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The impact of government support programs for the development of businesses in Chile

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Abstract

Purpose – The purpose of this paper is to analyze the impact on businesses in Chile of the Seed Capital Program (SCP) implemented by Chile's Technical Cooperation Services.

Design/methodology/approach – In order to analyze the impact of this SCP, a counter-factual scenario was used that entailed a combination of the propensity score matching with difference in difference methods. A total of 682 businesses were surveyed (378 in the treatment group and the rest in the control group), 164 of which gave complete responses to the surveys, 89 belonging to the treatment group and 75 to the control group.

Findings – The results are mixed. On the one hand, the impact of sales is positive but its statistical significance depends on the model used. With regard to the number of employees, however, the results are positive and statistically significant regardless of the model used. The results also show that participating in the program has no incidence on the probability of later obtaining financing.

Research limitations/implications – This study highlights the importance of differentiating between opportunity-driven entrepreneurship programs and necessity-driven entrepreneurship programs.

Practical implications – It also suggests improvements in public policy to develop entrepreneurship in small businesses in Chile. These suggestions may also be interesting for other countries facing similar challenges in terms of developing private entrepreneurship as a vehicle to generate economic development.

Originality/value – This exploratory work may be interesting to those in charge of designing, implementing and evaluating public programs in support of small- and mid-sized enterprise development.

Keywords Entrepreneurship, Economic development, Small- to medium-sized Enterprises

Paper type Research paper

1. Introduction

Some key factors that drive economic growth in any economy (Autio, 2007) are the creation of new businesses and the take-off of young small- and mid-sized enterprises (SMEs) that have not yet attained significant competitiveness. In both cases, an important obstacle for implementing and boosting a new business idea is the lack of funding, which limits take-off and conditions the firms to remain a small business over time (Echecopar *et al.*, 2006; De Bettignies and Brander, 2007; Fairchild, 2011; Venckuviene and Snieska, 2014).

In order to overcome these difficulties, several countries have developed government programs to support young SMEs. Public programs range from fostering export capacity to supporting innovation in high-impact small businesses, tax transparency and provisions programs, capital markets and bankruptcy laws, to subsidies to microenterprise, known as seed capital programs (SCPs) (Cumming, 2007; López-Acevedo and Tan, 2010; Reid and Nightingale, 2011; Sternberg, 2014).



This study analyses the impact that the SCP implemented by Chile's Technical Cooperation Services (Servicio de Cooperación Técnica, SERCOTEC) has had in Chile. This program offers a non-reimbursable cash subsidy that is intended to support the take-off of young SMEs that have a growth potential. The SCP has been declared to be a government program supporting the development of opportunity-driven entrepreneurship, meaning entrepreneurship that stems from a desire for independence, from wanting to increase income or from the existence of a business opportunity not previously envisaged (Blanchflower and Oswald, 1998). In other words, this SCP is not designed to support necessity-driven entrepreneurship, defined as entrepreneurship stemming from unemployment (Graham, 2005).

A counter-factual scenario was found between the two groups of companies for the purpose of analyzing the program. One was the treatment group that participated in the SCP and the other one was the control group that did not (Storey, 2000). A method was used in this study that combined propensity score matching (PSM) and difference in difference (DID). The data was gathered by a survey of beneficiaries. In all, 89 companies were a part of the treatment group and 75 a part of the control group. Three measurements commonly found in literature were used to evaluate the impact of the SCP: sales performance, changes in the number of workers hired and the impact on the probability of obtaining financing after the program (Storey, 2000; Marti *et al.*, 2008; Global Insight, 2009).

The results of the evaluation are mixed. First, it shows a positive impact on the sales of beneficiary firms, but the statistical significance depends on the model used. Second, when the number of employees is considered, the program reveals a positive and statistically significant impact, regardless of the specification used. Finally, the results suggest that receiving a subsidy is not a determinant for obtaining subsequent financing.

In view of the results and the features of the companies treated, key aspects of interest could be identified for people designing this type of program. The companies that participated in the SCP (treated and control) are the smallest in the production chain in Chile. Their notable features are low levels of sales and a small number of employees hired before the treatment. Although the SCP has a positive impact on sales and employees, the increases in these variables do not convert them into high-impact or rapid-growth businesses. SERCOTEC's SCP does not seem to be meeting its goal of boosting Chile's economic growth.

We believe that the results of this exploratory work may be interesting to those in charge of designing, implementing and evaluating public programs in support of SME development. Seed capital policies can generate an adverse selection problem (Akerlof, 1970) if they are poorly designed, since they can attract necessity-driven entrepreneurs rather than opportunity-driven entrepreneurs, which is the typical problem of developing countries when they promote entrepreneurship (Bosma *et al.*, 2008; Larroulet and Couyoumdjian, 2009). This is particularly important in countries where it is possible to find a lack of capabilities of Government officials to assess and manage investment opportunities and their potential to "crowd out" private sector investors (Nightingale *et al.*, 2009).

This paper progresses as follows: Section 2 presents a discussion about public support objectives and the scheme studied. Section 3 provides a brief description of theoretical start points, workable indicators and hypotheses. Section 4 presents the data and methodology used. Section 5 analyzes the results. Section 6 gives the political implications of the results. Finally, Section 7 states the conclusions and makes some suggestions for changes in public policy.

2. Entrepreneurs, public support and the scheme studied

According to Schumpeter (1934), an entrepreneur is someone who creates an imbalance in which he can recognize and capitalize on business opportunities before any other agent. Although there is no universally accepted definition of the meaning of entrepreneurship, it is commonly said that it entails creating something new (Reynolds *et al.*, 2005). In the business world, this means creating a new economic activity that leverages financial income, which not only has a positive impact on the entrepreneur himself, but also on his community. The Schumpeterian theory of entrepreneurship is clearly a long-term view where enterprises enter and leave the marketplace through creative destruction. However, this theory is not as useful in the short term because there are often microeconomic difficulties such as information asymmetries which result in credit rationing to entrepreneurs (Stiglitz and Weiss, 1981), external effects not initially considered, or even problems of economic policy – such as rent-seeking by bureaucrats, a theory initially developed by Tullock (1965) and Buchanan *et al.* (1980) – that hinder the development of enterprises with attractive projects.

For many, an important obstacle for implementing a new business idea is the lack of funding for the venture (Echecopar *et al.*, 2006; Reid and Nightingale, 2011). There is an ample literature studying the main difficulties faced by SMEs in obtaining the necessary funding to grow and expand adequately (Penrose, 1959; Lundström and Stevenson, 2005; Norrman and Bager-Sjögren, 2010; Smolarski and Kut, 2011; Murray *et al.*, 2012; Venckuviene and Snieska, 2014). First of all, banks generally do not like to assume high risks. New companies have no history or are not backed by significant assets, so they do not qualify for bank loans (Casamatta, 2003). Second, there is a problem in the market for the young business segment, consisting of the asymmetrical information on the true benefits and risks of their projects. If a bank wanted to grant a loan to a young SME, the information asymmetry would result in high interest rates and in credit rationing that will hinder its take-off (De Bettignies and Brander, 2007). Third, certain venture capitalists are not, in practice, a true funding alternative for young SMEs even though they might seem to be. Venture capitalists are very selective and tend to choose businesses they consider to be winners or to find companies that already have a certain maturity and have demonstrated a certain success (Wennekers and Thurik, 1999). New companies gain access to funding, especially for projects that are uncertain or volatile in terms of the expected return, through sources other than the traditional financial system (Dimov and Murria, 2007; Colombo *et al.*, 2014; Cumming *et al.*, 2014), and this is where public resources play a key role in supporting productive development.

Table I contains a list of some public funding instruments to support, directly or indirectly, the creation of new businesses and the take-off of SMEs.

The approach of governments to support new venture varies across countries and had evolved over time from loan guarantee schemes, through the development of bankruptcy laws and intellectual property protection systems, to the design of public SCPs (Murray *et al.*, 2012).

The economic justification for government intervention focussed on entrepreneurial development is based, on one hand, on the idea of mitigating existing information asymmetries and associated market failures, and on the other hand, enhancing the spillover effects from the positive economic externalities that result from the entrepreneurial take-off of program participants (Von Bargen *et al.*, 2003; Del-Palacio and Zhang, 2012). According to Acs and Amorós (2008), entrepreneurship is an important mechanism in economic development through its effects on employment, innovation and general welfare. That is why institutions that support productive development should

Table I.
Public funding
instruments

Name of the instrument	Characteristics
Tax transparency	Efficient tax structure for investments in private equity and venture capital, prevention of double taxation
Tax provisions	Capital gains tax rate
Intellectual property protection	Processing patents in a timely and efficient manner and having an effective enforcement system for patent protection
Capital markets	The existence of appropriate exit mechanisms
Bankruptcy laws	Effective liquidating strategies
Stock options	Securities rules governing the issuance of stock options and fiscal rules determining their taxation
Information flow and education	Dissemination of information by putting those seeking financing in touch with possible investors
Seed capital programs	Non-refundable loans with technical and administrative support
Direct supply of capital	Government equity investment or low-interest, long-term loans
Financial incentives	Tax credits to those investing in SMEs or Venture Capital (VC) funds and loan guarantees, to guarantee a proportion of bank loans to qualified SMEs
Investor regulations	Permission of institutions such as pension funds or insurance companies to invest in VC

Source: Based on Reid and Nightingale (2011)

leverage and support the factors that stimulate entrepreneurship, especially opportunity-driven entrepreneurship rather than necessity-driven entrepreneurship, as only the former have a positive impact on economic growth (Bosma and Levie, 2009).

It is important to keep in mind that entrepreneurs vary in terms of their intrinsic motivations. On one hand, opportunity-driven entrepreneurship arises from a desire for independence and increased income, and from a previously unforeseen entrepreneurial opportunity. This type of entrepreneurship, which is related to the Schumpeterian vision, adds value to the economy and is the engine of any capitalist economy. Necessity-driven entrepreneurship, however, arises from joblessness as a means to earn income (Blanchflower and Oswald, 1998; Graham, 2005). In this latter case, necessity-driven entrepreneurs create a business as a way to survive and support their families, which has little or no impact on the economy in which they do business. There is generally a high rate of opportunity-driven entrepreneurship in developed economies, with attendant positive effects on growth. Necessity-driven entrepreneurship is more common in less developed economies and has weaker effects on economic growth (Autio, 2007; Bosma *et al.*, 2008; Larroulet and Couyoumdjian, 2009; Amorós *et al.*, 2012).

However, even knowing how important it is to establish public intervention programs to support opportunity-driven entrepreneurship, it is no simple to evaluate the effect that these programs have on the beneficiaries, as there are inherent difficulties in measuring their direct results and even greater difficulties in measuring their externalities. It is a fundamental principle of evaluation that its prerequisite is the specification of the objectives of policy. The objectives chosen must be accompanied by measurable targets, with a timetable for their attainment (Storey, 2000).

2.1 The SERCOTEC SCP

This study is based upon a financial subsidy for enterprises, called SERCOTEC's SCP. It works as a competitive fund that aims to strengthen different areas of management, as well as entry into new markets and the consolidation of current markets that offer business opportunities to smaller businesses. This program provides financing and

obliges entrepreneurs of smaller firms to receive a certain level of training in order to gain access to funds. The program therefore offers more than just financial assistance and should not be classified solely as a financial aid program (Collewaert *et al.*, 2010). The current literature shows that programs that focus only on providing financing do not always have significant results, especially when variables measuring final results such as sales, wages and increases in productivity are taken into consideration (López-Acevedo and Tan, 2010). Fortunately, SERCOTEC's SCP amounts essentially to a combination of training and technical assistance programs, with a strong component of what in the literature is called "smart money" (Cancino and La Paz, 2010), that is support from persons trained in small business enterprise strategy, in addition to financial aid. This program began on a very small basis in 2005 and has invested annual resources worth a total of 6.639 billion pesos, approximately equivalent to USD 14 million.

The SCP is accessible through Chile's Internal Taxation Service (SII), to formally established, category-one micro and small enterprises with a valid municipal license and other relevant permits (such as environmental approval from SESMA; from the Agriculture and Livestock Service, etc.). Applicants need to have reported the commencement of their operations to SII at least 12 months before applying, and must have net annual sales equal to or less than 10,000 UF (*unidades de fomento*/indexed "development units,") approximately equivalent to USD 440,000. A company's application and its municipal license must be consistent with the nature of the project for which it is applying.

The SCP subsidy is a financial grant of approximately USD 6,000. The financial subsidy may be used for: acquisition of machines, tools and equipment; establishing infrastructure; technical consultations up to 20 percent of the total cost of the project; development of prototypes and products; working capital for an operational cycle up to four months long (including staff wages); development of a marketing plan (dissemination activities, promotion and building customer loyalty); and project-related rentals (of raw materials, machinery, vehicles, facilities, etc.).

The training and technical assistance of the SCP is carried out by a team of consultants, who contact all SCP winners. This team orients the entrepreneurs with regard to the implementation of their business plan and carries out an on-site SWOT (strengths, weaknesses, opportunities and threats) analysis of each company, reviewing its plan and providing guidelines, for example, for implementing its acquisitions plan. All of this is accompanied by ongoing consulting (by phone, e-mail or in person). At the same time, the consulting team establishes a training plan for each entrepreneur, which includes: courses on importing and exporting; internet marketing; preparation of web sites; guidance in the preparation of the business plan, accounting courses; and advice on accounting software and labor law.

The stages described above define the delivery of "smart capital," in which not only are financial resources allocated to companies who win the SCP competition, but knowledge, experience and best practices for the development of each business are also delivered.

3. Policy evaluation, workable indicators and hypotheses

Studies measuring impacts can be divided into two large groups (Storey, 2000). The first group is called "monitoring studies," where the progress in each plan is monitored on an exploratory basis, for example, merely by perception surveys among participants about what they value in the program. The second group is called "evaluation studies," where the intent is to demonstrate, with analytical rigor, the true impact of a public program offering support to production. Evaluation studies seek, by some means, to contrast these with non-recipients, in order to present a

“counter-factual.” The difference between actual changes and the “counter-factual” is viewed as the impact of the policy – or its “additionality” (Storey, 2000).

Different studies for developed countries using statistical techniques with the utmost analytical rigor have yielded mixed results on the impacts of their programs. Cumming (2007) analyses 280 Australian venture capital (VC) and private equity funds and their investments in 845 entrepreneurial firms over the period 1982-2005. He focusses the analysis on the Innovation Investment Fund (IIF) governmental program. The IIF program is unique with a focus on partnering between government-private sector partnerships. The data analyzed show that the IIF program has facilitated investment in start-up, early stage and high-tech firms as well as the provision of monitoring and value-added advice to investees. Also, Collewaert *et al.* (2010), in a study for Belgium, evaluated whether government intervention through a program of subsidization of business angel networks (BANs) enhances regional economic growth in Flanders. The results show that, first, BANs reduce the information and financing problems for entrepreneurial companies face. Second, that there are positive indicators of future potential in the ability to raise follow-on financing. Norrman and Bager-Sjögren (2010) also studied the SME support program of the Swedish Innovation Centre (SIC) that provided support to “innovators in their absolute earliest phases of development with financial capital, advice and networks” in the years between 1994 and 2003. They studied 510 companies subsidized by the program and 93 businesses that were not, although they applied to the program, which were used as the control group. The results indicate that the impact of the support to early stages ventures given by the public program SIC is weak or non-existent. Luukkonen *et al.* (2013) focus on the performance of government venture capital (GVC) funds and compare the importance for the firm’s development of post-investment, value-added activities by GVC firms and independent venture capital (IVC) firms. Using a composite indicator of the value added, they find that the contributions of IVC funds prove to be significantly higher than those of GVC funds. Also, Munari and Toschi (2014) analyses how the impact of publicly backed VC funds varies across regions in UK. Building on agency and human capital theories, the authors distinguish public VC funds into regional and governmental types, to assess potential differences in the performance of their portfolio companies. They confirm that regional characteristics matter for rigorous assessments of the effectiveness of public VC programs.

Several Latin American countries have begun to evaluate more systematically their programs for SME development. In particular, Alvarez and Crespi (2000) analyzed the impact Chile’s export promotion program ProChile in the 1990s, using a database of 365 enterprises. They found a positive effect on the technological innovation of exported products. However, the program did not seem to have significant results in increasing the number of types of export products. On the other hand, Tan and López-Acevedo (2005) analyzed the impact of the Centre for International Mobility program run by the Mexican Ministry of Labor, which focusses on worker training in SMEs. The authors observed a positive impact in the intermediate results for the first cohort (1991-1993), compared to the control group, in terms of investment allocated to training and the adoption of quality control processes in enterprises that received the treatment. However, the results were mixed for the second cohort (1993-1995). Also, Chudnovsky *et al.* (2006) analyzed a sample of 414 Argentine companies and studied the impact of the Argentine Technological Fund Program (FONTAR). This fund uses different instruments to finance innovation projects and is implemented through public tenders. The results indicate a positive impact on the intensity of innovation, but no impact on the sale of innovative products or on worker productivity.

All the studies discussed above recognize the need for evaluations of the impact of government entrepreneurial development programs using statistical techniques of the utmost analytical rigor, and this is the context of this study.

The following variables or measurements of interest are among those that are commonly used in literature measuring the impact of public SCPs: revenues, number of employees and capital raised post-funding (Gardner Pinfold, 2004; IVCA, 2012; Martí *et al.*, 2008; Global Insight, 2009; Croce *et al.*, 2013). These variables will be analyzed in this paper.

3.1 Revenues

A common variable in studying the growth of an enterprise is to analyze its behavior and entrepreneurial dynamic (Almus, 2004). Although the typical growth indicators are profitability and volume of sales, it is recommended that only sales growth be used for particularly young companies as it will be a more objective measure than profitability (Mainprize and Hindle, 2007; Norrman and Bager-Sjögren, 2010). For instance, Cumming *et al.* (2014) examine the impact of government vs private IVC backing on the exit performance of entrepreneurial firms. Also, Grilli and Murtinu (2014) assess the impact of government-managed (GVC) and IVC funds on the sales growth of European high-tech entrepreneurial firms. They show that the main statistically robust and economically relevant positive effect is exerted by IVC investors on firm sales growth. Conversely, the impact of GVC alone appears to be negligible. It would be interesting to identify if the SCP of SERCOTEC has a positive impact on sale growth of the firm:

H1. Supported SMEs show larger average sales than non-supported SMEs.

3.2 Number of employees

According to Storey (2000), the majority of the developed economies utilize public resources to provide subsidized assistance to SMEs to encourage investment in human capital. Venckuviene and Snieska (2014) show that the establishment of government sponsored instruments are justified because public funds are focussed on job creation. Also, Kosky and Pajarinen (2013) focus on the role of business subsidies in job creation. They suggest that the impact of business subsidies on employment growth differs more between high-growth start-ups and other firms than between start-ups and public programs' beneficiaries. On average, all subsidies relate positively to the contemporary employment growth for both start-ups and beneficiaries. Hiring new employees, particularly employees with special skills and know-how, would help boost the growth and expansion of a young SME (Almus, 2004). But that is not the only reason why it is interesting to look at the number of employees hired post-program as an indicator of its success. When an enterprise grows in terms of the numbers of its employees, that could be a good sign that it is producing and selling more goods and services, i.e., it is also an indicator of the firm's take-off and growth:

H2. Supported SMEs generate more employment than non-supported SMEs.

3.3 Capital raised post-financing

Government supply of capital has been a common policy initiative in European countries to overcome funding gaps in the promotion of early stage ventures (Luukkonena *et al.*, 2013). The performance of such government funds is better when private venture capital funds participates financing young firms (Buzzacchi *et al.*, 2013). In this sense, Del-Palacio and Zhang (2012) analyze effectiveness of public intervention for fostering private venture capital market in Spain. As the previous studies, it is common to find in literature that one of the objectives that a public program should

have is to support the take-off of young SMEs so that they grow and develop the potential of becoming businesses attractive to private venture capitalists (IVCA, 2012; Cumming, 2007; Bertoni and Tykvová, 2012). According to Collewaert *et al.* (2010), public programs that boost the growth of new businesses are successful when they allow fresh funding to come not only from new investors but also from the possibility of obtaining loans from banks or other financial institutions, which were not funding alternatives before the treatment:

H3. supported SMEs raise more new capital than non-supported SMEs.

4. Data and methodology

In order to analyze the impact of SERCOTEC's SCP, a counter-factual scenario was used that entailed a combination of the PSM with DID methods. Information was gathered on a group of companies that received the SCP funding (treatment group) and on a group of similar characteristics, or a clone group, that did not (control group).

We chose this method because it is the standard econometric policy evaluation method used in impact evaluations. Alternatively, other quantitative methods may rest in experiments where the control and treatment groups are chosen in advance in order to guarantee a perfect comparability between groups after the treatment. This is not the case of our program of interest since we face a quasi-experimental exercise and therefore, making sure that the data is comparable is a key part of the exercise. Some authors use the Cox proportional hazard rate instead of the probit we use to estimate the PSM function. The reason is that the context they have is somehow different than ours. The Cox hazard rate is the best choice when multiple treatment cohorts are in place, which was not the case of the SCP that we study. Also, qualitative methods are an alternative to evaluate the impact of a SCP. For instance, building some case studies is a way to highlight specific aspects of the program in order to obtain key insights of the experience. However, this kind of analysis is out of the scope of our quantitative exercise.

For the treatment group, data were obtained from surveys conducted of SERCOTEC's SCP beneficiaries in 2007. The beneficiaries' contact information was provided by SERCOTEC and a representative sample of businesses to be surveyed was chosen at random. Phone interviews and, in a few cases, face-to-face interviews were held.

The control group comes from a database (also provided by SERCOTEC) of businesses that met all requirements to apply to the SCP, but which for some administrative reason did not apply. The most common administrative reasons for companies not to comply with the program's requirements were the lack of a required document, or in several cases, failure to meet the application deadlines. These companies are considered clones of the treatment group and serve as the basis to determine the effects of the SCP.

A total of 682 businesses were surveyed (378 in the treatment group and the rest in the control group), 164 of which gave complete responses to the surveys, 89 belonging to the treatment group and 75 to the control group.

Table II provides descriptive statistics of the data collected, divided into groups. In general, both groups are observed to have very similar characteristics, supporting the argument that the control group enables reasonable comparisons with the treatment group. As is shown by the variables sex, education, entrepreneur and previous experience (SEX, EDUC, ENTREP and PREVEX) for both groups, the companies are mostly headed by women with technical training who, in general, have never undertaken projects in the past and who have very similar previous work experience.

Table II.
Descriptive statistics

Variables	Mean	SD	Median	Symmetry	Kurtosis
<i>Treatment group</i>					
<i>Number of observation 89</i>					
SEX	0.449	0.500	0.000	0.203	1.041
EDUC	3.112	0.994	3.000	-0.785	2.449
ENTREP	0.438	0.499	0.000	0.249	1.062
PREVEX	14.326	11.334	12.000	1.077	3.862
SALES 2006	13,942	41,840	800	4.981	30.447
SALES 2008	20,276	49,929	6,000	5.447	37.193
WORKERS 2006	1.180	1.951	0.000	2.089	7.639
WORKERS 2008	2.573	2.884	2.000	1.890	6.829
DIF SALES	6,333	14,654	2,000	4.077	23.800
DIF WORKERS	1.393	2.081	1.000	2.349	9.812
<i>Control group</i>					
<i>Number of observation 75</i>					
SEX	0.413	0.496	0.000	0.352	1.124
EDUC	2.840	0.987	3.000	-0.355	2.062
ENTREP	0.413	0.496	0.000	0.352	1.124
PREVEX	12.747	12.044	10.000	0.862	2.998
SALES 2006	15,463	37,597	3,700	4.441	24.874
SALES 2008	20,842	38,753	6,000	3.622	19.046
WORKERS 2006	2.533	3.947	2.000	2.711	10.979
WORKERS 2008	2.653	3.882	2.000	2.792	11.970
DIF SALES	5,379	15,309	0.000	2.857	12.374
DIF WORKERS	0.120	2.278	0.000	0.308	11.889

It is worth noting that the level of sales is slightly higher for the control group than for the treatment group in both years (2006 and 2008); however, the sales differential is greater for the treatment group, which is consistent with the initial idea of a positive impact of the program for beneficiary enterprises. The same is true in terms of the number of employees. At the same time, asymmetry and kurtosis coefficients for these variables indicate positive asymmetry and leptokurtosis; in other words, lower levels of sales and number of employees for most companies.

To estimate the effect that SERCOTEC's SCP has on beneficiaries, the method used is PSM, which states the probability that a firm will receive treatment based on its characteristics immediately before treatment. This method makes it possible to properly match the control group and treatment group, as a way of finding a common support and reducing the potential bias in sample selection, at least in terms of observable variables (see the Appendix).

$p(X) = p(D = 1|X) = E(D|X)$ represents the conditional probability of receiving the treatment given the vector of characteristics X , where D is a dummy variable that adopts the value 1 if the company receives the treatment and the value 0 otherwise. Rosenbaum and Rubin (1983) showed that if exposure to treatment is random in defined ranges of X , then it is also random in ranges defined by a one-dimensional variable $p(X)$. This model is easy to estimate using a logistic regression as follows:

$$T_i = F(X_i, \beta) = 1/1 + e^{-X_i\beta}$$

where:

$$X_i\beta = \beta_0 + \beta_1SEX_i + \beta_2EDUC_i + \beta_3ENTREP_i + \beta_4PREVEX_i + \beta_5SECALIM_i \\ + \beta_6SECBIEM_i + \beta_7SECEDUC_i + \beta_8SECMANU_i + \beta_9SECMEI_i \\ + \beta_{10}SECMULT_i + \beta_{11}SECSALUD_i + \beta_{12}SECTIC_i + \beta_{13}SECTUR_i$$

Here, i is the firm, where T is a dummy variable that equals 1 if the firm received the subsidy and 0 otherwise; SEX is another dummy variable that adopts the value 1 if the business is led by a male and 0 otherwise; $EDUC$ adopts the value 1 if the business leader has completed primary education, 2 if he has completed secondary education, 3 if he has completed technical education and 4 if he holds a university degree; $ENTREP$ adopts a value 1 if the business leader has undertaken entrepreneurial projects in the past and 0 otherwise; $PREVEX$ is a variable that indicates the number of years of work experience of the business leader. Finally, sector dummies were included to see if the impact of the program had any effect differentiated by production sector. The sector dummies are $SECALIM$ (food sector), $SECBIEM$ (biotechnology sector), $SECEDUC$ (education sector), $SECMANU$ (manufacturing sector), $SECMEI$ (mining and infrastructure sector), $SECMULT$ (multiple sectors), $SECSALUD$ (health care sector), $SECTIC$ (information technology sector) and $SECTUR$ (tourism sector). There were also controls by initial levels of employment and sales. Table III shows PSM results.

With the region of common support well defined – the range here is from 0.201 to 0.841 – the impact of the SERCOTEC SCP on beneficiary companies can be analyzed.

The method used to calculate the Average effect of Treatment on the Treated (ATT) is a version of the DID method, which has to be adjusted to the data available in this case. First, however, an OLS has to be run to see whether receiving the treatment had an effect on the change in sales or on the change in the number of workers, which are the results variables used here. In the case of sales, the impact variable is defined as $\Delta V = V_{2008} - V_{2006}$. This means that if the person was awarded the program in 2007,

Variables	Coefficient	p-Value
SEX	0.07611	0.833
EDUC	0.29374	0.113
ENTREP	0.50727	0.201
PREVEX	0.02078	0.213
SALES 2006	0.00001*	0.065
EMPLOYMENT 2006	-0.31222**	0.005
SECALIM	1.53570	0.359
SECBIEM	-0.01570	0.993
SECEDUC	-0.90710	0.637
SECMANU	1.26091	0.410
SECMULT	0.40950	0.787
SECTIC	1.5791	0.359
Constant	-1.7452	0.297
Number of observations	159	
LR χ^2	24.83	
Pseudo R^2	0.1192	

Note: *,**Significant at 10 and 1 percent levels, respectively

Table III.
Propensity score
matching

sales from 2006 and 2008 are used to evaluate the impact and the differential is calculated. The program was evaluated in terms of sales and number of workers. The general form of the model to be estimated here is:

$$Y_{i(t+1)} - Y_{i(t-1)} = \Delta Y_{it} = \beta X_{it} + \alpha D_{it} + \varepsilon_{it}$$

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where Y_{it} is the impact variable analyzed (sales or number of workers, as the case may be), X_{it} represents a vector with all control variables (SEX, EDUC, ENTREP and PREVEX in the sector and all dummy variables related to the identification of the sector in which the beneficiary does business), D_{it} is the key dummy variable that adopts the value 1 when the company receives the subsidy and a value of 0 otherwise, and ε_{it} represents the unexplained error of regression. The ATT was then estimated using a very simple version of the DIDs method, which estimates whether there is any significant difference in the post- and pre-treatment difference between the treatment and control group.

5. Analysis of results

The effect of receiving treatment on sales and on the number of workers hired is presented below, both in terms of levels and in logarithms (Table IV).

Receiving the subsidy has a positive impact on sales that is statistically significant only in model (b). One of the characteristics revealed by these regressions is the lack of statistically significant control variables to help explain the effect of the treatment on sales, which means that gender, level of education, previous entrepreneurial history and years of working experiences have no statistically significant effect on sales. Last year's sales however, show a negative statistically significant effect in the logarithmic model. This suggests that the larger are the sales before the treatment, the more difficult for the program is to have a positive impact on sales. The table also shows that for the logarithmic model, no sector have any specific effect on sales.

Table V presents the results for impact on the number of workers, using OLS.

Variables	(a) Coefficient	t-calculated	(b) Coefficient	t-calculated
TREATMENT	1,410	0.53	1.86**	3.25
SEX	1,442	0.57	0.12	-0.22
EDUC	939	0.93	0.07	0.33
ENTREP	-3,364	-1.20	0.38	0.73
PREVEX	-110	-1.32	-0.01	-0.67
SALES 2006	0.0604	-0.82	-0.66**	-10.62
SECALIM	-8.179	-1.01	1.58	0.41
SECBIEM	1.077	-0.10	2.56	0.62
SECEDUC	-5.670	-0.64	2.12	0.5
SECMANU	-6.752*	-1.86	1.56	0.4
SECMEI	-3.928	-0.34	3.63	0.91
SECMULT	-6.010	-0.71	1.25	0.32
SECSALUD	-5.150	0.58	2.49	0.63
SECTIC	-10.671**	-3.09	0.92	0.23
SECTUR	(dropped)			
Constant	31.134	2.21	3.17	0.78
Number of observations	159			

Table IV.
Effect on sales in (a)
levels and (b) ln

Note: *,**Significant at 1 and 10 percent levels, respectively

Table V.

Effect on workers in
(a) levels and (b) ln

Variables	(a) Coefficient	<i>t</i> -calculated	(b) Coefficient	<i>t</i> -calculated
TREATMENT	1.226**	3.99	0.354**	3.94
SEX	0.39	1.11	-0.035	-0.39
EDUC	0.00	-0.22	-0.006	-0.15
ENTREP	-0.48	-1.53	-0.082	-0.85
PREVEX	-0.03*	-1.77	-0.003	-0.75
WORKERS 2006	-0.17*	-1.74	-0.323	-5.06
SECALIM	-1.48	-0.71	-0.338	-0.48
SECBIEM	-1.92	-0.93	-0.363	-0.52
SECEDUC	-0.81	0.37	-0.116	-0.15
SECMANU	-1.50	-0.73	-0.381	-0.55
SECMEI	-1.57	0.41	0.231	-0.31
SECMULT	-1.58	-0.78	-1.586	-0.54
SECSALUD	-2.63	1.3	-2.634	-0.54
SECTIC	-2.69	-1.33	-2.698	-0.87
SECTUR	(dropped)			
Constant	0.94	0.83	0.944	1.12
Number of observations	159			

Note: *,**Significant at 10 and 1 percent levels, respectively

In this case, it can be seen, in both models, that receiving the treatment, that is obtaining the subsidy, has a positive and statistically significant impact on the number of workers hired.

This is an interesting result, since previous literature that focus on SMEs with high growth potential shows that the primary effect of a SCP is on sales, and the effect on labor is a second order effect that is not always present. However, the SERCOTEC SCP is different from what is commonly encountered in the entrepreneurial literature, because this program is not focus on high growth potential firms. Instead, it is focussed on SME that look much more like micro businesses, something that will be discussed in the next section of this paper. For now, we can say that is not likely that the firms of this program use the seed resources in programs to export to new markets or in new technology in order to increases productivity. These micro businesses are more likely to use the resources in more basic things like hiring the help that the entrepreneur needs in order to improve the day-to-day management of the firm.

Table VI reports the ATT using the nearest neighbor matching method.

As can be seen, the results of the ATT are consistent with the statements in the preceding paragraph. There is no significant impact on the sales variable, but there is a positive and significant impact on the number of workers.

Finally, we want to see here whether receiving treatment, that is receiving the subsidy, had an impact on the likelihood of obtaining financing later. We define success as receiving subsequent financing (e.g. in the form of a bank loan, contribution from family and friends, or another government subsidy), this is an indicator that the business has the potential to continue and eventually expand. The following model was designed for this purpose (the results are shown in Table VII):

$$\begin{aligned}
 EX_i = & \alpha_0 + \beta_0 TRAT_i + \beta_1 SEX_i + \beta_2 EDUC_i + \beta_3 ENTREP_i + \beta_4 PREVEX_i \\
 & + \beta_5 SECALIM_i + \beta_6 SECBIEM_i + \beta_7 SECEDUC_i + \beta_8 SECMANU_i \\
 & + \beta_9 SECMEI_i + \beta_{10} SECMULT_i + \beta_{12} SECTIC_i + \varepsilon_i
 \end{aligned}$$

It can be seen that receiving the treatment is not a statistically relevant factor for receiving subsequent financing. This result is consistent with the previous finding since we have argued that the firms in this SCP self-select, and they mostly correspond to micro business that are small and probably in early stage of development and therefore, they are still far from arriving to the point where raising more capital is a requirement.

6. Political implications of the results

We have studied the behavior and initial results of SMEs that have benefited from SERCOTEC's SCP in an attempt to determine whether this program has a true impact on the beneficiary firms. The results of this analysis are mixed.

When we examined whether or not there was an impact on the sales variable, we found that the statistical significance of the associated parameter depended on the model used. If we used only the logarithm model, the results showed that receiving the subsidy has a statistically significant positive impact. And if both models – levels and logarithms – were used, we found positive and statistically significant results in terms of the number of employees at the firms that received treatment. These statistical results indicate that SERCOTEC's SCP has a positive impact on the variables analyzed, which is similar to what the impact assessment bibliography on SME public programs shows for Australia (Cumming, 2007), Belgium (Collewaert *et al.*, 2010) and Mexico (Tan and López-Acevedo, 2005).

Table VI.
Average treatment in
(a) level and in (b) ln

Variables	(a) ATT	<i>t</i> -calculated	(b) ATT	<i>t</i> -calculated
DIF SALES	1,301	0.44	1.79	1.51
DIF WORKERS	1.24**	4.88	0.39**	3.25

Note: *,**Significant at 10 and 1 percent levels, respectively

Table VII.
Effect on
raising capital

Variables	Coefficient	<i>t</i> -calculated
TREATMENT	0.623	1.64
SEX	-0.491	-1.34
EDUC	-0.354	-1.16
ENTREP	-0.142	-0.37
PREVEX	-0.011	-0.66
SALES 2006	0.000	0.22
WORKERS 2006	0.097	1.44
SECALIM	-1.495	-1.15
SECBIEM	-1.328	-0.85
SECEDUC	-1.377	-0.80
SECMANU	-1.248	-0.97
SECMEI	-2.251	-1.27
SECMULT	-1.066	-0.83
SECSALUD	(dropped)	
SECTIC	-1.654	-1.37
SECTOR	(dropped)	
Constant	0.94481	0.48
Number of observations	164	

Although the positive impacts of SERCOTEC's SCP can be debated given the previous statistical results, also to be considered are the effects shown by the results of the study in terms of the magnitude or volume of sales by each company and the number of employees that they hire, both before and after the treatment. We were very surprised to see that SERCOTEC's SCP was unable to achieve its objective, as a public program, of generating support for the economic growth of Chile by reinforcing a higher number of opportunity-driven entrepreneurs, despite the positive effects it has on its beneficiaries.

Why this comment? When the SERCOTEC's SCP is studied in detail, the real beneficiaries of the program turn out to be mostly microbusinesses that respond to the program fundamentally to meet their working capital needs in order to continue in business. The proof of this is that, while it is true that the maximum sales limit to be accepted as a beneficiary of the program is 10,000 UF (USD 400,000 app.), the average sales figure of the companies in the sample is around 10 percent of this level. The descriptive statistics in our sample (Table II) also indicate that the enterprises analyzed are not just microenterprises because of the low levels of sales, but also because of the low number of workers that they have hired. Benefitting from the SCP may help them hire personnel, but in practice, most of the SMEs analyzed increased their number of employees by one or two out a total that ranged from 1 to 4 before being benefitted by the SCP. The beneficiaries of SERCOTEC's SCP use a large part of the resources for hiring someone to handle the day-to-day management of the company or who will help produce the product that the company offers.

On the other hand, according to the statistical results of our third variable of interest, receiving the treatment is not a statistically relevant factor for receiving subsequent financing. Some businesses that have participated in the program were able to raise funds after receiving the subsidy, whether in the form of a bank loan, contribution from family and friends, or another government subsidy (but one focussed on more developed firms, such as CORFO's SCP for companies with high growth potential). No beneficiary of the program reached the level of receiving angel investor or VC funding, which again reinforces the idea that the program concentrates on small businesses that are far from achieving promising growth in the near future.

The difference between the beneficiaries of the SERCOTEC SCP and those of the great majority of programs reviewed in this paper (Alvarez and Crespi, 2000; Tan and López-Acevedo, 2005; Chudnovsky *et al.*, 2006; Cumming, 2007; Collewaert *et al.*, 2010) resides in the fact that the eligibility criteria of the program studied here are attractive to microentrepreneurs (not small entrepreneurs) and this has a strong impact in terms of self-selection by newer microentrepreneurs, since those that have already grown larger are able to make use of other programs that are better focussed on the reality of SMEs, and which also offer more support to entrepreneurs.

This issue underscores the importance of being clear about the true objective of public programs implemented in developing economies. A program that fosters entrepreneurship and provides financial aid for productive development should accept opportunity-driven entrepreneurs who have ideas with practical potential, and who will contribute to the productive development of the nation. On the other hand, a social program, if it accepts entrepreneurs, will probably accept mostly very small entrepreneurs who, by necessity or unemployment, resort to the subsidy in order to conduct business on a very small scale.

In practice, it is difficult to establish eligibility criteria for projects that use standard methodologies to develop high-impact enterprises. It would be wise in the future to explore other techniques, such as the one proposed by Harvard University's Entrepreneurial

Finance Lab, which provides risk measurement mechanisms in contexts of uncertainty and limited accounting data. This methodology includes risk measurement based on psychometric tests that complement traditional credit risk calculations, making it a valuable instrument to increase credit access opportunities, especially in the microenterprise segment studied here.

7. Conclusions, limitations and future research

In recent years, the influence of SMEs on economic growth in markets has begun to be studied more assiduously. SMEs are capable, *inter alia*, of fostering innovation, moving the productive weave of each market and having a positive impact on employment (Acs and Szerb, 2007). Therefore, a large part of the world's economies have begun to use public funding to subsidize SMEs in the intent of promoting their development and growth (Storey, 2000; Cumming, 2007; Colombo *et al.*, 2014).

SERCOTEC's SCP that we studied in this paper is an example of this. The objective of this program is to support the take-off and growth of a larger number of opportunity-driven entrepreneurs that stand out because of high volumes of sales and a positive impact on employment in each economy (Autio, 2007). SERCOTEC's SCP provides as much as USD 6,000 in funding to entrepreneurs that want to boost their business and it tries to support their take-off by supplementing that financial aid with technical and administrative assistance.

The results of our paper show that although SERCOTEC's SCP has a positive impact on sales and on the number of employees hired, it does not have such an impact on raising capital after the subsidy. This impact is associated more with entrepreneurs that could be classified as necessity driven rather than opportunity driven, which would limit meeting the program's objectives.

Apparently, program would suffer, to a certain extent, from an issue of self-selection. The objective is to support opportunity-driven entrepreneurs but in practice, it attracts mainly microbusinesses, not SMEs, and those microbusinesses apply to the SCP solely to obtain more funding to overcome cash flow problems or to hire administrative staff to help in day-to-day management. According to Federico *et al.* (2009), it is fundamental for institutions to carefully consider their support programs and the type of businesses they are assisting so that they can better evaluate the real impact of each kind of program.

The results of this study must be considered preliminary, since a longer time frame is required to develop a conclusive opinion. However, this preliminary evaluation indicates that, when designing business development programs, it is necessary to take into consideration the intrinsic motivations of entrepreneurs, difficult though these may be to observe. It is also important to distinguish between programs aimed at maintaining employment and those aimed at generating growth and greater profitability. Since it is difficult to observe or reveal intrinsic motivations, and also difficult to create a single program with identical design and eligibility criteria to achieve both social and economic goals at the same time, these two types of projects should be clearly separated in order to make progress in identifying the incentive systems and operational criteria to be used in programs aimed at increasing profitability and, therefore, the prospects for business growth.

Like all empirical work, the data used in this analysis are not perfect. The sample used here is based in the Metropolitan Region. Although it is true that this is, by far, the biggest productive zone in the country, the results are not necessarily applicable to other regions. In particular, if the regional selection criteria are not exactly the same as

those of the Metropolitan Region – which is indeed the case – the potential differences in results between regions should not be attributed to treatment alone. Therefore, interesting future research would be to study the effect of the program in regions other than the Metropolitan Region. On the other hand, it is also possible that the initial impact of the program, the object of this paper, may undergo changes over time, and more time may be needed in order to see its longer-term impact.

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Appendix

Variables	Explanation
T	Dichotomous variable that takes the value 1 if the company received the subsidy
SEX	Dichotomous variable that takes the value 1 if the company is headed by a male
EDUC	Takes the value 1 for elementary education, 2 for secondary education, 3 for technical education and 4 for university education
ENTREP	Dichotomous variable that takes the value 1 if the person heading the company has been involved in a previous venture
PREVEX	Variable that indicates the number of years of experience of the person heading the company
SECALIM	Dichotomous variable that takes the value 1 if the company that received the subsidy belongs to the food sector
SECBIEM	Dichotomous variable that takes the value 1 if the company that received the subsidy belongs to the biotechnology, energy or environmental sector
SECEDUC	Dichotomous variable that takes the value 1 if the company that received the subsidy belongs to the education sector
SECMANU	Dichotomous variable that takes the value 1 if the company that received the subsidy belongs to the manufacturing sector
SECMEI	Dichotomous variable that takes the value 1 if the company that received the subsidy belongs to the mining or infrastructure sector
SECMULT	Dichotomous variable that takes the value 1 if the company that received the subsidy belongs to more than one sector
SECSALUD	Dichotomous variable that takes the value 1 if the company that received the subsidy belongs to the health sector
SECTIC	Dichotomous variable that takes the value 1 if the company that received the subsidy belongs to the information technology sector
SECTUR	Dichotomous variable that takes the value 1 if the company that received the subsidy belongs to the tourism sector

Table A1.
Variables used

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