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Claudio A. Bonilla
Christian A. Cancino

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Claudio A. Bonilla
Faculty of Economy and Business, University of Chile
Diagonal Paraguay 257, suite 1305, Santiago, Chile
E-mail: cbonilla@fen.uchile.cl

Christian A. Cancino
Faculty of Economy and Business, University of Chile
Diagonal Paraguay 257, suite 1301, Santiago, Chile
E-mail: cancino@fen.uchile.cl

Abstract[*]

This paper seeks to measure the impact on small businesses in Chile of
the Seed Capital Program implemented by Chile's Technical Cooperation
Services (Servicio de Cooperación Técnica – SERCOTEC). 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. This study highlights the importance of
differentiating between productive development programs and social
programs. It also suggests improvements in public policy to develop
entrepreneurship in small businesses in Chile. These suggestions may also
be interesting for other countries in the region facing similar challenges in
terms of developing private entrepreneurship as a vehicle to generate
economic development.

JEL Classification: O20, O22, O25
Keywords: Small and medium enterprise, entrepreneurship,
productive development.

1. Introduction

This study analyzes the impact of the Seed Capital Program implemented by Chile's Technical Cooperation Services (Servicio de Cooperación Técnica, SERCOTEC). To do so, three factors commonly used to evaluate this kind of public policy will be measured. First, the paper analyzes sales trends, and then changes in the number of workers hired. Finally, it considers the impact on the likelihood that beneficiaries of the program will receive subsequent funding.

In recent years, several Latin American countries have established public programs to support small and medium enterprises (SMEs) in order to overcome a particular market failure. The failure stems from asymmetric information about the true *pros* and *cons* of new projects by these businesses. This asymmetric information results in high interest rates and a rationing of credit that hinders the launching of these enterprises and relegates them to a permanent status of small businesses.

Public policies, such as the seed capital program, mainly counteract the credit rationing facing new companies that arise from the difficulties involved in monitoring them and their lack of credentials. There is extensive theoretical literature on the problem of credit rationing due to moral hazard, beginning with the seminal article by Stiglitz and Weiss (1981) and continuing with the emerging literature on *entrepreneurial finance*, which focuses on the financing of new companies (for example, see Casamatta, 2003; Bettignies and Brander, 2007; Fairchild, 2011). On the other hand, seed capital policies can generate an adverse selection problem (Akerlof, 1970) if they are poorly designed, since they can attract necessity entrepreneurs (individuals who have lost their employment and have no other short-term survival option) rather than opportunity entrepreneurs.

The public programs implemented to mitigate the effects of information asymmetries—which generally translate into credit rationing and lack of resources— range from programs that foster the export capacity of midsize companies, to programs

that support innovation in high-growth enterprises (*gazelle* companies), to direct subsidies of microbusinesses, often confusing the concept of support for productive development and the notion of simple resource transfers. The latter corresponds more to social policies aimed to combat poverty and unemployment.

In this context, the government of Chile, through SERCOTEC, has developed a Seed Capital Program (SCP), which since 2005 has attempted to overcome, in part, the problems that SMEs face in finding financing. It should be noted that the program focuses on the smaller businesses in the chain of production, leaving open the possibility that the program could become, in practice, a social program rather than a productive development program. The SCP represents a nonrefundable financial subsidy aimed at supporting SMEs in their early stages. The results and impact of the program have not yet been evaluated.

This paper analyzes the behavior and initial results of businesses that have been financed by SERCOTEC's SCP, particularly its line of support to ongoing concerns. The analysis uses information gathered in a field survey of beneficiaries and additional information provided by SERCOTEC, and takes into account diverse performance measurements such as revenue, number of employees, and post-financing capital raised. All these measurements are commonly used in the international literature to measure the impact of public and private seed capital programs (Gardner Pinfold, 2004; IVCA, 2006; Martí, Salas, and Barthel, 2008; Global Insight, 2009).

The results of the evaluation are mixed. On one hand, it shows a positive impact on the sales of beneficiary firms, but the statistical significance depends on the model used. On the other hand, when the number of employees is considered, the program reveals a positive and statistically significant impact, regardless of the specification used. This coincides with the calculation of average treatment effect (ATT), both for sales and for the number of workers.

Companies are then defined as "successful" if they later secure financing by raising capital from a relevant source (which may be bank debt, funding from family or

friends, or angel investors), and if they clearly indicate the intention to continue growing and expanding in some way. The results suggest that receiving a subsidy is not a factor in obtaining subsequent financing.

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. According to Federico, Kantis and Rabetino (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.

This paper progresses as follows. Section 2 presents a general theoretical framework on the importance of financing in productive entrepreneurship. Section 3 provides a brief description of literature evaluating the impact of public development programs, with a special focus on Latin America. Section 4 briefly describes the SERCOTEC seed capital program. Section 5 presents the data and methodology used. Section 6 analyzes the results. Finally, Section 7 states the conclusions and makes some suggestions for changes in public policy.

2. **Theoretical Framework: Financing and Entrepreneurship**

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, as mentioned above, result in credit rationing to entrepreneurs (Stiglitz and Weiss, 1981),

external effects not initially predicted, or even problems of economic policy (such as rent-seeking by bureaucrats, a theory initially developed by Tullock, 1965, and Buchanan, Tollison and Tullock, 1980) that hinder the development of enterprises with attractive projects. These problems make government intervention necessary.

For governments, the importance of strengthening entrepreneurship and developing new businesses lies mainly in the spillover of benefits from entrepreneurial activities. 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 leverage and support the factors that stimulate entrepreneurship, especially opportunity-driven entrepreneurship rather than necessity-driven entrepreneurship.

Hence, the economic justification for government intervention focused 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. However, it is no simple matter 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. Nonetheless, there are new studies, discussed herein, that recognize the need for evaluations of the impact of government entrepreneurial development programs.

Types of Entrepreneurship

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). 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).

Unfortunately, for some time public policies in many countries have failed to leverage entrepreneurship because they have not focused on the type of entrepreneurship that must be supported from the perspective productive development versus social policy. Although both types of government support are important, policies addressing them must be differentiated.

There are diverse factors that would explain the development of opportunity-driven entrepreneurship, the most notable being how proactive individuals are, how risk averse they are, and how much financing is available for entrepreneurship (Covin and Slevin, 2002; Lumpkin and Dess, 1996). For many entrepreneurs, the main obstacle to implementing a new business idea is the lack of funding for the venture (Echecopar et al., 2006). 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), and this is where public resources play a key role in supporting productive development.

3. **Evaluation of Impact in Latin America**

In recent years, several Latin American countries have begun to evaluate more systematically their programs for SME development. In particular, Alvarez and Crespi (2000) analyze 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, in particular given the number of agreements reached by enterprises that made use of the program. However, the program did not seem to have significant results in increasing the number of types of export products. On the

other hand, Benavente and Crespi (2003) study the impact on firms that have participated in Chile's Associated Development Projects (PROFO, or Proyectos Asociativos de Fomento), which provides strategic linkages among small businesses. These results indicate that the program has a positive impact on intermediate results (planning, marketing strategies, and training) and a minor impact on the net effect of total factor productivity (TFP). For their part, Tan and López-Acevedo (2005) analyze the impact of the Centre for International Mobility (CIMO) program run by the Mexican Ministry of Labor, which focuses 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) analyze a sample of 414 Argentine companies and study 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. Tan and López-Acevedo (2007) analyze programs administrated by the Ministry of Economy of Mexico (CRECE and COMPITE), as well as the CIMO program, mentioned above. The authors use several econometric alternatives and the results are again mixed. The programs have proven to be effective in terms of training and the adoption of technology, but no impact has been observed on employment or increased labor productivity.

López-Acevedo and Tan (2010) recently carried out more complete impact evaluations of different productive development programs in four Latin American countries (Chile, Colombia, Mexico, and Peru). They use newer econometric techniques for impact evaluation, using different variants of propensity score matching combined with the difference-in-differences methods, and primary databases arranged into panels with as many as 15 years in order to compare results among countries. Their work is the most important contribution, to date, in the evaluation of public programs in Latin

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America, and will likely become a necessary reference work and starting point for researchers in coming years. The results of the López-Acevedo and Tan (2010) report are detailed below.

First, in Chile, several public programs developed by Corfo (Production Development Corporation) and by other productive development entities in Chile were analyzed and it was found that there was a positive short-term impact on intermediate results in training and the adoption of new technologies, and improvements in entrepreneurial organization. However, the results for sales, salaries, and increases in labor productivity were less auspicious. The greatest impact came from the program focused on improving the firm associativity with a view to developing the creation of clusters (PROFO program) and another providing technical assistance (the Technical Assistance Fund, or FAT program). By contrast, none of the programs that focus simply on providing financial aid have been effective. This is relevant information that must be taken into account in the evaluation of SERCOTEC's seed capital program, since the main component of that program is financial aid, as well as a beneficiary training component.

Second, Colombia's Modernization and Technological Development Fund for Micro, Small, and Medium Enterprises (FOMIPYME) program was analyzed. This is the most important program providing support to smaller enterprises in Colombia and several impacts were observed. For example, a positive effect was found on salaries in the first two years after participation in the program, although this effect became negative in the third year. Following the third year, a positive effect was also found on exports by the manufacturing sector, accompanied by an increase in research and development (R&D) spending. It is important to note that the impact of FOMIPYME on productivity is heavily influenced by variables in Colombia's business climate. The crime rate, in particular, has a significant effect on all productive sectors.

Third, in Mexico, a positive impact on elements such as value added, sales, exports, and employment was observed in some of the programs analyzed. The authors

suggest, however, that these positive results are probably due to a selection bias in program participation (Sectoral Promotion Program, or PROSEC; National Environmental Auditing Program, or PNAA; and the tax incentives provided through the National Science and Technology Council, or CONACYT), which represent the elite of small businesses in Mexico in terms of their level of technology, export focus, and physical and human capital. It is also interesting to note that, in Mexico, the program impacts started to materialize in the third year after treatment was received, suggesting that, ideally, longer term panels are required to see the impacts of these types of public programs.

Fourth and lastly, three SME programs were analyzed in Peru, only two of which, PROMPYME and BONOPYME, proved to have a significant impact on sales, total earnings, and earnings per worker (on the order of 15–20 percent). This is considerably more positive than what was found in the other three countries studied.

4. The SERCOTEC Seed Capital Program

SERCOTEC's Seed Capital Program (SCP) is a financial subsidy for enterprises. 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. Based on the studies carried out in Latin America (López-Acevedo and Tan, 2010), 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. 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" (Sorensen, 2007), 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 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.).

SERCOTEC's SCP consists of two stages. In the first stage—evaluation and selection of plans—all applications are studied to determine their eligibility. Plans are rejected if they were submitted by previous winners of SERCOTEC competitions, by companies with less than one year of existence, or by other applicants who do not qualify for the kind of financing offered in the bidding conditions. Next, plans that meet the eligibility criteria are evaluated according to a methodology that contains an assessment matrix based on criteria such as net present value (NPV), analysis of preferred territories, and specific areas targeted by SERCOTEC each year. Plans are then ranked according to the assessment matrix. After a field visit and an on-site evaluation of all documents presented in the operational and financing plans, the

winning businesses are selected. Confirmation of the winners marks the end of the first stage.

In the second stage—technical consulting with the selected entrepreneurs—a team of consultants is established that contacts 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, email, 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 websites; guidance in the preparation of the business plan, accounting courses; and advice on accounting software and labor law.

These stages 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.

5. Data and Methodology

For the treatment group, data was 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 of businesses (also provided by SERCOTEC) that meet all requirements to apply to the SCP, but which for some administrative reason did not apply. In this case, there is an acknowledged risk that the control group is biased to a certain degree. In particular, it is possible that these companies did not meet the deadlines because they did not really need the resources, which would unquestionably diminish the strength of the results of this study. However, since this is a universal seed

capital program, meaning it is for all SMEs that meet program's requirements, no untreated control group actually exists by the strictest definition. Nevertheless, for the purposes of this study, companies that did not take part in the program for administrative reasons are considered to be the best available option for a control group.

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 for 2007, which is the base year for the current study. These companies are considered *clones*—not pure, but *clones* nevertheless—of the first group and serve as the basis to determine the effects of the SCP. This database was complemented by additional data on similar businesses obtained from certain municipalities that keep information on firms in their area that meet the requirements and have the profile to apply to different SME programs offered in Chile. 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. The main reason for the low rate of response from these businesses is likely the profile of the enterprises attracted by the program. As will be explained in detail later on, the large majority of beneficiaries are very small businesses that were actually in search of a subsidy because of a need for working capital. For example, while it is true that the program requires that applicant companies have annual sales that do not exceed 10,000 UF, the data shows that companies that received the subsidy had annual sales of less than 1,000 UF in 2006. The opinion maintained here is that small enterprises of this kind have less interest in answering surveys or allocating time to activities where there is no direct value to their business. These businesses operate much more informally and, therefore, are less likely to answer surveys. As a result, it is likely that more developed, formal enterprises responded to the survey, somewhat biasing the analysis toward more favorable results.

Table 1 provides descriptive statistics of the data 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

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. It is also 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 argument that the impact of the program has been positive 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. This coincides with the suggestion above that the average level of sales for both the treated and the control firms is far below the maximum level established as an application requirement.

Table 1. Descriptive Statistics

Treatment group
Number of observations   89

Variable	Mean	Standard deviation	Median	Symmetry	Kurtosis
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

Control group
Number of observations   75

Variable	Mean	Standard deviation	Median	Symmetry	Kurtosis
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

Methodology

To estimate the effect that SERCOTEC's SCP has on beneficiaries, it is first necessary to find a counterfactual scenario for the businesses treated. To do so correctly, this study has focused on firms in the control group with characteristics similar to the businesses that received the benefit immediately before treatment.

The method used at this stage is propensity score matching (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. The following equation represents the conditional probability of receiving the treatment given the vector of characteristics X

$$p(X) = p(D = 1 / X) = E(D / X)$$

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) show 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:

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

where:

$$
\begin{aligned}
X b_i = {} & b_0 + b_1 SEX_i + b_2 EDUC_i + b_3 ENTREP_i + b_4 PREVEX_i + b_5 SECALIM_i + \\
& b_6 SECBIEM_i + b_7 SECEDUC_i + b_8 SECMANU_i + b_9 SECMEI_i + \\
& b_{10} SECMULT_i + b_{11} SECSALUD_i + b_{10} SECTIC_i + b_{11} SECTUR_i
\end{aligned}
$$

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 2 shows PSM results.

Table 2. Propensity Score Matching

Variable	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
No. of observations	159	
LR chi2	24.83	
Pseudo R2	0.1192	

* (**) Denotes a statistical significance at 10% (1%).

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. First, however, Table 3 presents the propensity score matching distribution.

Table 3. PSM Distribution

Treatment	Control	PSM Density
0.2	0.21	0.01
0.219	0.28	0.04
0.228	0.32	0.05
0.238	0.44	0.15
0.551	0.55	0.25
0.812	0.65	0.25
0.815	0.76	0.15
0.824	0.8	0.05
0.841	0.82	0.04

The method used to calculate the ATT is a version of the difference-in-differences 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 $DV = V_{2008} - V_{2006}$. This means that if the person was awarded the program in 2007, 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:

$$Y_{i(t+1)} - Y_{i(t-1)} = DY_{it} = bX_{it} + aD_{it} + e_{it}$$

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 e_{it} represents the unexplained error of regression. The ATT was then estimated using a very simple version of the difference-in-differences method, which estimates whether there is any significant difference in the post- and pretreatment difference between the treatment and control group.

6. 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. The results of this analysis completely coincide with the results of the impact assessment presented below, using the traditional evaluation methods employed in this study.

Table 4. Effect on Sales in (a) Levels and (b) Ln

Variable	(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
No. of observations	159			

** (*) Denotes a statistical significance at 10% (1%).

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 and number of workers hired (see Table 5). There are two basic reasons for this. First, it is very unlikely that the industrial sector in which the firm operates will be a significant and determining factor in its growth, since the treated firms, like the untreated ones, are all in very early stages of their productive development; they therefore require much greater maturity in order to feel any potential accelerator/decelerator effect of the sector in which they operate. Second, when the fieldwork was carried out, a low response rate was obtained, along with a limited number of observations for each industrial sector, thereby hindering the econometric

analysis of this sample. Table 5 presents the results for impact on the number of workers, using OLS.

Table 5. Effect on Sales in (a) Levels and (b) Ln

Variable	(a) Coefficient	t-calculated	(b) Coefficient	t-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			

* (**) Denotes a statistical significance at 10% (1%).

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 result differs from what the impact evaluation literature on these programs finds in Latin America in general. What is the explanation for this result? The answer is not absolutely clear, but it seems that SERCOTEC's SCP has certain distinctive characteristics compared to others of its kind. First, most of the public SME development programs studied in the region are programs that tend to aim at firms of a certain size that are, for example, capable of exporting or adopting new technologies or new productive processes. The programs or subsidies designed for these firms aim to

help them *make the jump* to a higher stage of development. By contrast, although SERCOTEC's SCP is officially a productive entrepreneurship support program, when 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. We believe that this is fundamentally due to the program's eligibility criteria. In particular, the requirement that a company be less than one year old and is micro or small in size, attracts exclusively micro entrepreneurs who are just beginning their activity. Slightly larger companies, categorized as small enterprises, have access to other development programs specifically designed for SMEs; these programs are better focused on their problems and also have more available resources, such as the CORFO's seed capital program. It is therefore likely that 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.

In light of the above, it can be seen that in practice, SERCOTEC's SCP fits more into the category of a social program than a SME productive development program, which is different from the declared objective of this program. While this cannot be categorically inferred from the results of this study, it is the interpretation presented herein. This is also consistent with the results of the discussion groups and lengthy interviews carried out during the fieldwork stage with entrepreneurs who had been through the program. This connects with the explanation given by Larroulet and Couyoumdjian (2009) regarding the Latin American paradox of entrepreneurship and growth, with countries in the region being highly entrepreneurial but with very low growth. These authors demonstrate that a large part of the entrepreneurship in Latin America is necessity-driven entrepreneurship with low productivity, often focused on mere survival. This cannot be compared to opportunity-driven entrepreneurship, which is what adds greatest value to the economy. Therefore, in the case of SERCOTEC's SCP, our impression is that many of the beneficiaries in fact fit in the category of necessity-driven entrepreneurship given the size of their companies.

Second, while it is true that SERCOTEC's SCP provides resources for beneficiary companies to operate, it also obliges beneficiaries to receive training from expert consultants working for SERCOTEC. This feature is unique to the program and is therefore not directly comparable to the others reviewed in the Latin American literature, which focuses on subsidies in the form of financial aid. In this case, the subsidy is more than just financial aid.

Third, and finally, to obtain definitive results, the program will need to mature for several more years in order to provide better data for evaluation. In this case, we have been able to evaluate the impact of SERCOTEC's SCP in 2007 using information on the businesses from 2006 to 2008. This evaluation has shed light on the program's real impact. However, to produce conclusive results, a more robust evaluation will require a time frame of at least six years

Determining Impact

Table 6 reports the average treatment (ATT) using the nearest neighbor matching method.

Table 6. Average Treatment in (a) Level and in (b) Ln

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

* (**) Denotes statistical significance to 10% (1%)

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.

Determinants of Success in Raising Funds

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 focused on more developed firms, such as CORFO's Seed Capital Program for companies with high growth potential). No beneficiary of the program reached the level of receiving angel investor or venture capital funding, which again reinforces the idea that the program concentrates on small businesses that are far from achieving promising growth in the near future. Regardless, we wanted to see here whether receiving treatment, that is receiving the subsidy, had an impact on the likelihood of obtaining financing later. Herein success is defined as receiving subsequent financing, this is an indicator that the business has the potential to continue and eventually expand. The following model was designed for this purpose:

$$EX_i = a_0 + b_0 TRAT + b_1 SEX_i + b_2 EDUC_i + b_3 ENTREP_i + b_4 PREVEX_i +$$
$$b_5 SECALIM_i + b_6 SECBIEM_i + b_7 SECEDUC_i + b_8 SECMANU_i + b_9 SECMEI_i +$$
$$b_{10} SECMULT_i + b_{10} SECTIC_i + b_{11} + e_i$$

The results are shown in Table 7. It can be seen that receiving the treatment is not a statistically relevant factor for receiving subsequent financing.

Table 7. Effect on Raising Capital

Variable	Coefficient	t-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
SECTUR	(dropped)	
Constant	0.94481	0.48
No. of observations	164	

Limitations and Future Research

It is important to mention that difficulties exist in evaluating the SERCOTEC SCP, since the resources obtained through the subsidy may have different uses and may, therefore, have different effects on the impact variables. All beneficiaries receive consulting services and training as a common component, although the quality of these services is not clear.

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.

7. Conclusions

The paper has analyzed 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. On one hand, the statistical significance of the positive results depends on model used. On the other, positive and statistically significant results are found in terms of the number of employees at the firms that received treatment. This result differs from those found in the impact evaluation literature on development programs in Latin America, where it is common to find significant impacts on intermediate results (technology and innovation, investment and training, improvement of processes), but no results indicating an impact on the number of workers.

The explanation of this result herein is supported by the fact that SERCOTEC's SCP is different than most of the programs evaluated in prior literature applied to the region. The main difference is that this program has, in practice, become a social program rather than a productive development program for 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, the average sales figure of the companies in the sample is around 10 percent of this level. Therefore, it is highly likely that a significant part of the program's funding is used to hire people to take charge of daily management or for production. By contrast, other programs such as those discussed in the review of the literature, aim at somewhat larger businesses that often use resources for technological

improvements, development of strategic plans, improvements in processes, or even the development of an associative policy with a view towards selling on foreign markets.

While it is true that this program seems to be a social program rather than a productive development program with a real economic impact, this cannot be absolutely inferred from the results (mainly due to the impossibility of controlling for unobservable variables, such as intrinsic motivations). However, this interpretation is supported by the results from discussion groups and in-depth interviews with entrepreneurs who had been through the program, carried out prior to fieldwork.

Another particular characteristic of this program is the inclusion of consulting services and obligatory training for beneficiaries. This is clearly different from the typical seed capital programs that are centered on funding. Consulting services and obligatory training to some degree acknowledge the fact that the beneficiaries of the SERCOTEC program need additional help to perform better using the resources provided. The difference between the beneficiaries of the SERCOTEC SCP and those of the great majority of programs implemented in Latin America, and dealt with in this article, resides in the fact that the eligibility criteria of the program studied here are attractive to microentrepreneurs (not small entrepreneurs). In particular, the requirement that applicant companies must be less than one year old, and the fact that the program focuses on micro and small businesses, both have 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 focused 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. These necessity-driven entrepreneurs should be under the wing of social programs that, by their nature, have objectives other than productive development and which should, therefore, follow a logic that is appropriate to those objectives.

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 herein.

Finally, 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, even though they may be difficult 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.

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Annex 1

Comparative Chart of the Programs Studied

Study	Country	Program	Source of data and methodology	Results
Álvarez and Crespi (2000)	Chile	Export Promotion Program / Programa de Promoción a las Exportaciones (ProChile)	Information came from a survey of 365 exporting companies whose data were obtained from Central Bank of Chile export statistics for 1992-96. Methodology: fixed effects regression.	From a qualitative perspective, a positive effect is observed in terms of technological innovation. However, there is no evidence of a positive impact on the number products exported by the companies. At the same time, the results suggest that only certain instruments – specifically export committees – are effective in opening new markets and increasing exports.
Benavente and Crespi (2003)	Chile	Associative Development Projects / Proyectos Asociativos de Fomento (Profo): program that promotes the development of SME clusters.	Information came from a survey of 102 companies that took part in Profo projects between 1992 and 1995. The data were then contrasted with a control sample, whose data were, in turn, obtained from the Chilean National Statistics Institute. Methodology: differences in differences (DID), DID matching.	The results indicate that the program has a positive impact on intermediate results (improvements in business planning, marketing strategies, training). However, less impact is seen on the net effect of TFP, on innovation and on improvement of processes.

Tan and López-Acevedo (2005)	Mexico	Centre for International Mobility (CIMO): Program providing training and technical assistance to SMEs.	The data were obtained through a survey of a number of CIMO beneficiary companies (treatment) and a second group (control) for 1991 to 1993, and 1993 to 1995. Methodology: production functions and DID regressions.	A positive impact on intermediate results is observed among the first cohort of companies that received treatment (1991-93), in comparison to the control group, in terms of investment destined to training and also adoption of quality control processes. Mixed results were obtained for the second cohort (1993-95).
Chudnovsky, López, Rossi and Ubfal (2006)	Argentina	Argentine Technological Fund / Fondo Tecnológico Argentino (Fontar): Program to foment productivity through technological innovation.	The information came from a survey conducted by the National Statistics and Census Institute / Instituto Nacional de Estadística y Censos (Indec), with data on 414 companies over four consecutive years (2001-04) and for 1998. Of the 414 companies, 136 were subsidized to invest in R+D projects, 62 applied but did not receive the subsidy and 216 did not apply for the subsidy. Methodology: differences in differences (DID), DID matching.	The results show a positive impact on the intensity of innovation (indicator of R+D on sales), but no impact on sales of innovative products or on worker productivity.
Tan and López-Acevedo (2007)	Mexico	CRECE, COMPITE, CIMO, others. Programs that seek to increase productivity through training and technical assistance to SMEs.	National Survey of Employment, Salaries, Technology and Training / Encuesta Nacional de Empleo, Salarios, Tecnología y Capacitación (ENESTYC) with data from 1995 to 2001. Methodology: production functions and combined DID matching.	The programs appear to be effective in the development of labor training and adoption of technology. However, no impact is observed on sales increases or labor productivity.

		Technical Assistance Fund / Fondo de Asistencia Técnica (FAT), Profo, Supplier Development Program / Programa de Desarrollo de Proveedores (PDP), Technological and Productive Fund / Fondo Tecnológico y Productivo (Fontec), training funds offered by the National Training and Employment Service / Servicio Nacional de Capacitación y Empleo (SENSE).	The information came from the 2004 Chile Investment Climate Survey / Encuesta de Clima para las Inversiones en Chile 2004 (ICS) and the 2004 Annual National Industrial Survey / Encuesta Nacional Industrial Anual 2004 (ENIA), with data between 1992 and 2002. Both surveys were conducted by the National Statistics Institute (INE). ENIA data were updated from 2003 to 2006. Methodology: combination of Propensity Score Matching (PSM) and DID.	In general, there is evidence that the programs studied improve certain intermediate results (training, adoption of new technologies and organizational practices), and also have positive effects on profits, labor productivity and salaries. Specifically, it is observed that FAT, Profo and Fontec produce better results in several measurements of final impact. Also, all programs that provide solely economic resources do not show a high impact on final results.
López-Acevedo and Tan (2010)	Chile			

Colombia	Colombian Fund for the Modernization and Technological Development of Micro, Small and Medium Enterprises / Fondo Colombiano de Modernización y Desarrollo Tecnológico de las Micro, Pequeñas y Medianas Empresas (Fomipyme).	Data from 1999 to 2006 on 751 companies that constitute the study sample, obtained from a survey complemented with databases of the National Administrative Department for Statistics / Departamento Administrativo Nacional de Estadística (DANE) in its three annual surveys: Manufacturing (EAM), Services (EAS) and Trade (EAC). A survey was also conducted with a control group that did not take part in the program. Methodology: combination of Propensity Score Matching (PSM) and analysis of panel data.	A positive effect on salaries was noted in the first two years of treatment; this turned negative after the second year. In the manufacturing sector, a positive effect is seen on exports as a percentage of sales and on investment in R+D, which shows a three-year lag since intervention. A positive effect on TFP is also observed.
Mexico	CIMO, PAC, COMPITE, CRECE, FAMPYME, FIDECAP, PMT, PAIDEC. All these are programs to support training, technical assistance, development of networks, technological innovation or the promotion of exports.	The study uses the National Survey of Employment, Salaries, Training and Technology / Encuesta Nacional de Empleo, Salarios, Capacitación y Tecnología (ENESTYC) and the Annual Industrial Survey / Encuesta Industrial Anual (EIA) conducted by the National Institute of Statistics and Geography / Instituto Nacional de Estadísticas y Geografía (INEGI) from 1994 to 2005. Methodology: combination of Propensity Score Matching (PSM) and DID.	Using the fixed effects model, it can be observed that all the SME support programs have a positive impact on added value, production, total sales, employment and fixed assets. The programs that appear to support mainly SMEs are run by the Ministry of Economy (FIDECAP, FAMPYME) and the National Science and Technology Council (PMT, PAIDEC).

| | | BONOMYPE (training program), PROMPYME (program promoting public procurement from SMEs), CITE (program supporting technological innovation in the footwear manufacturing industry). | Information on program beneficiaries was linked to data from the National Statistics Survey (Encuesta Nacional de Estadística) conducted by the National Statistics and Informatics Institute / Instituto Nacional de Estadística e Informática (INEI). Control groups were generated from the same sample of companies.

Methodology: combination of Propensity Score Matching (PSM) and fixed effects models. | The results indicate that participation in the programs has a positive impact on company sales and profits.

Specifically, PROMPYME and BONOPYME show considerable (positive) impacts on profitability per worker, sales and profits.

The above is not true of the CITE program. |
| Peru | | | |

Annex 2

Variables Used

Variable	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