Understanding the Use of Public Supports For Internationalisation

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Abstract

Why do firms use public support during their internationalisation process? This paper investigates this question using a novel framework for analysing the firm behavior from the outset of awareness of the existence of public support. The causes of differences between firms on uptake of and participation on support are decomposed according to firm characteristics and idiosyncrasies of the internationalisation process. The empirical analysis applies a variant of the Heckman Selection Model on data collected through a survey of 441 firms within a matrix of 11 different types of incentives to promote the internationalisation of a small open economy. Our findings clearly suggest that firm capabilities are inversely associated with the use of public incentives on contrast with awareness which is found to increase with capabilities. Since use depends on awareness, public interventions may not cover an important set of firms that fit with allocation criteria. On the other hand, activities in more demanding projects are positively associated with awareness and use what lead us to ask whether firms more skilled in accessing public support employ such support to cover their more risky projects or not. In terms of practical assistance, this study is relevant to public administrators, politicians, and researchers concerned with the effectiveness of policies and programs operating at the micro-level. Moreover, these results may contribute towards building informed decision making, towards policy development and implementation, and towards communications strategy, and evaluation of policies.

Keywords: Internationalisation; Allocation; Public support; Use; Awareness; Screening; Capabilities; Opportunism; Internationalisation specificities; Participation environment; Heckman Selection Model

JEL codes: C13; C50; F23; H23; H81

1 Introduction

This paper presents a framework and an investigation to empirical study the use of public incentives for internationalisation activities from the outset of firms' awareness of public support. The model is a variant often used in labor economics of the Heckman & Robb (1985) and Heckman & Smith (1999)'s proposals. The framework is applied to analyze unique and detailed data gathered in a matrix of 11 different types of public support measures aimed at promoting the internationalisation of firms from a small open economy. Investigating the use of public support is valuable for at least three reasons. First, it sheds light on sources of inequality in the receipt of government support (Heckman & Smith, 2004). Our framework allows us to go beyond simple comparisons of means on awareness or use of public supports. We organise both into a process capable of provide the deeper understanding of the role of capabilities and specificities of the internationalisation process on the behavior of firms depending on whether the changes result from firms' needs, search and screening costs or from mere opportunism. Second, the identification of patterns in awareness and use can yield relevant information about the determinants of firms' participation in public programs aimed at encouraging activities with potential impact on economic growth. Third, information regarding the participation process has important implications for program evaluation strategies. Knowledge of how the determinants of participation vary can inform choices about from where in the process to draw a comparison group, about what variables to collect in a survey, and about what identification strategy to adopt according with certain circumstances (Abelson, Forest, Eyles, Smith, Martin & Gauvin, 2003; Heckman & Smith, 2004).

In the various branches of economic literature, including the international economics, researchers either take for granted the behavior of firms as well as the "institutional status". In terms of applied research on the encouragement of international activities, there are some studies which provide interesting insights about the promotion of exports (Gil, Llorca & Martinez, 2008; Girma & Görg, 2007; Martincus & Carballo, 2008). However, there is a lack

of evidence on processes that drive the allocation of public incentives between firms (Bannò & Piscitello, 2010; Colombo, Grilli & Verga, 2007). At same time existing evaluations of policy measures to support private investments, for internationalisation or for other purposes, have emphasized issues related to the impact of the measures while questions related with the "bridge between awareness and participation" have been relatively neglected (Bergemann & Välimäki, 2002; Heckman, 2010). Existing evidence indicates that government actions may fail immediately at this critical level. Take for instance the example of the export promotion in the United Kingdom, where a recent survey by the British Chambers of Commerce involving 8000 companies concludes that over 65% of the firms were unaware of public support for exports. Other evidence for this problem can be found in distinct branches of economic literature including innovation and entrepreneurship (Crick, 1997; Klette, Mřen & Griliches, 2000; Koksal, 2009; Lenihan, 1999; Martin & Scott, 2000; Ostrom, Schroeder & Wynne, 1993; Spence, 2003; Storey, 2000; Tanayama, 2007).

Taking into consideration the scale of the resources often involved and the need of efficiency, it seems timely and especially germane to understand this process better. Moreover, for such evaluations are important for measuring the impact of policies, to showing the taxpayer and business community whether the programs are cost-effective, and to improve the design and administration of the programs (OECD, 2009). Indeed, evaluation has to be integral to the policy process (Hansen & Vedung, 2010; Schilder, 2000; Vedung, 2009).

The empirical analysis conducted here is based on information from a sample of 441 Portuguese firms. Data was collected through a survey which covers the awareness and use of 11 distinct types of home country measures, hereafter HCMs, launched in Portugal between 1994 and 2009 with the objective of promote the internationalisation of domestic firms. For each measure, the study considers the users and potential applicants. Results indicate that search and screening costs and internal needs relate with firm behavior. In fact, it was found a relatively high level of awareness of several measures, but relatively low use of them. The empirical results overall show which firm capabilities and specificities of the internationalisation process positively affect awareness and use. There is evidence that

firms self-select, because even controlling for awareness, firms with higher capabilities are less likely to use the support measures available, whereas firms involved in more demanding processes of internationalisation are more likely to have used them. There is also evidence that firm capabilities and search and screening costs may affect the firm awareness and use of public supports. Furthermore, in more demanding projects public support seems to be a strong contender as a tool of risk externalisation.

The present study is of direct practical assistance to public administrators and politicians concerned with evidence for the effectiveness of policies and programs that operate at the micro level suffering of considerable impacts from public policy decisions. Our results support the argumentation raised by Blanes & Busom (2004), González, Jaumandreu & Pazó (2005), Hall & Reenen (2000) and Bannò & Piscitello (2010) considering that policy makers should be concerned about program development and implementation with the communications strategy and the application stage because there may be unexpected barriers and facilitators to firms' participation in public programs. Moreover, this analysis could also shed some light on the trade-off that a firm must make between its economic functions (i.e., transaction economic costs) and the capability at managing institutional idiosyncrasies (Henisz, 2003). Hence, we contribute to improvements in the design and administration of programs for the promotion of internationalisation from the home country perspective but also to host country policy programs and, more generally, to the "big picture" of public incentives to private activities. The present paper also makes for increasing the awareness of politicians and public officials of the benefits from having an evaluation culture, from highlighting key evaluation debates, and from having discussions about the procedures and methods to be used.

The paper is organized as follows. In the next section, we explore the determinants of awareness and use of public support. In Section 3, we explain the methodology including the empirical setting, process of data collection, econometric model utilized and process of variables definition and measurement. Sections 4 and 5 present respectively the results, including the statistical validation of the model applied, and the discussion of statistical

evidence. The final Section concludes.

2 Use of Public Support for Internationalisation

Although several studies have observed deficiencies related with a low participation rates in public programs aiming at promote internationalisation by eligible firms (Giebe, Grebe & Wolfstette, 2006), scholars have paid little attention to its underlying causes and consequences. Indeed, we know surprisingly little about how potential applicants decide whether to apply, what are determinants of firms' access to public support, or even what forces are involved in such process (Colombo et al., 2007).

It is indubitable that the implementation of policies is not a mere sequence of administrative routines, but instead a complex process involving various actors (Corbett & Lennon, 2002; Schilder, 2000). Important clues were provided by Heckman & Smith (2004) whose considerations allow a possible decomposition of the allocative problem. Policy makers set the criteria of eligibility, which will be implemented by the agencies in charge of the management of the incentive program. Based on their awareness, i.e., the extent to which eligible subjects are informed about the existence of a suitable public measure, firms decide whether to submit an application. Thus, firms self-select to participate in the allocation process. Finally, public agencies make granting decisions by choosing which applications will be accepted and which firms will be enrolled in the program (Heckman & Smith, 2004). From this process highlights two key points that we will explore here. Awareness of public support and the use in itself that depends of the awareness.[1]

[1]Meier & Pilgrim (1994), for example, state that a lack of awareness of the existence of business assistance services provided by the government agencies is among the reasons for the poor take-up rate. In addition, the potential beneficiaries themselves are the ones that decide whether and when to apply for public aid.

2.1 Determinants of Awareness

Regardless of the intervention area, awareness of public support is a primary goal that governmental agencies pursue. Hence, at the risk of oversimplifying, we assume that firms' awareness of public support depends on a balance between the efforts of promotion by governmental agencies and the firms' capabilities and needs, but may also be influenced by some facilitators and barriers to participation embedded in the so-called determinants of awareness. From the firm perspective, we are prone to consider that the question remains as to whether significant search and screening costs compromise the effectiveness of a policy tool, as they reduce the awareness of the measures by eligible candidates or not (Feinberg & Huber, 1996). But on the other hand, we need to ask whether internal needs resulting of the involvement in more demanding projects may create a firm's intention to search for additional external support or not. In this point, we keep an eye in possible opportunistic behaviors.[2]

Based on the above discussion, our first research hypothesis claims that information gathering and screening costs significantly influence firms' awareness of a public incentive, generating at the outset barriers to participation. In what concerns the available public support for internationalisation in specific, firms previously involved in international activities probably have accumulated a larger number of relevant contacts and developed more efficient channels to receive and screen relevant information about support measures for internationalisation activities (Erramilli, 1991; Henisz & Zelner, 2005). On other hand, size and age are commonly used as measures for accumulated firm capabilities, and according to Demick & O'Reilly (2000), larger and older firms have a higher probability of being aware of public support for internationalisation. Larger and older firms, as well as firms with more experience with international markets, are less numerous, have more interfaces with the external environment and with professional networks, which reduces the difficulties of being reached

[2]This point is with the danger of reaching firms beyond the target group and generating deadweight effects

by governmental agencies (Pfaffermayr, 2004). These firms also have more resources to deal with the complexity and pluralistic pattern of promotion programs. Additionally, firms with more skilled human capital may be more aware of existing public support. Skilled employees are more likely to be connected to the relevant networks, be more open to the external environment, and be more able to understand and treat the information externally available (Laamanen & Wallin, 2009). Thus, firms with more skilled human capital are expected to be more aware of existing public support.

In conjunction with the possible patterns identified above, the existence of financial constraints may lead firms to develop strategies to overcome firms' difficulties. These strategies include screening external sources of funds, not only private sources through indebtedness or cooperation with other firms, but also support provided by public sources such as governmental agencies. Thus we expect that the greater the need (i.e., the greater the financial constraints) the greater will be the awareness of existing public support. In accordance with these lines of reasoning, firms embarking in more demanding projects of internationalisation, e.g., involving higher number of exporting markets, higher number of subsidiaries, riskier host economies, etc., have a greater need for resources (Tallman & Li, 1996) and this fact may stimulate them to search more intensively for external support. Naturally the conjunction of these expectations may translate into a greater awareness of available public support. In accordance with these assumptions, the following hypotheses can be derived:

Hypothesis 1. *Firms' search and screening costs are negatively associated with the awareness of public support measures for internationalisation.*

Hypothesis 2. *Firms' internal needs are positively associated with the awareness of public support measures for internationalisation.*

In addition to the above-mentioned issues, other variables may affect the degree to which firms are aware of existing governmental incentives. For instance, innovative intensity, ownership, and location are just some of these variables. Despite being interesting to discuss

their potential impact on awareness, the clues provided by literature in terms of the direction of their relation with the awareness is mixed and inhibits us to propose objective hypotheses. Notwithstanding, as a guide for future research in this domain, we provide some lines about the relation of these variables with the awareness of public support for internationalisation.

In the case of innovative intensity, it is of common sense that governments of several countries have traditionally supported innovation given its positive impacts on growth (Grossman & Helpman, 1994; Verspagen, 2005). Thus, innovative firms have probably been more in contact with other types of public support in the past. Hence, knowing better the channels and the processes of application,[3] more innovative firms may have an higher probability of being aware of public support for private investment in general.[4]

Other interesting line of research is related with the firm ownership. For instance, family owned firms are largely SMEs[5] and try to keep the business under the control of family members, avoiding external interference (Abdellatif, Amann & Jaussaud, 2010; Kontinen & Ojala, 2010). This behaviour may reduce the search and hence the awareness of external support. On other hand, foreign-owned firms suffer from the so-called "liability of foreignness", there is, they are more distant culturally and institutionally from foreign agents than are domestic firms and such distance may result in a lower awareness of public support in the host economy (Hymer, 1976; Zaheer, 1995; Zaheer & Mosakowski, 1997; Zaheer, 2002).

In terms of agglomeration effects, firms located in central areas may benefit from economies of agglomeration which may increase their awareness of public support for internationalisation activities (Greenaway & Kneller, 2008; Mariotti, Piscitello & Elia, 2010; Patel & Vega, 1999). However, the location in central regions may be associated with the advantage related with the existence of alternatives to the public support what may lead some firms to lose the interest in the support provided by public institutions surrogating them by other peers.

[3]Some processes provided by the same institutions and therefore with clear similarities.

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

[5]Size is expected to be negatively related to awareness.

2.2 Determinants of Use

Taking into consideration all the hazards associated with international involvement, firms with higher internal capabilities, fewer financial difficulties, and those involved in less demanding internationalisation strategies, are expected to use public support to a lesser extent because they attribute at the outset less benefit to participation in the programs. More specifically, one also expects firms with greater previous international experience to rely more on their own capabilities when embracing further internationalisation actions, and thus to attribute less value to externally available resources (Koksal, 2009). Larger and older firms, as well as firms with greater international experience, are more likely to have the relevant capabilities to follow international opportunities autonomously, not having to rely on public support. In fact, ever since Penrose (1959), it has been well accepted by international business 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 (Autio, Sapienza & Almeida, 2000; Spence & Crick, 2001). 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 type of 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. In line with their international experience, firms with more qualified employees have probably more of the relevant capabilities to embrace internationalisation activities on their own pace. Therefore, firms with more skilled human capital may attribute less value to available public support and therefore use it less.

Financial constraints and the perceived risk associated with more demanding projects of internationalisation both are expected to encourage the use of public support. As discussed in the recent literature, the market for investment capital is subject to significant imperfections, which often result in financial constraints (Antràs, Desai & Foley, 2009). Firms face greater difficulties in accessing capital to finance international projects due to the volatile and asymmetric information typical of those projects. Financial market imperfections can

consequently curb investment projects and limit a firm's capability to engage in internationalisation (De Maeseneire & Claeys, 2012; Van Tongeren, 1998). Specific subsidies to help internationalising firms to overcome their financial constraints can reduce the cost of the internationalisation process. Otherwise, firms involved in more demanding projects of internationalisation, in the form of a larger number of export markets and/or of FDI locations, may face a higher level of complexity and uncertainty. These issues may increase not only firms' needs but also lead an behavior in acquiescence with an externalisation of risk in certain activities. According with these arguments, we can derive the following hypotheses.

Hypothesis 3. *Firms' capabilities reduce the use of public support measures for internationalisation by decreasing the need of external assistance.*

Hypothesis 4. *Firms' financial constraints and the requirements associated with an internationalisation raise the use public support by increasing the perceived benefits of participation.*

Besides the above mentioned aspects, other variables such as family and foreign ownership and location might affect the use of public support. Following the discussion initiated to the role of some control variables on awareness, in terms of use there are also some underexplored clues. For instance, taking the discussion started Graves (2008) that family-owned firms pursue more independent strategies than more diversely held private firms, we find three characteristics on family-owned firms which may influence their internationalisation strategies and practices (Gallo, Tapies & Cappuyns, 2004; Littunen, 2003). Combining a strong desire to maintain control and influence with an averse attitude towards risk and a specific governance, creates the potential for family-owned businesses may be willing to utilize family resources instead of using any type of public support (Kontinen & Ojala, 2010).

Foreign-owned firms for their part are often target with support to inward foreign direct investment and not to develop their outward internalisation. Additionally these firms are often considered as more distant culturally 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 their parent firms (Egelhoff, 2010; Zaheer, 1995).

In terms of location, firms from the core areas often benefit from economies of agglomeration, specifically from the flow of knowledge between peers, making imitation and knowledge diffusion about international processes easier (Bennett, Robson & Bratton, 2001; Brakman, Garretsen & Marrewijk, 2007; Dupont & Martin, 2006). Hence, firms located in the periphery are expected to attach more value to public incentives and use it more than firms located in central areas. But on other hand, firms in the periphery need to compete with firms in the core – when they internationalize, they are competing in the same markets – so supports are acting as a subsidy that all firms will try to incorporate in their economic functions (i.e., revenue or costs) (Brander & Spencer, 1985; Pecorino, 1999). Additionally, other issue may be worthy to understand this point. Firms located in the core, being more close of the location of the "sources", may benefit in larger extent of these supports if better advised with some inside information. Summarizing the discussion above, Figure 1 depicts the environment of participation including the determinants of awareness and use of internationalisation support measures discussed above and highlighting the existence of barriers and facilitators that could increase or decrease the allocation efficiency.

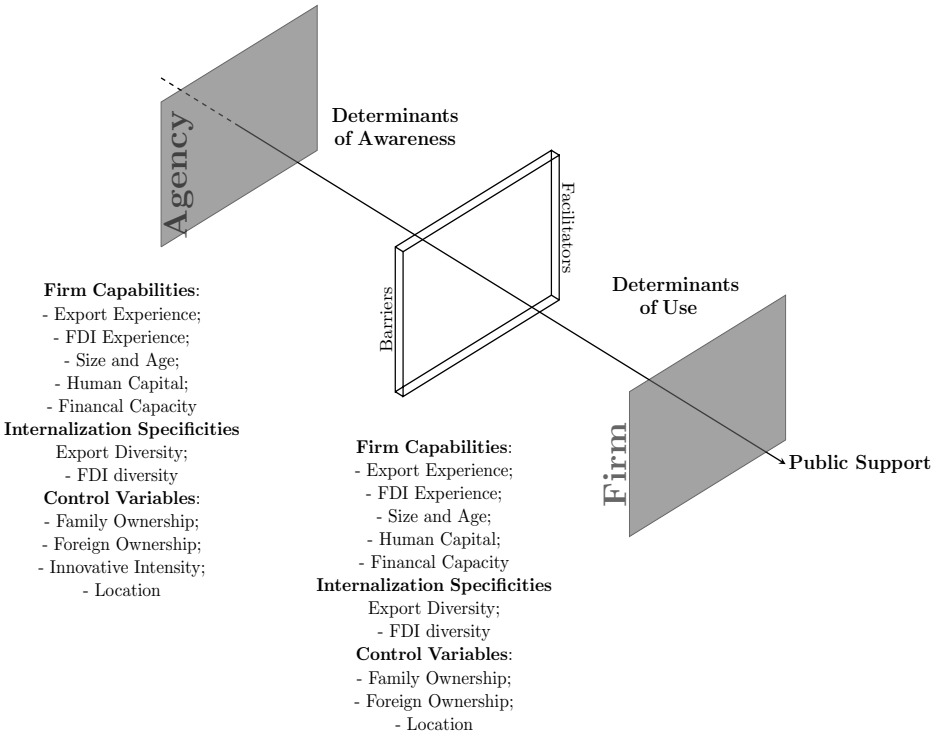
3 Methodology

3.1 Empirical Setting

As other European economies, over the 1990s, the Portuguese governments launched a number of initiatives to promote the internationalisation of domestic firms.[6] Thus, we take advantage of the case of firms from a small open economy where an extensive and diverse grant support system has been used in an attempt to make them more internationally com-

[6]The year 1994 was the first when were established formal initiatives to promote internationalisation through the *Programa de Apoio à Internacionalização das Empresas Portuguesas* (PAIEP).

Figure 1: Participation Environment



Source: authors

petitive. Portugal benefit from this characteristic and seems a particularly suitable candidate to our research aims. Table 1 shows 11 types of home country measures (HCMs) launched in Portugal and the legal instruments associated. These measures take the form of financial and non-financial support. Non-financial HCMs consist 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 (HCM1 to HCM5). Financial support has been allocated through 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 (HCM6 to HCM11). Each of these measures are considered in Section 3.4 during the dependent variables' definition. To our best knowledge there are not, so far, academic or other studies identifying objectively the possible types of measures, evaluating the awareness, use or the effects of these programs. Hence, our study is innovative

Table 1: Home Country Measures and Legal Instruments Launched in Portugal (1994–2009

Type	Legal Instruments
Public support for trade fairs and state missions (HCM1)	law 560/2004 and law decree 1463/2007
Public support through training and consulting services (HCM2)	law 560/2004
Public support through informational services (HCM3)	law 560/2004 and law decree 245/2007
Public support for the exchange of human resources (HCM4)	law decree 245/2007 and law 249/2009
Public support through international investment agreements (HCM5)	law decree 245/2007
Public support through investment and credit insurance or mutual funds (HCM6)	law decree 245/2007
Public support through venture capital (HCM7)	law decrees 290/1994, 401/1999 and 249/2009
Public support through fiscal benefits (HCM8)	law decrees 290/1994, 401/1999 and 249/2009
Public support through other public financial support (HCM9)	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
Public support through protocols of governmental agencies and banks (HCM10)	law decree 245/2007
Public support for acquiring or developing brands, marketing or sales (HCM11)	laws 1254/2003 and 560/2004, and in law decrees 290/1994, 1463/2007, 250/2008, 353-A and 1020

Source: authors

also in this regard. Taking in consideration the present limitations imposed by the debt crises, and the continuous need to stimulate firms' internationalisation, there is clearly a need to learn from previous experiences to improve policy design and implementation.

3.2 Data Collection

Official data related to the allocation and impact of the public support measures for internationalisation are not available for Portugal. Therefore, the data for this study had to be collected through a questionnaire survey to firms about their use and awareness of the HCMs available. In order to ensure valid and reliable results, we developed a questionnaire following three steps. First, the relevant literature was reviewed to identify measures of the constructs to include in the questionnaire. Second, to have content validity, two consultants and five managers read the questionnaire and provided inputs for revision. Third, the questionnaire was pre-tested through interviews in ten firms. After this preliminary stage, the questionnaire was administered to a representative sample of Portuguese firms

obtained through previous contact with 89 business associations that represent all industries established in Portugal. In total, 4637 firms (almost 1% of all firms established in Portugal during 2009) were contacted by several modes (e-mail, postal letter, and phone) and invited to fill out the questionnaire on-line. Between December 2009 and May 2010, we received 441 responses (10% of all firms contacted).

3.3 Econometric Model

As dependent variables, we considered firm awareness (0: not aware and 1: aware) and use (0: not use; 1: use) of public incentives. Given the relationship between the dependent variable "awareness" with "use", it was applied an Heckman Selection Model (HSM hereafter). This is a two-stage procedure that corrects for sample selection bias in regression analysis (Heckman, 1979). This model predicts all parameters in two stages, i.e., with two equations: selection and outcome. The selection equation estimates the likelihood of each independent variable affect awareness, while the output equation tests 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 relationship:

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

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

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

where U_i represents the use of one HCM by firm i; A_i represents the awareness of one HCM by firm i; $u_1 \sim N(0;\sigma)$; $u_2 \sim N(0;1)$ and; $corr(u_1;u_2) = \rho$.

The log likelihood for observation j, $lnL_j = l_j$, is

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

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. Rather, $ln\ \sigma$ and $atanh\ \rho$ are directly estimated:

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

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

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

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

$$Pr(U_j observed | A_j) = \Phi(.)(A_j\gamma). \tag{3.6}$$

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:

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

where ϕ is the normal density. We also define

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

Following the 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,

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

The two-step estimate of ρ is then:

$$\hat{\rho} = \frac{\beta_m}{\hat{\sigma}}. \tag{3.10}$$

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 variance–covariance estimate (VCE) is

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

where

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

Here, 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 VCE from the probit estimation of the selection equation. Then, the empirical analysis follows a process as used by Plumper, Schneider & Troeger (2005). The first step estimates the firms awareness of public support for internationalisation; the estimated probability of awareness is used in the second step as a regressor to tests the likelihood of using public support for internationalisation. Then, 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 unawareness has an influence on the likelihood of using the HCM in the second stage. Since the dependent

variables in the first and second steps are binary, a standard Heckman model would be inconsistent and biased. To solve this situation, a modified HSM can be employed. As in the original approach, it consists of two steps. While the original HSM uses a probit estimator in the selection equation and an ordinary least squares estimator in the second step, the modified HSM runs a probit estimator in both steps. In the first step, all firms are analysed; in the second step, the model only considers the firms aware of public support. Then, the outcome equation explains the use of one HCM and the selection equation the firms' awareness of the same measure. The model was run for each of the 11 HCMs. For each one, it were considered two binary dependent variables: awareness (0: aware and 1: not aware) and use (0: not use; 1: use).

3.4 Variables and Measurement

3.4.1 Dependent Variable

Table 2 depicts the descriptive results regarding the levels of use and awareness for each of 11 HCMs identified. It shows that a high percentage of firms are aware of the measures, which contrasts with the low percentage of firms reporting having used them. Companies are more aware about the existence of tax incentives and information services. By contrast, few firms reported to know about protocols between governmental agencies and banks and about public support for acquiring, or for developing brands, marketing or sales. As regards use, public support through informational services, venture capital, and tax incentives are the measures that firms reported to have used more. The measures used less by companies are other public financial support, protocols between governmental agencies and banks, investment, credit insurance, and mutual funds.

Table 2: Use and Awareness of Internationalisation Support Measures

Internationalisation Support Measure	Use %	Awareness %
Public support for trade fairs and state missions	32.2	85.2
Public support through training and consulting services	34.2	84.1
Public support through informational services	61.2	87.9
Public support for the exchange of human resources	21.7	72.5
Public support through international investment agreements	37.4	81.6
Public support through investment and credit insurance or mutual funds	14.0	80.0
Public support through venture capital	42.4	85.0
Public support through fiscal benefits	43.5	90.2
Public support through other public financial incentives	14.0	54.6
Public support through protocols of governmental agencies and banks	12.4	56.0
Public support for acquiring or developing brands, marketing or sales	17.4	59.8

Source: authors

3.4.2 Independent Variables

The independent variables included in the model were grouped into firm capabilities and specificities of the internationalisation process. The firm capabilities considered are export and FDI experience, size, age, human capital and financial capacity. The number of export markets and FDI locations aims at capture the specificities of the internationalisation process. The model also considered innovative intensity, family and foreign ownership, and location as control variables for the selection equation. The same variables, excluding the innovation intensity by requirement of the model, were included in the outcome equation (see Table 3 for details about the variables measurement).[7]

Table 4 depicts the descriptive statistics of the sample. A typical firm has on average 12 years of export experience, 2 years of FDI experience, 528 employees, 23% of which have bachelor's degrees, and 24 years of existence. The ratio of indebtedness defined as liabilities to assets is on average 43%. The number of export destinations is about 10, and the number

[7]Specifications with industry dummy variables were also tested as control variables. There was high collinearity of these variables with human capital, and they were not statistically significant. Moreover, in some cases they significantly reduced our sample because of missing data. Since this paper is about the use of public support in general and does not aim to capture industry-level specificities, these specifications were not reported.

Table 3: Independent Variables (Measurement and Computation)

Variable	Description	Computation
Export experience	Number of years as exporter (difference between 2009 (t) and the year of first export (t_e))	$EXPX = t - t_e$
FDI experience	Number of years as foreign direct investor (Dunning & Lundan (2008)'s criterion) (difference between 2009 (t) and the year the firm established its first foreign subsidiary (t_s)	$FDIX = t - t_s$
Size	Natural logarithm of the number of employees in each firm (2009)	N.A.
Age	Years (difference between 2009 (t) and the year of establishment (t_f)	$AGE = t - t_f$
Human capital	The weight ratio of the number of employees with bachelor degree (BA) to total employees (SIZE) in 2009 (t)	$HRQ = \frac{BA_t}{SIZE_t}$
Indebtedness	The weight ratio of liabilities to assets in 2009	$FCS = \frac{LIABILITIES_t}{ASSETS_t}$
Export diversification	Number of export markets in 2009	N.A.
FDI diversification	Number of FDI locations in 2009	N.A.
Innovative intensity	The weight ratio of research and development (R&D) expenditures (RDE) to the total sales (S) in 2009	$RDI = \frac{RDE_t}{S_t}$
Family ownership	It is a binary variable (0 if not family-owned and 1 if family-owned)	N.A.
Foreign ownership	It is a binary variable (0 if not foreign-owned and 1 if foreign-owned)	N.A.
Peripheral location	It is a binary variable (0 if located in a central region and 1 if located in a peripheral region)	N.A.

Source: authors

of FDI destinations is 1. Regarding the control variables, the innovative intensity defined as research and development expenditures to the total sales is about 4%, 28% of the firms are family-owned, 10% are foreign-owned, and 76% of the firms are located in peripheral regions. According with White (1980), the correlation between the independent variables is acceptable (see Table 5 for details).

Table 4: Summary Statistics

Variables	Number	Variables	%
Years of export experience	12	Human capital	23.1
Years of FDI experience	2	Innovative intensity	4.3
Size (number of employees)	528	Family ownership	27.7
Age (number of years)	24	Foreign Ownership	9.8
Number of export markets	10	Indebteness	43.1
Number of FDI locations	1	Peripheral	76.1

Source: authors

Table 5: Cross-correlation Matrix

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
(1) Export experience	1.00											
(2) FDI experience	0.01	1.00										
(3) Size	0.24	0.60	1.00									
(4) Age	0.08	0.42	0.28	1.00								
(5) Human capital	0.20	-0.01	-0.05	-0.14	1.00							
(6) Indebtedness	0.00	-0.08	-0.07	-0.09	-0.05	1.00						
(7) Export markets	-0.05	0.15	0.06	0.17	-0.05	0.01	1.00					
(8) FDI markets	0.03	0.71	0.43	0.31	-0.06	0.01	0.23	1.00				
(9) Innovative intensity	0.12	0.02	0.07	-0.02	0.07	0.00	0.00	0.01	1.00			
(10) Family ownership	-0.01	0.02	-0.02	0.05	-0.20	0.02	-0.09	0.00	-0.09	1.00		
(11) Foreign ownership	0.00	-0.09	-0.02	0.12	-0.03	0.08	0.20	-0.10	0.00	-0.29	1.00	
(12) Peripheral location	0.05	-0.11	-0.13	-0.23	0.00	-0.03	0.02	0.14	-0.01	0.12	-0.27	1.00

Source: authors

4 Econometric Findings

Tables 6 and 7 depict the results for non-financial and financial measures, respectively. They show that firms with fewer needs, i.e., those with greater internal capabilities, fewer financial constraints, and involved in less demanding internationalisation processes, despite knowing better the measures of public support for internationalisation, seem to use them to a lower extent. The results seem the corroborate the idea that capabilities are positively related with awareness and negatively with the use of public support (Hypotheses 1 and 3). Detailing for the variables that proxy for capabilities, export experience is positively related to awareness about several measures: public support for participation in trade fairs and state missions, through training and consulting services and informational services. By contrast, there is a negative effect of export experience on the use of most public support measures. These results confirm that experience as an exporter may increase a firm's own-flows of information, which positively impacts on its awareness of public support; however, it increases the accumulated experience and reduces the level of use of public support. The results for FDI experience are not so conclusive. Previous FDI experience exerts a positive effect on the awareness about public support for participation in trade fairs and state missions and a

negative effect on the use of public support for acquiring and developing brands, marketing or sales. Two important proxies for capabilities are firm size and qualification of its human capital. For most measures, we found a positive effect of size upon awareness of public support and negative effects on their use. Otherwise, greater qualification of human capital seems to have a significant impact on the awareness of several types of public support and a positive effect on the use of public support for exchanging human resources.

With regards to Hypotheses 2 and 4, that more demanding processes of internationalisation or a lack of financial capacity would be positively related with the awareness and the use of public support, the results also somewhat corroborate them. Financial constraints lead firms to use international agreements to protect their investments. However, the effect of indebtedness on the use of fiscal benefits is negative. In line with the ideas of Feldstein (1999), this result may indicate that more indebted firms can develop strategies to reduce their tax bill and less indebted firms tend to use this strategy less than more indebted firms. Regarding the demanding characteristics of the international environment, they are proxied by a large number of export markets and FDI markets. This seems to have a positive effect on the awareness and use of public support. This results seems to corroborate the idea that firms when exposed to more demanding conditions have a greater need of resources and this may stimulate them to search and use more intensively support of external sources.

In terms of the control variables, family-owned firms, which are largely SMEs, and foreign owned firms seem to be less aware and to use less public support in general. Finally, being established in peripheral locations seems to have a positive impact on the use of public support. This may result from the lack of economies of agglomeration and because these firms based on peripheral regions are often targeted for support (Audretsch & Dohse, 2007).[8]

[8] Along the in Appendices A to K, we present further details about the econometric validation of each model included by column in Tables 6 and 7.

5 Discussion

To the extent that the programs aim at tackling market failures, as defined in the laws and decree-laws that support the inclusion of the different types of measures, they seem to be reaching the right targets, i.e., firms lacking capabilities and those involved in more demanding and riskier strategies. However, we also identified some factors that create, right at the outset, barriers to participation. The costs of information gathering and screening, and a lack of experience in the international scenario, along with fewer capabilities reduce awareness which may withdraw firms from the process of participating. This fact may generate negative effects on the efficiency of public programs and possible misalignments between the policy goals and the allocation outcomes. Additionally, the results suggest that firms apply for public support as a function of their needs and expected benefits. Firms self-select to use public support, depending on their financial constraints, lack of capabilities and other difficulties related with the internationalisation process.

These findings have interesting policy implications. First, identifying the main determinants of awareness may help to design communication strategies that enhance the participation rate among the target groups. The policy designers should consider the costs of information gathering and screening, and the lack of experience in the international scenario as determinants of participation. In the light of what we know now, we strongly suggest that the next step is to understand how firms evaluate the public support measures, also in light of their capabilities and specificities of the internationalisation process. The evaluation of these measures should be at the top of the agenda of politicians, decision makers, and scholars. Politicians and public servants administering internationalisation programs should seek continuous improvements and there is of course a need to ensure adaptation to changing conditions. Evaluation is a key tool for learning about how well policies and programs are delivering, what problems may be emerging, what elements work well or less well, and what could be done better in the future. For example, policy makers may seek to target policies to different groups, e.g., directing more resources towards enterprises established by the socially

Table 6: Estimation Results of Non-Financial Measures

Variable	HCM1	HCM2	HCM3	HCM4	HCM5
			Outcome equation (Use)		
Export experience	-0.009***	-0.006***	-0.010***	-0.005***	-0.004**
	(0.003)	(0.002)	(0.002)	(0.002)	(0.002)
FDI experience	0.007	0.005	0.000	0.001	-0.004
	(0.006)	(0.005)	(0.004)	(0.005)	(0.005)
Size	-0.000***	-0.000***	-0.000***	-0.000***	-0.000***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Age	-0.002	-0.002	-0.001	-0.002	0.002
	(0.002)	(0.002)	(0.001)	(0.002)	(0.002)
Human capital	0.142	0.016	0.079	0.269***	0.009
	(0.101)	(0.090)	(0.079)	(0.102)	(0.095)
Indebtedness	0.212	-0.003	0.001	0.032	0.285***
	(0.145)	(0.129)	(0.113)	(0.137)	(0.134)
Export diversification	-0.002	-0.001	-0.001	0.000	0.002
	(0.002)	(0.001)	(0.001)	(0.001)	(0.001)
FDI diversification	0.001	0.015	0.035***	0.033*	-0.009
	(0.020)	(0.017)	(0.014)	(0.018)	(0.017)
Family ownership	0.007	-0.043	-0.065	0.009	-0.090
	(0.072)	(0.062)	(0.056)	(0.066)	(0.071)
Foreign ownership	-0.164***	-0.275***	-0.123**	-0.137*	-0.039
	(0.077)	(0.067)	(0.066)	(0.081)	(0.072)
Peripheral location	-0.068	0.080	0.033	0.151**	0.128*
	(0.166)	(0.064)	(0.057)	(0.071)	(0.068)
Intercept	0.689***	0.452***	0.800***	0.071	0.283**
	(0.125)	(0.127)	(0.097)	(0.148)	(0.130)
			Selection equation (Awareness)		
Export experience	0.021***	-0.003	0.018**	-0.004	0.008
	(0.007)	(0.005)	(0.008)	(0.005)	(0.006)
FDI experience	0.137*	0.042	5.098	0.039	0.026
	(0.082)	(0.047)	(0.000)	(0.034)	(0.045)
Size	0.000	0.000***	0.003***	0.000***	0.002***
	(0.000)	(0.000)	(0.001)	(0.000)	(0.001)
Age	0.006	0.003	0.000	-0.002	0.000
	(0.005)	(0.005)	(0.006)	(0.004)	(0.001)
Human capital	0.022	0.448*	0.210	0.686***	0.701**
	(0.264)	(0.266)	(0.296)	(0.247)	(0.277)
Indebtedness	-0.342	-0.488	-0.398	-0.411	-0.177
	(0.402)	(0.393)	(0.443)	()0.350	(0.389)
Export diversification	-0.001	-0.014	-0.006	0.005	0.001
	(0.004)	(0.005)	(0.006)	(0.005)	(0.005)
FDI diversification	0.141	0.078	0.025	0.133	1.105
	(0.118)	(0.098)	(0.129)	(0.088)	(0.113)
Family ownership	-0.183	0.256	-0.220	0.195	-0.233
	(0.193)	(0.190)	(0.217)	(0.170)	(0.180)
Foreign ownership	0.009	-0.081	-0.520**	-0.258	-0.297
	(0.209)	(0.209)	(0.259)	(0.181)	(0.222)
Peripheral location	0.303	0.194	0.221	0.267	0.182
	(0.191)	(0.196)	(0.225)	(0.173)	(0.199)
Intercept	0.511	0.566*	0.713**	0.194	0.334
	(0.315)	(0.309)	(0.364)	(0.276)	(0.321)
			The inverse Mills ratio		
Estimated selection coefficient (λ)	-0.564	0.213	0.158	0.281	-0.141
	(0.171)	(0.213)	(0.147)	(0.188)	(0.175)
Correlation coefficient (ρ)	-1.000	0.453	0.369	0.591	-0.287
Adjusted standard error (σ)	0.564	0.471	0.429	0.476	0.490
Average Mills ratio (τ)	0.354	0.472	0.222	0.659	0.291
Average truncation effect (ζ)	- 0.200	0.101	0.035	0.185	-0.041
N	419	419	419	419	419
$\chi^2_{(11)}$	37.79	46.15	65.16	24.28	16.9

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

Source: authors

Table 7: Estimation Results of Financial Measures

Variable	HCM6	HCM7	HCM8	HCM9	HCM10	HCM11
			Outcome equation (Use)			
Export experience	-0.001	-0.007***	-0.007***	-0.007***	-0.004	-0.003
	(0.003)	(0.002)	(0.001)	(0.003)	(0.003)	(0.002)
FDI experience	-0.004	-0.004	0.004	0.007	0.007	-0.009*
	(0.006)	(0.005)	(0.005)	(0.006)	(0.007)	(0.006)
Size	0.000	0.000	0.000**	0.000	0.000*	0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Age	0.000	0.002	0.000	0.000	0.002	0.002
	(0.002)	(0.001)	(0.001)	(0.000)	(0.002)	(0.002)
Human capital	-0.106	-0.087	-0.077	-0.145	-0.099	-0.074
	(0.118)	(0.114)	(0.090)	(0.125)	(0.129)	(0.101)
Indebtedness	0.086	0.300	-0.195**	0.256	-0.022	0.103
	(0.153)	(0.137)	(0.132)	(0.161)	(0.195)	(0.139)
Export diversification	0.000	-0.001	0.000	0.001	-0.002	0.000
	(0.002)	(0.002)	(0.001)	(0.002)	(0.002)	(0.002)
FDI diversification	0.014	0.003	0.054***	0.008	-0.010	0.014
	(0.022)	(0.016)	(0.017)	(0.027)	(0.028)	(0.090)
Family ownership	-0.256**	-0.030	0.013	-0.266***	0.106	-0.092
	(0.140)	(0.110)	(0.070)	(0.104)	(0.110)	(0.084)
Foreign ownership	-0.219**	0.108	-0.085	-0.180	0.140	-0.116
	(0.130)	(0.067)	(0.071)	(0.112)	(0.096)	(0.124)
Peripheral location	0.045	0.127**	-0.004	0.124	0.005	0.010
	(0.073)	(0.064)	(0.067)	(0.084)	(0.090)	(0.075)
Intercept	0.040	0.869***	0.594***	-0.068	0.639**	0.285
	(0.261)	(0.207)	(0.108)	(0.438)	(0.666)	(0.210)
			Selection equation (Awareness)			
Export experience	0.007	-0.005	0.011	0.003	-0.002	-0.004
	(0.006)	(0.005)	(0.008)	(0.004)	(0.005)	(0.004)
FDI experience	0.013	0.000	0.000	0.006	-0.023	-0.007
	(0.029)	(0.289)	(0.000)	(0.019)	(0.020)	(0.019)
Size	0.000	0.000	0.003***	0.000	0.000	0.000*
	(0.000)	(0.000)	(0.001)	(0.000)	(0.0000)	(0.000)
Age	0.004	0.000	0.003	-0.001	-0.006	-0.001
	(0.004)	(0.004)	(0.006)	(0.004)	(0.003)	(0.004)
Human capital	0.311	0.480	0.086	0.184	0.166	0.100
	(0.261)	(0.296)	(0.321)	(0.217)	(0.223)	(0.220)
Indebtedness	-0.215	0.160	0.846*	0.184	0.367	-0.099
	(0.365)	(0.400)	(0.492)	(0.217)	(0.320)	(0.321)
Export diversification	0.006	0.022**	0.008	0.005	0.005	0.006
	(0.005)	(0.010)	(0.008)	(0.004)	(0.003)	(0.004)
FDI diversification	0.081	0.002	0.067	0.069	0.214***	0.049
	(0.080)	(0.065)	(0.145)	(0.049)	(0.070)	(0.050)
Innovative intensity	0.256	0.473	-1.467	0.979	2.763**	1.515
	(0.947)	(1.027)	(0.993)	(0.797)	(1.112)	(0.930)
Family ownership	-0.443***	-0.401*	-0.608***	-0.179	-0.306**	-0.205
	(0.171)	(0.178)	(0.228)	(0.151)	(0.154)	(0.155)
Foreign ownership	-0.381**	0.008	-0.742**	-0.190	0.149	-0.532***
	(0.190)	(0.231)	(0.290)	(0.168)	(0.172)	(0.173)
Peripheral location	0.030	0.002	0.343	0.053	-0.099	-0.110
	(0.184)	(0.208)	(0.246)	(0.158)	(0.162)	(0.163)
Intercept	0.756**	0.869***	1.141***	0.133	0.032	0.318
	(0.299)	(0.322)	(0.419)	(0.251)	(0.259)	(0.258)
			The inverse Mills ratio			
Estimated selection coefficient (λ)	0.566	-0.092	-0.509	0.451	-0.636	0.027
	(0.640)	(0.553)	(0.186)	(0.554)	(0.290)	(0.320)
Correlation coefficient (ρ)	1.000	-0.193	-0.995	0.847	-1.000	0.059
Adjusted standard error (σ)	0.566	0.482	0.512	0.532	0.636	0.447
Average Mills ratio (τ)	0.690	0.389	0.181	0.882	0.695	
Average truncation effect (ζ)	0.391	-0.036	-0.092	0.398	-0.442	0.639
N	419	419	419	419	419	419
$\chi^2_{(11)}$	12.05	29.16	48.16	30.23	11.22	7.89

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

Source: authors

disadvantaged, or by those likely to employ others, or to those in high technology. They may seek to deliver policies using different organizational forms, to stimulate the take-up of those policies or to deliver them in a more cost effective manner. All these changes of focus can emerge from undertaking appropriate evaluations. Alternatively, existing policies can be delivered more effectively as a result of accumulated evaluation experience.

Since FDI is considered a demanding activity, firms with FDI may have more capabilities, so measures applied to these firms should be differentiated from measures applied to the firms that do not yet have FDI. As firms with different levels of capabilities and involved in projects of internationalisation with different requirements behave differently, we suggest support based on clusters. Moreover, in order to increase the efficiency of measures at least two main sets based on firms' needs and aims should be established. These conversations help not only to obtain information from stakeholders that can lead to a deeper understanding of the mechanisms by which policy impact is achieved and how policy might be adjusted, but also help to engage stakeholders in policy learning processes. This approach can also pick up a wide range of other information of interest to policy makers, going beyond impact to issues such as client satisfaction, policy appropriateness, sustainability, and conflicts with other policies.

6 Conclusion

Search and screening and internal needs act on firm behavior relatively to the awareness and use of support provided by public institutions. There are two crucial insights about how policy makers could increase the efficiency of public policies. First, assuming that firms self-select to use public support, depending on their financial constraints, lack of capabilities and other difficulties related with the internationalisation processes, policy makers, with an eye in potential facilitators, should increase managers ability to identify and overcome potential barriers to participation. Second, considering that public support aiming at promote inter-

nationalisation may create "good deficiencies" but also may give rise to an externalisation of the risk embedded in some activities, policy makers should promote the understanding the counterbalancing forces acting on the participation environment. As part of the future research program, this study links with an emergent stream of literature that considers the transaction economic costs with transactional political costs. From the firm perspective, managers' ability to economize in both economic and political governance could be an important source of advantage over its competitors (Williamson, 1999). Doing so and even at a different level, we open an important line of research that could support future empirical corroborations of the Henisz & Zelner (2004)'s argument defending that managers who can better identify pivotal actors in the policymaking process and deliver to those actors the messages most likely to generate favorable policy outcomes may generate super-normal returns for their firms. The results presented in this study give an example of when simple aggregate relations can be deduced from relations underlying the micro behavior of the individual agents, but they do not justify using the constructed aggregate relations to evaluate fully the welfare costs and benefits of policies. Not achieving this objective yet, we hope humbly have contributed to provide support for future developments that may increase the efficiency of decision and policy making.

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