The Impact of the Lending Program for the Productive Development and Employment Generation of the San Juan Province

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November 2016

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Abstract[*]

A shortcoming of the current empirical impact evaluation literature is the lack of studies that measure the effect of access to credit in the medium and long term, as well as the impact on interventions targeted at micro-, small-, and medium-sized enterprises (MSMEs). This study addresses both aspects by analyzing the average impact that the Lending Program for the Productive Development and Employment Generation of the San Juan Province has had on sales, employment, investment, and productivity of beneficiary MSMEs. The authors measured the abovementioned impacts using a lagged dependent variable (LDV) model that, beyond controlling for selection bias, also controls for the sequential entry of companies into the program. To conduct this analysis, the authors used a survey implemented by the National University of San Juan to 664 companies. The results of the study indicate a positive and statistically significant impact of 6.9 percent on the likelihood to invest, 9.7 percent on sales, 4.3 percent on employment, and 6.4 percent on labor productivity. The analysis allows for the identification of differentiated impacts by type of company, as classified by size and sector or type of economic activity.

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1. Introduction

Together with the Inter-American Development Bank (IDB), the government of San Juan Province (Argentina) implemented the Lending Program for the Productive Development and Employment Generation of the San Juan Province. The program aimed to support the province's economic growth and enhance its sustainability by carrying out various activities to support micro-, small-, and medium-sized enterprises (MSME). There were three support modalities: a financial component in the form of credit lines; a nonfinancial component or technical assistance for the specialized support of supply chains; and one for the institutional strengthening of the Investment Development Agency of San Juan (Agencia San Juan de Desarrollo de Inversiones, or ASJDI), which implemented the program and established the San Juan Quality Agency (Agencia Calidad San Juan). To date, two phases of the credit component have been completed aimed at increasing production, employment, and the productivity of the MSMEs and the supply chains to which they belong.

To quantify the program's impact on economic activity, this study aims to measure how a reduction in the cost of accessing medium- and long-term loans concretely impacts economic indicators at the firm or industry level, such as investment, sales, employment generation, and labor productivity.

Numerous studies have demonstrated the importance of MSMEs for the health and dynamics of the economy (Ayyagari, Beck, and Demirguc-Kunt, 2007; Beck, Demirguc-Kunt, and Levine, 2005; Beck, Demirguc-Kunt, and Maksimovic, 2008; Liedholm, 2002; Liedholm and Mead, 2013; Nichter and Goldmark, 2009). The studies demonstrate that MSMEs employ the largest share of the labor force and generate the highest number of jobs. Consequently, several studies have been able to define access to finance as one of the main factors that determine if MSMEs are established and how well they perform, compared with large companies.

There are many reasons why MSMEs face barriers in accessing finance. The main reason is information asymmetries on the part of financial intermediaries or potential investors (Stiglitz and Weiss, 1981). Companies that present an investment project to request financing have more information than their potential financiers. Coupled with the fact that small companies have are riskier on average, potential investors treat all small companies as high-risk regardless of the project presented. This challenge is exacerbated for small companies, as many of them lack accounting records or sufficient assets to offer as collateral. Another market failure that disproportionately affects MSMEs has to do with economies of scale, specifically the associated cost of evaluating projects. As the size of a loan increases, the average cost of its assessment

declines. Thus, investors have a greater incentive to focus on larger companies (Ibarraran, Maffioli, and Stucchi, 2010). Additionally, in the event of default, the cost of litigation relative to loan size is usually higher for MSMEs than for larger companies.

Various public policies have been implemented to mitigate market failures and promote access to productive lending for MSMEs. Nevertheless, there is limited evidence of the effectiveness of these programs or policies through experimental and quasi-experimental evaluations. The current literature has mainly focused on certain types of interventions, such as microfinance (Aroca, 2002; Banegas et al., 2002; Banerjee et al., 2014; Dunn and Arbunckle, 2001; McNelly et al., 1996; Mosley, 2001) and loan guarantee programs (Arráiz, Meléndez, and Stucchi, 2014; Chandler, 2012; Kang, Heshmati, and Choi, 2008; Zecchini and Ventura, 2009). Given that there are different types of interventions, existing knowledge on the effectiveness of one type of program is not necessarily relevant for designing policies regarding another type of program.

There are few studies on productive lending provided to MSMEs. These include the works of Banerjee and Duflo (2014); De Negri et al. (2011); Eslava, Maffioli, and Melendez (2014); OVE (2014); and Paravisini (2005). These studies generally show a positive effect of access to credit on investment and production growth, as well as an improvement in loan conditions. However, they are less conclusive on the effect of lending on productivity (Ibarraran, Maffioli, and Stucchi, 2010). This study contributes to the current literature by providing additional evidence from a productive loan program that allows the impact of medium- to long-term financing on growth and productivity to be evaluated.

To conduct this evaluation, the authors administered a survey to companies that benefited from productive lending and those that did not. The survey collected data retrospectively for the years 2004, 2007, 2009, 2011, 2013, and 2014. This data was used to construct a panel and consequently allowed for the minimization of selection bias through the temporal structure of the database.

To estimate the average impact of the program, the authors used a dynamic lagged dependent variable (LDV) model. The main advantage of this model is that it allows for the estimation of the impact of the program, even when the evolution and trends of the outcome variables of interest prior to participating in the program of the beneficiaries differs from the evolution and trends of these same variables of the nonbeneficiaries (Angrist and Pischke, 2009). This divergence in trends between beneficiaries and controls is precisely the case of this study, at least with respect to its financial component. Since banks prefer to grant loans to companies with greater repayment potential and this is reflected in the fact that these companies exhibit

better performance in the outcome variables of interest than nonbeneficiaries even prior to receiving the credit, it is expected that the beneficiaries would have performed better than nonbeneficiaries even if they had not received the loan.

The estimates show that the program had a positive impact on the likelihood to invest, sales, the number of employees, and the labor productivity of participating companies. More specifically, the findings indicate a positive impact from receiving loans on the increase in sales by 10.2 percent, on number of employees by 4.1 percent, on the likelihood to invest by 8.2 percent, and on labor productivity by 8.2 percent, regardless of whether technical assistance was provided. Impacts also differ by company size and sector.

The rest of the study is organized as follows: Section 2 presents a clear and concise description of the productive and job development program in San Juan Province; Section 3 describes the data used; Section 4 explains the strategy adopted to estimate the average program impact on the dependent variables; Section 5 shows the results of the estimates; and finally Section 6 presents a brief conclusion about the results obtained.

2. Lending Program for the Productive Development and Employment Generation of the San Juan Province

San Juan province is located in western Argentina's Cuyo region. It covers an area of 89,651 km^2, of which less than 3 percent is suitable for agriculture. In 2003, the provincial population was 620,000 inhabitants, or roughly 1.7 percent of the national population, and the gross geographical product (GGP) was \$2,657 million, or approximately 1 percent of Argentina's gross domestic product (GDP). San Juan's socioeconomic development trails the national average, with its per capita output at slightly over half that of Argentina as a whole. Traditionally, the province's productive base has been tied to the primary sector, with little value-added and limited productive diversification. Production of basic or table wines traditionally led local production. This sector was hit hard by a crisis in the 1980s, as consumption of this category of wines dropped dramatically.

Following the nationwide economic crisis of 2001, economic growth in San Juan was on par with the rest of the country. The provincial economy saw a cumulative 18 percent drop in its GGP during the period 1998–2002, reversing this trend in 2003. Between 2003 and 2012, the provincial economy exhibited cumulative real growth of 184 percent, averaging 11.3 percent in real growth per annum, far above the recorded national growth rate of 6.9 percent. During that

time, formal employment in the private sector grew by 122 percent.[1] As part of its aim to achieve sustainable growth in the province, the government of San Juan implemented the Lending Program for the Productive Development and Employment Generation of San Juan Province.

The program aimed at supporting economic growth and job creation in the province. It was designed in three components: (i) financial support, which sought to provide medium- and long-term financing and technical assistance to MSMEs[2] by providing capital to retail banking institutions through auctions carried out with the intervention of the Central Bank of Argentina (BCRA); (ii) nonfinancial support, which focused on improving and facilitating linkages within and among productive value chains, in order to strengthen MSMEs to enhance their competitiveness, and competitiveness improvement plans (CIPs) were developed for and implemented in selected supply chains; and (iii) institutional strengthening of the Investment Development Agency of San Juan, which implemented the program and established the San Juan Quality Agency.

BCRA facilitated the transactions of the financial component of the program and strengthened the efficiency and transparency of loan and sub-loan allocation. This produced excellent results in terms of both the number of projects funded within the province and loan portfolio performance.

The San Juan-IDB credit line was designed as a second-tier lending facility distributed through competitive bidding among the 13 active financial institutions in San Juan province that participated in the program. The financial intermediaries subsequently made sub-loans to local MSMEs following market procedures and fully assumed the associated credit risk.

The lending program has played an important role since its rollout in mid-2008, and continues to be relevant now in the designing of the framework for San Juan Program II. From mid-2008 through May 2016, the Investment Development Agency of San Juan has allocated $408 million among participating intermediary financial institutions (IFIs) through 15 auctions of funds.

These funds, allocated through the BCRA to the IFIs, enabled the financing of 921 sub-loans granted to MSMEs for a total of $400.26 million. Ninety-four percent of the funding provided went toward supporting investment projects, while the remaining 6 percent went toward financing working capital. Micro and small enterprises received over 60 percent of the total number of loans and more than 50 percent of the total amount of financing placed, while MSMEs as a whole

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[1] The data are drawn from the Summary Report on the Socio-Productive Characteristics, Office of the Deputy Secretary for Provincial Coordination, Office of the Secretary of Treasury, Ministry of Treasury and Public Finances.
[2] The selected supply chains are: (i) differentiated wines, (ii) basic wines, (iii) grape juice (must), (iv) mining, (v) preserved olives and olive oil, (vi) fresh fruits, (vii) raisins, (viii) fresh vegetables, (ix) commercially grown vegetables, (x) seeds, and (xi) tourism.

received more than 90 percent of the loans. Eighty-six percent of the loans (93 percent of the loan volume) were issued with terms longer than 36 months.

The nonfinancial component in support of productive value chains included the diagnostic assessments for outreach campaigns and the strategic planning for the implementation of competitive improvement plans (CIPs). The two program phases provided support to 15 supply chains that are considered priorities for the socioeconomic development of San Juan Province. The tools for technical assistance to the productive sector were developed with the participation and consensus of all relevant stakeholders, including producers, companies, boards of trade, professionals, qualified informants, and suppliers. The drafting of CIPs made it possible to identify 34 structured projects,[3] 13 of which have been completed and 21 of which are ongoing. The program granted 375 nonrefundable subsidies to support entrepreneurial capacity improvement plans (*planes de mejora de capacidad empresarial*, or PMCE) through technical assistance, training, and market access (*asistencia técnica, capacitación y acceso a mercados*, or ACTAM).

3. Data and Descriptive Statistics on Participating and Nonparticipating Companies

To estimate the average impact of the program, the authors relied on the data gathered through a survey conducted by the National University of San Juan in collaboration with the provincial Bureau of Statistics. The surveyors interviewed both beneficiary and nonbeneficiary companies. The survey was designed to be representative of the productive sector of the province, and it collected data retrospectively for the years 2004, 2007, 2009, 2011, 2013, and 2014. Its objective was to obtain a representative sample of the nonbeneficiary companies in San Juan. To achieve this purpose, the latest available census data for the different sectors were used as a frame of reference, with a coefficient of variation of no more than 5 percent, which is the default pre-set estimation error in using the Hidiroglou stratification methodology to determine the minimum sample size needed to ensure representativeness. Once the sample size was determined, a random selection of companies was made. Beneficiary companies were all surveyed. The final sample consisted of 664 companies.

Table 1 shows the number of companies by type of benefit. A total of 226 companies received some type of benefit and participated at least once. Access to credit was the most

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[3] The structured projects are an initiative that is consensually identified as a strategic solution that helps to correct the main weaknesses in CIP, and in this way improves the competitiveness of the supply chain as a whole.

popular type of benefit. Among the beneficiaries, 18 received two or more types of benefits, while 15 companies applied for but were not granted benefits.

Table 1. Number of Companies by Type of Benefit

Type of benefit	Number of companies
Did not apply to the program	423
Applied but was not accepted	15
Received credit lines	151
Received ATCAM	52
Participated in structured projects	5
Received credit lines and ATCAM	14
Received credit lines and participated in structured projects	2
Received ATCAM and participated in structured projects	1
Received credit lines, ATCAM, and participated in structured projects	1
Total	**664**

Table 2 shows the number of treated and control companies by sector of economic activity. Since none of the beneficiary companies are from the financial services and community services industries, these sectors were discarded when estimating the program impact.

Table 2. Number of Beneficiary and Nonbeneficiary Companies by Sector

Economic sector	Beneficiaries	Nonbeneficiaries
A. Agriculture	118	53
C. Mining	14	9
D. Industry	85	76
F. Construction	39	19
G. Commercial sector	106	30
H. Hotel and restaurant services	19	18
I. Transportation and communication services	24	15
J. Financial services	1	
K. Real estate services	13	2
N. Social services and healthcare	3	3
O. Community services	4	
Total	**426**	**225**

Table 3 shows the temporal evolution in the sequential admission of beneficiary companies by type of benefit. In 2007, five companies started receiving benefits, four of which were granted credit lines and one received ATCAM; by 2009, there were 58 beneficiaries, 52 of which received credit lines, one received ATCAM, one which applied but was not admitted, and four which

received both credit lines and ATCAM. Table 3 shows the behavioral dynamics of the admitted companies according to the treatment.

Table 3. Number of Companies by Type of Benefit and by Year

Type of benefit	2004	2007	2009	2011	2013	2014
Applied but was not accepted	0	0	1	2	5	8
Received credit lines	0	4	52	102	135	145
Received ATCAM	0	1	1	9	36	46
Participated in structured projects	0	0	0	2	3	5
Received credit lines and ATCAM	0	0	4	9	13	14
Received credit lines and participated in structured projects	0	0	0	1	2	2
Received ATCAM and participated in structured projects	0	0	0	0	1	1
Received credit lines, ATCAM, and participated in structured projects	0	0	0	0	0	1
Total	**0**	**5**	**58**	**125**	**195**	**222**

Table 4 shows the trends in average annual firm sales over time by type of treatment.[4] The average sales of beneficiary companies that were granted credit increased rapidly between 2009 and 2013, during which time more than 57 percent of the beneficiaries received this type of treatment. A similar trend, though of lesser magnitude, was observed in the average sales of the companies that received ATCAM after 2011, with both the number of beneficiaries and average sales growing by more than 100 percent. By contrast, the companies that participated in structured projects did not exhibit a consistent trend of sales growth.

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[4] Beneficiaries here refer to the companies that participated at least once in the program during the period analyzed.

Table 4. Average Annual Firm Sales by Type of Benefit and by Year

Type of benefit	2004	2007	2009	2011	2013	2014
Did not apply to the program	3,586,918	11,560,314	19,604,484	24,355,859	16,452,312	21,847,241
Applied but was not accepted	802,747	995,853	2,740,537	3,446,989	6,159,616	11,682,647
Received credit lines	3,009,384	5,945,405	9,095,254	16,240,805	27,122,935	30,708,183
Received ATCAM	1,327,398	2,109,369	2,008,741	5,526,263	4,799,108	5,152,301
Participated in structured projects	6,385,220	9,327,406	5,895,260	7,703,314	9,220,880	10,742,327
Received credit lines and ATCAM	1,072,728	2,874,537	4,336,143	9,237,278	13,392,384	18,267,912
Received credit lines and participated in structured projects	5,458,058	11,648,731	13,903,989	25,807,382	37,642,947	42,460,680
Received ATCAM and participated in structural projects		18,000	30,800	48,400	180,000	285,000
Beneficiaries of credit lines, ATCAM and structural projects	459,125	902,137	926,267	2,211,297	4,332,986	4,489,610

Table 5 shows the evolution in the average number of employees of companies by the type of benefit they received. Again, the increase in the average number of employees in the companies that received credit accelerated as more companies began to participate in the program. In particular, the period between 2009 and 2011 saw a significant increase in the average number of employees, which stabilized after 2011, with a slightly downward trend.

Among companies that participated in ATCAM, the average number of employees did not show an upward trend as more companies participated; on the contrary, the average number of employees fell consistently since 2007. Among companies that participated in structured projects, there was no apparent trend in the average number of employees as more companies participated.

Table 5. Average Number of Employees by Type of Benefit Received

Type of benefit	2004	2007	2009	2011	2013	2014
Did not apply to the program	15.7	20.1	19.8	24.6	23.7	23.7
Applied but was not accepted	3.1	6.1	25.9	13.6	17.8	22.6
Received credit lines	23.1	30.8	43.1	54.2	51.6	49.6
Received ATCAM	25.0	21.7	19.5	16.9	12.1	11.5
Participated in structured projects	39.5	33.5	15.8	17.4	22.8	18.8
Received credit lines and ATCAM	13.0	18.9	20.3	23.2	19.6	20.6
Received credit lines and participated in structured projects	37.5	65.5	55.0	81.0	51.5	99.0
Received ATCAM and participated in structured projects	0.0	3.0	3.0	4.0	4.0	3.0
Received credit lines, ATCAM, and participated in structured projects	15.0	15.0	13.0	12.0	14.0	12.0

Table 6 shows the evolution in the share of companies investing according to the type of treatment received.[5] Among companies that received credit, there was a small leap between 2009 and 2011 in the share of companies that invest; nevertheless, there was no clear trend in the share of companies investing even though the number of companies that received credit increased by more than 43 percent between 2011 and 2014. Among the companies that received ATCAM, the share of companies that invest increased after 2009, a period that saw the fastest growth in the number of beneficiaries receiving this treatment, which increased fivefold. Companies that participated in structured projects only started to invest after 2011, when the number of beneficiaries increased. However, it is should be noted that this last category included few beneficiaries—only five throughout the period analyzed.

Table 6. Share of Companies that Invest by Year and by Type of Benefit Received

Type of benefit	2004	2007	2009	2011	2013	2014
Did not apply to the program	12.1%	18.8%	22.3%	22.9%	23.8%	19.4%
Applied but was not accepted	12.5%	9.1%	15.4%	21.4%	13.3%	26.7%
Received credit lines	24.2%	30.8%	33.8%	40.4%	39.1%	38.4%
Received ATCAM	23.1%	17.7%	22.5%	23.4%	26.9%	23.1%
Participated in structured projects	0.0%	0.0%	0.0%	0.0%	40.0%	20.0%
Received credit lines and ATCAM	20.0%	38.5%	30.8%	46.2%	57.1%	50.0%
Received credit lines and participated in structured projects	0.0%	0.0%	0.0%	50.0%	50.0%	0.0%
Received ATCAM and participated in structured projects	0.0%	0.0%	0.0%	100.0%	0.0%	0.0%
Received credit lines, ATCAM, and participated in structured projects	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%

4. Strategy for Identifying and Estimating the Average Treatment Effect of the Program

This section presents the assumptions based on which the authors expect to identify the causality of the program on the dependent variables, and the methods used to estimate its magnitude. The causal impact of a program on a treated or beneficiary company is the difference between the observed value of the dependent variable and the value that would have been observed if the company had not participated in the program. Since it is impossible to observe the latter, the main challenge that must be overcome is how to estimate this counterfactual. This challenge entails at least two significant empirical problems. The first is how to estimate a counterfactual outcome for

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[5] This table is to be interpreted in the same way as Table 5. In other words, Table 6 shows the investment by companies that have been program beneficiaries at some point, regardless of the year of participation.

each beneficiary company. If the program's impact is the same for all the companies, this challenge can be overcome by estimating the average impact. The analysis will start with this approach and then conduct sensitivity tests to measure the heterogeneity among the different groups of beneficiaries. The second and more conceptually demanding challenge is that it is impossible to obtain data on the values that the dependent variables would have had if the companies had not participated in the program. This leads to the necessity of estimating the counterfactual. On the one hand, the participating companies choose to apply for loans or to participate in ATCAM, which means that there is a self-selection process. On the other, banks make loans to companies with repayment capacity; therefore, the companies that participate may have characteristics that differentiate them from those that do not. This creates a problem of possible estimation bias if the participating and nonparticipating companies are simply compared against each other. If the companies receiving credit lines are the ones with greater repayment potential, the comparison between participating and nonparticipating companies can overestimate the impact of the program. The same is true for participation in ATCAM; for example, the companies with greater potential to take advantage of ATCAM are the ones that apply.

The solution to these challenges requires proper definition and validation of the assumptions based on which the causal effect of the program on the dependent variables can be empirically quantified. The economic model for estimating the program's impact will be chosen based on the validity of these assumptions.

If variable (D) measures participation in the program, then it takes on the value of 1 (one) if the company participated, and 0 (zero) if the company did not. Additionally, if company "i" participated in the program, then $D_i = 1$, and the value of the dependent variable would be $Y_{1,i}$; if the company did not participate in the program, then $D_i = 0$, and the value of the dependent variable would be $Y_{0,i}$.

$$Y_i = \begin{cases} Y_{0,i} \ if \ D_i = 0 \\ Y_{1,i} \ if \ D_i = 1 \end{cases}. \tag{1}$$

If the decision to apply and successful application to ATCAM (selected by banks or by an agency) are associated with certain characteristics of the companies that do not change over time, then the program's impact can be estimated by using the structure of the data panel and controlling for fixed effects. This method requires the estimation of the average impact assuming that in the absence of the program, the variable component of the dependent variables of the companies that participate in the program would evolve in the same way as that of nonparticipants. Based on this assumption, the average impact is estimated using available data on the companies before and after the program, and assuming that the unobservable components that affect the decision

to apply (and selection by banks or by an agency) to the program do not change over time. If this is the case, accounting for the time difference in the dependent variables before and after participating in the program will remove the effects of these unobservable factors on the dependent variables. As a result, the subsequent difference in the resulting dependent variables through comparison with nonparticipants would be the causal effect of the program. However, the core assumption cannot be empirically verified since the trends in the absence of the program are not observable and hence the validity of the estimates will always depend on the subjective criteria of the researcher. Nevertheless, the trends that preceded the companies' participation in the program are observable; if they differ from each other, one can reasonably assume that the trends would also be different without the program. There are various reasons why the previous trends can be different; for example, banks may approve loans only for the more dynamic companies, or the more dynamic companies could be the ones that apply to receive the benefits of the program. Therefore, if participation in the program depends on past information—in other words, if the companies decide whether to participate based on their past performance, and since the fixed effects estimator does not provide a consistent estimate of the program, it would overestimate the program impact if the more dynamic companies are the ones that receive the benefits. In this case, an alternative estimation strategy is to include the lagged value of the dependent variables as a control (LDV) and assume that this is sufficient to distinguish it from treatment, or in other words: $E(Y_{0,it}|Y_{it-1}, D_{it}) = E(Y_{0,it}|Y_{it-1})$ (see Angrist and Pischke, 2009). Based on this assumption, the equation for estimation is as follows:

$$Y_{it} = \phi Y_{it-1} + \delta D_{it} + \gamma X_{it} + \mu_t + \varepsilon_{it}, \tag{2}$$

where D_{it} is a dummy variable, which takes on the value of 0 (zero) before a company participates in the program and the value of 1 (one) when it participates in the program; X_i is a group of observable variables of company "i" at time "t"; μ_t measures the unobservable effects over time that affect all the companies in the same manner; and ε_{it} is the error term.

This identification strategy is the best one for the Lending Program for the Productive Development and Employment Generation of the San Juan Province, as it is expected that banks selected the more dynamic companies based on the screening mechanism used because it is precisely these companies that have a greater loan repayment capacity.

5. Empirical Results

Equation (2) makes estimates by using ordinary least squares OLS). Table 7 shows the results of the estimation made by equation (2), which incorporates the LDV to control for the sequential entry of companies into the program. A statistically significant effect is observed on the likelihood to invest: the value of the coefficient implies that the likelihood to invest increases by an average of 6.9 percentage points from one year to the next. However, no average impact is observed on the amount of investment. The estimations of the impact of program participation on three variables (logarithm of sales, logarithm of the number of employees hired by the companies, and a labor productivity index defined as the quotient of sales divided by the number of employees) show an average impact of 9.7 percent, 4.3 percent, and 6.4 percent, respectively.

Table 7. Differentiated Estimation of the Program Effect on the Dependent Variables

	Likelihood to invest	Investment	Sales	Number of employees	Productivity
Program participation	0.069***	0.203	0.097***	0.043**	0.064*
	(0.020)	(0.170)	(0.035)	(0.022)	(0.036)
Investment at t-1 = 1	0.644***				
	(0.018)				
Log investment at t-1		0.575***			
		(0.048)			
Log sales at t-1			0.903***		
			(0.013)		
Log number of employees at t-1				0.932***	
				(0.012)	
Log productivity at t-1					0.777***
					(0.020)
Constant	0.114***	4.784***	1.989***	0.327***	2.929***
	(0.032)	(0.655)	(0.191)	(0.042)	(0.230)
Observations	2,622	536	2,154	2,283	2,040
Number of companies	585	196	549	568	542
R2	0.449	0.481	0.877	0,898	0.729
Control for age and age^2	Yes	Yes	Yes	Yes	Yes
Control for foreign capital	Yes	Yes	Yes	Yes	Yes
Fixed effects by year	Yes	Yes	Yes	Yes	Yes
Fixed effects by company	No	No	No	No	No
Fixed effects by company size	Yes	Yes	Yes	Yes	Yes
Fixed effects by industry	Yes	Yes	Yes	Yes	Yes

Note: Standard errors in parentheses: * $p<0.10$; ** $p<0.05$; *** $p<0.01$.

Table 8 shows estimates of the average impact of participation of the companies on the variables of likelihood to invest, logarithm of the investment amount, logarithm of sales, logarithm of the number of employees, and labor productivity. It differentiates between companies that only participate by receiving credit lines and those that receive nonfinancial support (the latter includes companies that received credit lines and nonfinancial support or only received nonfinancial support). The table shows a positive and statistically significant impact on the likelihood to invest among the companies whose participation consisted of receiving credit. The impacts on companies whose participation consisted of receiving nonfinancial support or technical assistance are not statistically significant. Similarly, only the companies that received credit exhibited statistically significant effects on sales, the number of employees, and productivity. However, the estimation of the effects of participating by only receiving credit shows similar results as those obtained in Table 5, with a slight overall increase in the coefficients.

Table 8. Estimation of the Effect of Program Participation on the Logarithm of Sales, the Logarithm of the Number of Employees, and Productivity of Participating Companies

	Likelihood to invest	Investment	Sales	Number of employees	Productivity
Received credit lines only	0.083***	0.249	0.108***	0.046*	0.081**
	(0.023)	(0.172)	(0.037)	(0.024)	(0.038)
Received nonfinancial support	0.037	-0.071	0.057	0.002	0.036
	(0.032)	(0.363)	(0.079)	(0.032)	(0.080)
Investment at t-1 = 1	0.645***				
	(0.019)				
Log investment at t-1		0.580***			
		(0.048)			
Log sales at t-1			0.903***		
			(0.013)		
Log number of employees at t-1				0.927***	
				(0.012)	
Log productivity at t-1					0.776***
					(0.020)
Constant	0.117***	4.791***	1.987***	0.329***	2.949***
	(0.033)	(0.654)	(0.197)	(0.041)	(0.235)
Observations	2,584	534	2,119	2,249	2,008
Number of companies	576	194	540	559	533
R2	0.454	0.489	0.877	0.901	0.729
Control for age and age^2	Yes	Yes	Yes	Yes	Yes
Control for foreign capital	Yes	Yes	Yes	Yes	Yes
Fixed effects by year	Yes	Yes	Yes	Yes	Yes
Fixed effects by company	No	No	No	No	No
Fixed effects by company size	Yes	Yes	Yes	Yes	Yes
Fixed effects by industry	Yes	Yes	Yes	Yes	Yes

Note: Standard errors in parentheses: * p<0.10; ** p<0.05; *** p<0.01.

6. Heterogeneity: Estimating the Program's Average Effect by Company Size and Sector

This section presents the results of the estimation of the impacts on the logarithm of sales, the logarithm of the number of employees, and the likelihood to invest, differentiating between the companies by size and sector. Companies with 20 employees or fewer are classified as "small," and those with 20 or more are classified as "medium-sized" or "large." In terms of the type of economic activity, the analysis estimated the impact by considering the three sectors with the

largest number of companies, namely, the agricultural, commercial, and industrial sectors. There are too few companies in other sectors to generate enough observations to run regressions.

Table 9 shows the estimates of the program effect on the likelihood to invest, the logarithm of sales, and the logarithm of the number of employees for small companies. The analysis shows a positive average effect on the likelihood to invest (7.5 percentage points) and on sales (9.1 percent). The program had no statistically significant impact on the number of employees.

Table 9. Estimation of the Program Effect on Small Companies

	Likelihood to invest	Sales	Number of employees	Productivity
Program participation	0.075***	0.091*	0.020	0.072*
	(0.023)	(0.047)	(0.024)	(0.041)
Log sales at t-1		0.907***		
		(0.014)		
Investment=1 at t-1	0.631***			
	(0.021)			
Log number of employees at t-1			0.924***	
			(0.012)	
Log productivity at t-1				0.782***
				(0.019)
Constant	0.110***	1.975***	0.354***	2.807***
	(0.033)	(0.213)	(0.045)	(0.221)
Observations	2,135	1,434	1,805	1,604
Number of employees	483	385	467	445
R2	0.422	0.853	0.850	0.715
Control for age and age^2	Yes	Yes	Yes	Yes
Control for foreign capital	Yes	Yes	Yes	Yes
Fixed effects by year	Yes	Yes	Yes	Yes
Fixed effects by company	No	No	No	No
Fixed effects by industry	Yes	Yes	Yes	Yes

Note: Standard errors in parentheses: * $p<0.10$; ** $p<0.05$; *** $p<0.01$.

Table 10 shows the estimates of the program's average impact on the likelihood to invest, the logarithm of sales, and the logarithm of the number of employees for medium- and large-sized companies. On average, the program had no positive statistically significant impact on the likelihood to invest in medium- and large-sized companies that participated. However, there is, on average, a positive and statistically significant effect on the participating companies in terms of sales (18.5 percent increase) and number of employees hired (15.5 percent increase).

Table 10. Estimation of Program Effect on Medium- and Large-Sized Companies

	Likelihood to invest	Sales	Number of employees	Productivity
Program participation	**0.004**	**0.185***	**0.155***	**-0.014**
	(0.048)	**(0.068)**	**(0.055)**	**(0.073)**
Log sales at t-1		0.861***		
		(0.043)		
Investment=1 at t-1	0.729***			
	(0.037)			
Log number of employees at t-1			0.957***	
			(0.030)	
Log productivity at t-1				0.707***
				(0.070)
Constant	0.128	2.562***	0.186	3.857***
	(0.143)	(0.637)	(0.163)	(0.752)
Observations	482	434	476	427
Number of employees	101	98	100	97
R2	0.581	0.831	0.816	0.724
Control for age and age^2	Yes	Yes	Yes	Yes
Control for foreign capital	Yes	Yes	Yes	Yes
Fixed effects by year	Yes	Yes	Yes	Yes
Fixed effects by company	No	No	No	No
Fixed effects by industry	Yes	Yes	Yes	Yes

Note: Standard errors in parentheses: * $p<0.10$; ** $p<0.05$; *** $p<0.01$.

Table 11 shows the estimates of the program's average impact on the likelihood to invest, the logarithm of sales, and the logarithm of the number of employees for the companies in the agricultural sector. On one hand, there is a statistically significant increase in the likelihood to invest by 9.9 percentage points. On the other, there is a positive and statistically significant increase of 27.5 percent on sales of participating companies. However, the program had no statistically significant impact on the number of employees in the participating companies.

Table 11. Estimation of Program Effect on Companies in the Agricultural Sector

	Likelihood to invest	Sales	Number of employees	Productivity
Program participation	0.099**	0.275***	0.063	0.179**
	(0.044)	(0.086)	(0.045)	(0.085)
Log sales at t-1		0.797***		
		(0.034)		
Investment=1 at t-1	0.502***			
	(0.043)			
Log number of employees at t-1			0.911***	
			(0.029)	
Log productivity at t-1				0.684***
				(0.042)
Constant	0.073	3.158***	0.258***	4.012***
	(0.046)	(0.452)	(0.064)	(0.472)
Observations	650	511	563	478
Number of employees	142	127	135	123
R2	0.297	0.738	0.881	0.579
Control for age and age^2	Yes	Yes	Yes	Yes
Fixed effects by year	Yes	Yes	Yes	Yes
Fixed effects by company	No	No	No	No
Fixed effects by size of company	Yes	Yes	Yes	Yes

Note: Standard errors in parentheses: * $p<0.10$; ** $p<0.05$; *** $p<0.01$.

Table 12 shows estimates of the average impact of the program on the likelihood to invest, the logarithm of sales, and the logarithm of the number of employees of the companies in the industrial sector. In this case, there is a statistically significant impact on the likelihood to invest, of 10.4 percentage points. However, there is no statistically significant impact on sales or on the number of employees.

Table 12. Estimation of Program Effect on Companies in the Industrial Sector

	Likelihood to invest	Sales	Number of employees	Productivity
Program participation	0.104***	0.014	0.048	-0.024
	(0.039)	(0.056)	(0.034)	(0.054)
Log sales at t-1		0.907***		
		(0.020)		
Investment=1 at t-1	0.643***			
	(0.036)			
Log number of employees at t-1			0.938***	
			(0.023)	
Log productivity at t-1				0.823***
				(0.025)
Constant	0.194***	2.167***	0.460***	2.509***
	(0.049)	(0.300)	(0.091)	(0.303)
Observations	691	590	610	568
Number of employees	152	148	150	147
R2	0.448	0.882	0.897	0.791
Control for age and age^2	Yes	Yes	Yes	Yes
Fixed effects by year	Yes	Yes	Yes	Yes
Fixed effects by company	No	No	No	No
Fixed effects by company size	Yes	Yes	Yes	Yes

Note: Standard errors in parentheses: * $p<0.10$; ** $p<0.05$; *** $p<0.01$.

Table 13 shows the program's average impact on the likelihood to invest, the logarithm of sales, and the logarithm of the number of employees of the companies in the commercial sector. The analysis showed no statistically significant impacts on any of the variables.

Table 13. Estimation of Program Effect on Companies in the Commercial Sector

	Likelihood to invest	Sales	Number of employees	Productivity
Program participation	0.070	-0.054	0.019	-0.044
	(0.051)	(0.060)	(0.032)	(0.069)
Log sales at t-1		0.961***		
		(0.021)		
Investment=1 at t-1	0.622***			
	(0.046)			
Log number of employees at t-1			0.978***	
			(0.018)	
Log productivity at t-1				0.861***
				(0.039)
Constant	0.110**	1.744***	0.418***	2.280***
	(0.045)	(0.364)	(0.125)	(0.442)
Observations	595	476	523	448
Number of employees	131	126	129	126
R2	0.422	0.924	0.916	0.801
Control for age and age^2	Yes	Yes	Yes	Yes
Control for foreign capital	Yes	Yes	Yes	Yes
Fixed effects by year	Yes	Yes	Yes	Yes
Fixed effects by company	No	No	No	No
Fixed effects by company size	Yes	Yes	Yes	Yes

Note: Standard errors in parentheses: * p<0.10; ** p<0.05; *** p<0.01.

7. Conclusions

This study measures the average impact of the Lending Program for the Productive Development and Employment Generation of the San Juan Province in terms of sales, number of employees, and productivity of beneficiary companies. The authors used a LDV model, which enables them to measure the impact of the program and control for bias since companies decide whether or not to participate based on their past performance; and also to control for the sequential entry of the beneficiary companies. The estimations showed that on average there is a positive impact on the participating companies in terms of sales, number of employees, and productivity, which increased by 9.7 percent, 4.3 percent, and 6.4 percent, respectively. Participation in the component of nonfinancial support or technical assistance had no statistically significant impact on the variables analyzed.

Sorting the sample by size into small companies (with 20 or fewer employees) or medium-sized and large companies revealed a positive and statistically significant impact on both groups, while the latter experienced greater impact on annual sales and the number of employees,

approximately twice that of the impact on small companies. However, only small companies saw a positive and statistically significant impact on the likelihood to invest and productivity.

The last part of the study looked at companies in the agricultural, industrial, and commercial sectors. The estimations showed that the companies in the agricultural sector benefited the most in terms of average increase in sales and number of employees, measured on an annual basis. There was a statistically significant increase in the likelihood to invest among companies in the agricultural and industrial sectors. The program had no statistically significant impacts on the companies in the commercial sector.

This impact evaluation can expand our knowledge on the effectiveness of programs that provide productive development financing by granting medium- and long-term loans. However, given the limited scope and the high degree of heterogeneity in the nonfinancial component or technical assistance, no conclusions could be drawn regarding the impact of this component or the combined impact of loans and the nonfinancial component. Based on the results and the discussions above, the authors suggest taking into account the following points in future implementations or expansions of the program:

- The program had positive impacts on the agricultural and industrial sectors, which play an important role in the productive development of the Province of San Juan. Therefore, the authors recommend examining in greater detail the changes in these sectors and supply chains to identify success factors that can be replicated elsewhere.
- Financial inclusion of unbanked companies was not among the objectives of the current program, which is why this type of beneficiary was not represented. If the program wishes to enhance credit access to companies that had none before, the authors recommend using other mechanisms to overcome the challenge of information asymmetry in this segment, such as alternative screening mechanisms (see, for example, Arráiz, Bruhn, and Stucchi, 2016).
- The insignificant impact of the nonfinancial component is counterintuitive, and could indicate that nonfinancial support to companies failed to generate the expected impact on the beneficiaries. However, this result could also be due to the fact that the majority of the beneficiaries of this component received support starting in 2011 and that not enough time has passed for the impacts to take hold. In any case, it would be important to examine this component further, including the process of beneficiary selection, the type of nonfinancial assistance, and their executing agencies.

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Annex A. Additional Information on the Survey Data

The authors had access not only to the program-related data on each company, but also to general information on the companies, such as the date of establishment, the economic sector, the number of employees, sales, exports, and the structure of shareholder equity, among others. The following tables provide more detailed information on the data collected through the survey.

Table A1. Temporal Structure of the Data

Number of companies	Relative frequency	2004	2007	2009	2011	2013	2014
492	74.1	X	X	X	X	X	X
83	12.5		X	X	X	X	X
34	5.12				X	X	X
32	4.82			X	X	X	X
20	3.01					X	X
3	0.45						X
664	**100**						

Table A2. Number of Companies by Sector and Year

Type of economic activity	2004	2007	2009	2011	2013	2014
A. Agriculture	141	151	157	166	171	171
C. Mining	16	21	21	22	23	23
D. Industry	125	140	148	157	161	161
F. Construction	38	51	53	54	57	58
G. Commercial sector	101	117	126	134	136	136
H. Hotel and restaurant services	20	25	29	32	36	37
I. Transportation and communication services	26	33	36	37	38	39
J. Financial services		1	1	1	1	1
K. Real estate services	7	13	13	15	15	15
N. Social services and healthcare	5	6	6	6	6	6
O. Community services	3	4	4	4	4	4
Total	**482**	**562**	**594**	**628**	**648**	**651**

Table A3. Number of Companies by Relationship with Financing Bank

Year	Beneficiaries		Nonbeneficiaries	Total
	Customers	Noncustomers		
2004	0	0	492	**492**
2007	3	1	571	**575**
2009	43	5	559	**607**
2011	93	8	540	**641**
2013	123	10	528	**661**
2014	131	10	523	**664**