.002	(0.002)
Number of employees	0.000*	(0.000)
Financial constraints	-0.022	(0.195)
Qualification of human resources	-0.099	(0.129)
Number of export markets	-0.002	(0.002)
Number of investment markets	-0.010	(0.028)
Family ownership	0.106	(0.110)
Foreign ownership	0.140	(0.096)
Peripheral location	0.005	(0.090)
Intercept	0.639**	(0.666)
Selection equation (A_ISM10)		
Firm export experience	-0.002	(0.005)
Firm FDI experience	-0.023	(0.020)
Firm age	-0.006	(0.003)
Number of employees	0.000	(0.000)
Financial constraints	0.367	(0.320)
Qualification of human resources	0.166	(0.223)
Number of export markets	0.005	(0.003)
Number of investment markets	0.214***	(0.070)
Research and development intensity	2.763**	(1.112)
Family ownership	-0.306**	(0.154)
Foreign ownership	0.149	(0.172)
Peripheral location	-0.099	(0.162)
Intercept	0.032	(0.259)
The inverse Mills ratio		
Estimated selection coefficient (λ)	-0.636	(0.290)
Correlation coefficient (ρ)	-1.000	
Adjusted standard error (σ)	0.636	
Average Mills value (τ)	0.695	
Average truncation effect (ζ)	-0.442	
N		419
$\chi^2_{(11)}$		11.22

Significance levels : $*: 10\%$ $**: 5\%$ $***: 1\%$

Table 14: Estimation Results for *Public Support for Acquiring and Developing Brands, Marketing or Sales (ISM11)* with a Heckman Selection Model

Variable	Coefficient	(Std. Err.)
Outcome equation (U_ISM11)		
Firm export experience	-0.003	(0.002)
Firm FDI experience	-0.009*	(0.006)
Firm age	0.002	(0.002)
Number of employees	0.000	(0.000)
Financial constraints	0.103	(0.139)
Qualification of human resources	-0.074	(0.101)
Number of export markets	0.000	(0.002)
Number of investment markets	0.014	(0.090)
Family ownership	-0.092	(0.084)
Foreign ownership	-0.116	(0.124)
Peripheral location	0.010	(0.075)
Intercept	0.285	(0.210)
Selection equation (A_ISM11)		
Firm export experience	-0.004	(0.004)
Firm FDI experience	-0.007	(0.019)
Firm age	-0.001	(0.004)
Number of employees	0.000*	(0.000)
Financial constraints	-0.099	(0.321)
Qualification of human resources	0.100	(0.220)
Number of export markets	0.006	(0.004)
Number of investment markets	0.049	(0.050)
Research and development intensity	1.515	(0.930)
Family ownership	-0.205	(0.155)
Foreign ownership	-0.532***	(0.173)
Peripheral location	-0.110	(0.163)
Intercept	0.318	(0.258)
The inverse Mills ratio		
Estimated selection coefficient (λ)	0.027	(0.320)
Correlation coefficient (ρ)	0.059	
Adjusted standard error (σ)	0.447	
Average Mills value (τ)	0.639	
Average truncation effect (ζ)	0.171	
N		419
$\chi^2_{(11)}$		7.89

Significance levels : $*:10\%$ $**:5\%$ $***:1\%$

Table 15: Coefficient Signals

	U_ISM1	A_ISM1	U_ISM2	A_ISM2	U_ISM3	A_ISM3	U_ISM4	A_ISM4	U_ISM5	A_ISM5	U_ISM6	A_ISM6	U_ISM7	A_ISM7	U_ISM8	A_ISM8	U_ISM9	A_ISM9	U_ISM10	A_ISM10	U_ISM11	A_ISM11
EXPX	-	+	-	+	-	+	-		-				-		-			-				
FDIX		+																			-	
AGE																						
EMP	-		-	+		+		+		+					-	+		-	-			+
RDI								+												+		
FCS									+				+		-							
QHR				+			+	+		+												
NEM														+								
NIM			+		+		+								+					+		
FAM											-	-		-		-		-		-		
FF	-		-		-		-				-					-						-
LOC							+		+				+									

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