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Access to Credit and Employment

Authors:
David Giuliodori
Sebastian Guiñazú
Julián Martinez-Correa
Rodolfo Stucchi

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David Giuliodori† Sebastian Guiñazú‡
Julián Martinez-Correa§ Rodolfo Stucchi ¶

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Abstract

This paper estimates the effect of guarantees provided to SMEs by the Mutual Guarantee Societies (SGRs) on access to credit and firm performance in Argentina between 2010 and 2016. SGRs provided SMEs with guarantees to discount deferred payment checks in the stock market and guarantees to obtain long term loans in the financial sector. Using administrative data for the whole population of firms in Argentina for the period 2007-2017 and combining propensity score matching with fixed effects, we find that both instruments increased the probability of SMEs having a loan from a financial institution. In terms of performance, our results show that while firms that received financial guarantees increased their survival probability and created more jobs, firms that only received guarantees for the discount of checks increased their survival probability but did not create more jobs.

JEL Classification: G21, G23, J21, O16.
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†Universidad Nacional de Córdoba.
‡Universidad Nacional de General San Martín.
§Universidad Nacional de La Plata (UNLP).
¶IDB Invest and Universidad de San Andrés. Esmeralda 130, Ciudad Autónoma de Buenos Aires, Argentina. Email: rstucchi@iadb.org.

1 Introduction

SMEs in less developed countries tend to stay small and are significantly less productive than larger firms. As a result, despite representing the lion's share of businesses, they account only for a small fraction of the countries GDP (Beck et al., 2005a; Ibarraran et al., 2010). One of the main reasons behind this fact is the lack of adequate financing(Beck et al., 2005b). SMEs need access to adequate financing options to finance working capital, capital investments to support their expansion, exports and imports, and innovation activities that can improve their productivity and promote their growth. Without access to adequate financing SMEs are also more exposed to economic shocks.(Beck et al., 2000; Levine, 2005; Pagés, 2010).

The most important market failure preventing SMEs from accessing adequate financing is asymmetric information (Stiglitz and Weiss, 1981). Because firms asking for financing have better information about their own projects and repayment capacity than financial institutions, it can be difficult for financial institutions to distinguish between the type of borrowers. In addition, given that on average SMEs are riskier than larger firms, financial institutions usually treat all SMEs as riskier and therefore they offer less or more expensive credit—or ask for more collateral—than what it would be offered if financial institutions had more information. Another issue in the financial market that affect SMEs is the presence of economies of scale. Credit scoring and evaluation costs remain somewhat the same even for loans of small size, making such deals less appealing to lenders. Similarly, SMEs are proportionally more expensive to deal with in the case of a default because the costs associated with liquidation proceedings are not proportional to the credit amount. Therefore, investors and lenders typically focus on larger firms (Ibarraran et al., 2010).

There is robust evidence that information sharing, credit bureaus, and credit scoring can increase credit to SMEs (Berger et al., 2005; Brown et al., 2009; Love and Mylenko, 2003; Peria and Singh, 2014; Arraiz et al., 2018). However, not all countries have credit bureaus and where bureaus exist, the information they provide may be limited.

In the banking system, the use of collateral is widely applied. When there is a specific asset that guarantees the loan, the lender increases the cost of default for the borrower, thus reducing the moral hazard, and guaranteeing some recovery if the default occurs. However, problems associated with the procedures for the liquidation of assets used as collateral, limitations on the type of assets that can be used as collateral, and uncertainty about property rights hinder access to credit (Beck et al., 2011). In addition, SMEs usually

lack adequate guarantees.

Faced with these imperfections in financial markets, many countries have implemented guarantees programs to improve access to credit of SMEs (Beck et al., 2008a; Honohan, 2010; Arráiz et al., 2014). Additionally, guarantee funds can produce gains in terms of the ability to assess risk if the guarantor has better information about the borrower than the lender (Beck et al., 2008b; Honohan, 2010).[1]

In this paper we study the effect of guarantees on access to credit and performance of SMEs. To do this we assess the effectiveness of guarantees provided by Mutual Guarantee Companies (SGRs, for its spanish acronym Sociedad de Garantía Recíproca) in Argentina. These commercial societies were created in 1995 to improve the access to finance of SMEs. They provide SMEs with guarantees to obtain credit in the financial sector and to discount deferred payment checks in the stock market. An interesting feature of this regulation is that it decentralized the risk assessment of SMEs to SGRs who have the potential to improve the risk assessment by specializing in the SME sector and in some cases they have less asymmetric information because they provide guaranties to SMEs that are their suppliers.

We use administrative data for the whole population of firms in Argentina for the period 2007-2017. This dataset allows us to control for the selection of SMEs who access to guarantees by using propensity score matching and a fixed effects model.

Our results confirm the importance of guarantees to improve access to credit to SMEs. Firms that received guarantees for the discount of deferred payment checks in the capital market increased their probability of having a loan from a financial institution by 9 pp, whereas firms that received financial guarantees increased this probability by 24.5 pp. Our results also show that the default rates of firms that received guarantees to ask for credit in the

[1] Guarantee funds vary widely in terms of ownership structures, administration, financing and risk analysis, as well as in relation to the level of participation of the public sector. Beck et al. (2010) study different schemes of guarantee funds in 46 countries. In general terms, they find an important role for the government in the financing and management of funds, but not so much in the evaluation and recovery of risks, roles that are limited mainly to the private sector. In schemes where the public sector plays an important role in risk assessment or risk management tools are not used, high default rates are observed. The authors classify the guarantee funds into three models: (1) associations or Mutual Guarantee Companies (which can receive support from the government) are a group of companies that subsidize collective guarantees for the loans taken by their members, who are shareholders of the company and / or manage it; (2) public systems operated by government initiatives, which may include management by private parties; and (3) business associations directly financed and operated by the private sector.

financial sector did not increase. Given that those loans are the loans that were guaranteed by the SGR, this might be showing that the risk assessment done by SGR was effective and that SGR actually have more information about SMEs than the financial sector. On the other hand, the default rate of loans in the financial sector of firms that only received guarantees for the discount of checks increased by 1.9 pp.

Our results also show that firms while both types of guarantees increased the survival probability of SMEs, only financial guarantees created more jobs.

The paper contributes to the literature by providing evidence on how an innovative regulation that decentralized the risk assessment away from the traditional banking system was effective in providing guarantees that allowed SMEs to improve access to finance and grow. Although similar regulations were used in other countries, to the best of our knowledge, this is the first evaluation those regulations. The paper also contributes to the literature on financial constraints and firms' growth. By evaluating the effect of different types of guarantees, our paper provides evidence on the importance of long-term financing for firms' growth.

The rest of the paper is organized as follows. Section 2, describes the way SGRs work and the type of guarantees they provide to SMEs. Section 3 describes the dataset and presents some descriptive statistics. Section 4 presents the identification strategy used to estimate the effect of the guarantees on firms access to credit and performance. Section 5 presents and discusses the results. Section 6 present some extensions to the baseline model. Finally, section 6 concludes.

2 The system of mutual guarantees

With the objective of improving the financing conditions of SMEs, the Argentinean government passed a legislation in 1995 to create the mutual guarantees system. After some modifications, the system is still active.[2] This law allowed the creation of a new type of company, the Mutual Guarantee Company (SGR, for its spanish acronym Sociedad de Garantía Recíproca). These companies have two types of partners: protective and participating partners. Protective partners constitute a risk fund to cover the guarantees that are granted to participating partners. Only SMEs were eligible as par-

[2]The system was originally created by Law 24.467 and modified by Law 25.300 and Decree 1076/2001.

ticipating partners.[3] The law created in this way incentives to encourage large firms (protective partners) to play an active role in promoting financing for SMEs in exchange for a number of tax advantages, such as exemption from value-added and income taxes.[4]

SMEs interested in receiving a guarantee applied to the SGR who was responsible for assessing the risk and decided whether to offer a guarantee and its conditions. In many cases, the SMEs are suppliers or clients of the SGR protection partners. Therefore, the SGR have more information about SMEs than the one managed by the financial sector. With this feature the program aimed at decentralizing the risk analysis with agents that were better suite to deal with the asymmetric information.

Although SGRs request SMEs to comply with certain requirements to ensure that they will honor their debt, these requirements are more flexible than those requested in traditional banking. For instance, although SGRs request SMEs to have a guarantee (they call it a counter-guarantee), they are more open to non-traditional guarantees, such as the assignment of billing rights, existing machinery, promissory notes, or bonds. In addition, while banks require guarantees for securities that far exceed the amount of credit requested, SGRs usually accept as counter-guarantees assets of lower value.

The SGRs offered two types of products: guarantees for discounting deferred payment checks (DPC) in the capital market and financial guarantees (FG) that SMEs used to access loans from the banking system. The first product allows SMEs to access short-term financing in the capital market at rates similar to those offered to large firms. The way this product works is the following. First, SMEs negotiate their own checks or third-party checks with a SGR. Then, if they reached an agreement, the SGR endorse the check and send it to the capital market for further negotiation. In this way, in the event of any difficulty in collecting the check, the SGR becomes the main guarantor.

The financial guarantees, on the other hand, provide SMEs with an endorsement from the SGR to obtain financing from the financial sector. Through this product the SGR responds jointly and severally in the case of a default. Given that the SGR guarantee constitutes a safe guarantee for banks, this product allows SMEs to access longer terms and lower rates than

[3]Beside this requirement, there was no other eligibility condition in terms of sector or firm's age.

[4]The fiscal cost of these tax exemptions in 2017 was 138.1 millions of dollars (close to 0.03 percent of the GDP). To be deductible from the tax result the capital contributions and the contributions to the risk fund of the protective and participating partners must be kept in the society for a minimum of two years.

they could have accessed without the intermediation of the SGR.

Table 1: SGR guarantees, 2010-2016.

Type of guarantee	# guarantees	# firms	Guarantees per firm	Amount (s.d.)	Tenor in days (s.d.)
DPC	541,072	7,254	74.6	170,548	128.18
				(333452.26)	(93.77)
FG	13,923	8,792	1.6	2,147,998	1,439.01
				(2537337.28)	(472.63)

Notes: Amount in constant Argentine pesos of December 2017. Standard deviations in parentheses. DPC: Deferred Payment Checks; FG: Financial Guarantees with Financial Institutions for loans with a tenor longer than a year.

We have data from the firms that received a guarantee (participating partners) from a SGR between 2010 and 2016. Table 1 shows that during this period almost 550,000 guarantees were granted to 15,700 firms.[5] Most of the transactions were guarantees for deferred payment checks (91.6%), while 7.3% were financial guarantees for loans with financial entities.[6] In terms of volume the figures are reversed; while the average amount of credit was ARS 2,147,998 for the firms that obtained financial guarantees, the average amount of credit for firms that received guarantees for deferred payment checks was only ARS 170,548. It is also worth noting that SMEs used guarantees for deferred payment checks recurrently; between 2010 and 2016 SMEs used on average 74.6 guarantees.[7]

3 Data and descriptive statistics

We use administrative data from different sources. First, we use data from administrative records of the program. This data provides us with information about the beneficiaries of the different types of guarantees between 2010 and 2016. Second, we use firm-level data about the number of employees and average wage from the National Social Security Administration and sector of activity and location from the Federal Administration of Public Revenues.

[5] In Table 1 the total number of firms is higher because some firms obtained different types of guarantees.

[6] There were other types of guarantees but they reached approximately 1% of the guarantees granted and for this reason we concentrated on guarantees for deferred payment checks and guarantees for loans in financial institutions.

[7] By law the term of the checks cannot be longer than one year.

Table 2: Number of guarantees and firms per year

	DPC		FG	
	Guarantees	Firms	Guarantees	Firms
2010	49,046	1,441	1,088	846
2011	59,686	1,589	1,520	707
2012	65,196	1,809	1,394	1,057
2013	72,206	2,241	1,634	1,314
2014	82,519	2,797	2,160	1,811
2015	95,860	3,153	4,022	3,582
2016	116,559	3,773	2,105	1,833

Notes: DPC: Deferred Payment Checks; FG: Financial Guarantees with Financial Institutions for loans with a tenor longer than a year.

Third, we use data on imports and exports from the foreign trade database. Fourth, we use financial data (debt situations, lender institution, rejected checks) from the Central Bank of the Argentine Republic.

With these sources we construct a panel with the full population of formal firms in Argentina for the period 2007-2017 in which we were able to identify the SMEs that were beneficiaries of the guarantees granted by SGRs between 2010 and 2016. The main advantage of this dataset is its coverage: with the whole population for firms it is more likely to find firms that did not receive guarantees and have similar characteristics to those that did. In addition, the panel structure allows us to control for time invariant individual characteristics that affect the probability of receiving a guarantee, access to financing, and firms performance. Given our objective of estimating the impact of guarantees on SMEs access to credit and firm performance, we restricted the sample to those firms between 2 and 200 employees. We also excluded firms from the public or the financial services sector. Finally, we only considered SMEs that received only one of the benefits, either the deferred payment checks or the financial guarantees (but not both).

Table 3: Descriptive statistics by type of guarantee. Period 2007-2017.

	Non-beneficiaries	DPC	FG
# of firms	663,242	4,093	5,264
Firms characteristics			
# of employees	7.3	22.1	18.4
	(20.2)	(36.6)	(31.3)
Average wage	15,800	20,601	20,418
	(10,622)	(9,054)	(9,474)
Age	19.3	20.4	23.2
	(26.6)	(25.4)	(28.1)
= 1 if exporting	0.03	0.17	0.14
	(0.17)	(0.38)	(0.35)
Value of exports, if exports > 0	28,496	129,160	73,055
	(2,569,023)	(1,074,858)	(782,278)
= 1 if importing	0.05	0.23	0.21
	(0.22)	(0.42)	(0.41)
Value of imports, if imports > 0	42,127	186,371	74,197
	(3,527,086)	(1,351,334)	(464,840)
Financing conditions			
= 1 if access credit	0.19	0.74	0.77
	(0.32)	(0.31)	(0.25)
Value of debt, if access = 1 (in thousands)	2,244	11,343	4,812
	(18,783)	(30,105)	(12,149)
# of banks	0.9	2.5	2.2
	(1.00)	(1.80)	(1.30)
Default, if access = 1	0.03	0.04	0.01
	(0.15)	(0.12)	(0.05)
= 1 if rejected check	0.06	0.08	0.04
	(0.16)	(0.15)	(0.11)
# of rejected checks	1.2	4.5	0.9
	(8.90)	(19.00)	(8.50)

Note: Monetary values in constant Argentine pesos of 2017, except for exports and imports that is expressed in constant dollars of 2017. The binary variables (exports, imports, access to credit, default check rejected) are the maximum for the 2007- 2017 (for example, if the company exported only one year in the period, it takes value 1). DPC: Deferred Payment Checks; FG: Financial Guarantees with Financial Institutions for loans with a tenor longer than a year. Standard errors in parentheses.

Table 3 shows descriptive statistics of the main variables by type of guarantee for the period 2007-2017. The firms that benefited from the guarantees were larger than the non-beneficiaries, they paid higher wages on average, and they were also more likely to export and import. The beneficiaries of financial guarantees were older. In terms of the financial variables, beneficiary firms were more likely to have a loan, and they worked with a larger

number of banks. Beneficiary firms were also less likely to have loans in delinquency.

4 Identification strategy

To estimate the effect of each type of guarantee on access to credit and on SMEs performance it is necessary to compare the value of these variables after the SMEs receive the guarantee with the value these variables would have if the SMEs do not receive the guarantee. The main challenge is that this counterfactual is non-observable. Should SGRs grant guarantees randomly, the counterfactual would have been easy to estimate; it would just be the average of the outcome variables for the firms that do not receive guarantees. However, given that SMEs request the guarantees (i.e., there is self-selection) and then the SGR select SMEs to offer the guarantees, the firms that do not receive guarantees are not a good counterfactual for beneficiaries. In fact, as Table 3 shows, beneficiaries are different from non-beneficiaries and therefore they could have different results even without the benefits of the guarantees.

If the self-selection and the selection done by SGR depends on SMEs characteristics that do not change over time, it is possible to solve the bias caused by the selection problem using a fixed effect model. Then, for each outcome variable, Y, and each benefit D, the estimating equation is:

$$Y_{it} = \beta D_{it} + \gamma X_{it} + \eta_{jt} + \eta_{rt} + \alpha_i + \delta_t + \varepsilon_{it} \tag{1}$$

where Y_{it} are the outcome variables of firm i in year t, D_{it} is a binary variable that takes value one after the year in which firm i is offered a guarantee, α_i is a set of firm-specific time-invariant characteristics, δ_t are year dummies, η_{jt} is a set of industry-year dummies capturing non-observable time-varying factors that affect all firms in the same industry j, η_{rt} is a set of region-year dummies capturing non-observables that affect all the firms in the same region r, X_{it} is a set of other control variables such as the age of the firm, finally, ε_{it} is an error term that is assumed to be not correlated with D_{it}.

The main identification assumption of the fixed-effect model is that in absence of the guarantee the trend in the outcome variables would be the same both for the SMEs that were offered a guarantee and the SMEs that were not offered a guarantee (Angrist and Pischke, 2009). When beneficiaries and non-beneficiaries are too different, this assumption is barely fulfilled. One way to solve this problem is to find a group of non-beneficiaries whose characteristics are similar to those shown by beneficiaries before they received

the guarantee.

To reduce the sample of non-beneficiaries to those with the same characteristics and equal trend in the outcome variables, for each type of benefit and for each cohort of beneficiaries, we use propensity score matching. We estimate the propensity score using a logit model and then we restrict the sample using nearest-neighbor algorithm with 1 neighbor[8]. Considering each cohort separately improves the quality of the pairing. For the estimates of each cohort to be strictly comparable, it is desirable to take the same number of years before and after the benefit for each cohort. Thus, the previous information used and the period in which we measure the impact is homogeneous among cohorts. Given that we have information of the beneficiaries of each type of guarantee for the period 2010-2016 and the panel with the rest of the variables includes 2007-2017, we use the 2011, 2012, 2013 and 2014 cohorts considering 4 years of pre-treatment and 4 years post-treatment (including the year in which the firm receive the guarantee).[9]

Tables A1 in Appendix A and 4 provide evidence on the effectiveness of the matching in finding firms that on average have the same trend in the outcome variables before the beneficiary firms receive the guarantees. Specifically, when comparing treatment firms and the full-sample of non-beneficiaries in Appendix A we find significant differences in the pre-benefit period whereas these differences disappear after the matching procedure. Although we further explore this in the event-study approach, this table already suggests the presence of paralleled trends for the pre-treatment period. This table also confirms that the fixed effects estimation without the propensity score matching might be biased.

[8]We also restrict the sample of potential controls excluding firms that are from industries where there are no beneficiary firms.

[9]Beneficiary firms do not appear twice in the different cohorts. In case of more than one benefit, the year of the first one is taken. Since firms belonging to the excluded cohorts cannot be part of the control group, these were eliminated from the database.

Table 4: Groups' balance in the pre-treatment period by type of guarantee (Control vs Treatment).

	DPC			FG		
	Treat. (1)	Cont. (2)	p value (1)-(2)	Treat. (1)	Cont. (2)	p value (1)-(2)
Access (1 year before benefit)	0.85	0.86	0.80	0.79	0.79	0.96
Access (2 years before benefit)	0.81	0.82	0.95	0.74	0.75	0.65
Access (3 years before benefit)	0.77	0.77	0.96	0.71	0.71	0.79
Access (4 years before benefit)	0.70	0.69	0.80	0.64	0.64	0.93
Credit (in log) (1 year before benefit)	7.39	7.38	0.95	6.22	6.25	0.85
Credit (in log) (2 years before benefit)	6.94	6.86	0.65	5.81	5.86	0.72
Credit (in log) (3 years before benefit)	6.49	6.43	0.74	5.55	5.61	0.70
Credit (in log) (4 years before benefit)	5.83	5.71	0.54	5.00	4.99	0.97
# Banks (1 year before benefit)	2.91	2.77	0.18	2.41	2.48	0.36
# Banks (2 years before benefit)	2.60	2.50	0.32	2.15	2.22	0.35
# Banks (3 years before benefit)	2.29	2.18	0.25	1.93	1.97	0.53
# Banks (4 years before benefit)	1.93	1.81	0.15	1.68	1.70	0.82
Default	0.01	0.01	0.67	0.01	0.01	0.68
Bounced checks	0.13	0.14	0.35	0.09	0.10	0.37
Employment (in log) (1 year before benefit)	2.57	2.57	0.90	2.61	2.55	0.25
Employment (in log) (2 years before benefit)	2.53	2.55	0.67	2.57	2.53	0.36
Employment (in log) (3 years before benefit)	2.46	2.49	0.57	2.51	2.48	0.54
Employment (in log) (4 years before benefit)	2.37	2.39	0.78	2.41	2.36	0.35
Avg. wage (in log) (1 year before benefit)	9.93	9.94	0.45	9.94	9.95	0.46
Avg. wage (in log) (2 years before benefit)	9.90	9.91	0.48	9.91	9.93	0.44
Avg. wage (in log) (3 years before benefit)	9.87	9.88	0.59	9.88	9.89	0.39
Avg. wage (in log) (4 years before benefit)	9.83	9.84	0.51	9.84	9.86	0.32
Exports	0.20	0.20	0.86	0.23	0.21	0.21
Exports (in log) (1 year before benefit)	1.53	1.57	0.84	1.80	1.76	0.83
Exports (in log) (2 years before benefit)	1.47	1.55	0.68	1.70	1.72	0.94
Exports (in log) (3 years before benefit)	1.34	1.47	0.50	1.77	1.81	0.83
Exports (in log) (4 years before benefit)	1.34	1.38	0.84	1.72	1.73	0.96
Imports	0.26	0.26	0.75	0.31	0.29	0.41
Imports (in log) (1 year before benefit)	1.79	1.72	0.72	2.29	2.10	0.32
Imports (in log) (2 years before benefit)	1.88	1.85	0.92	2.21	2.07	0.44
Imports (in log) (3 years before benefit)	1.82	1.81	0.94	2.27	2.01	0.16
Imports (in log) (4 years before benefit)	1.77	1.83	0.75	2.23	2.04	0.30
Age	24.78	22.73	0.10	25.53	25.00	0.64
# Activities	3.52	3.49	0.76	2.60	2.54	0.48

Note: This table includes the collapsed information of the treatment and control groups that arises from the appended datasets for each cohort of beneficiaries. Variant-in-time variables are average values for both groups 1,2,3 and 4 years before the intervention. The dummy variables of province and sector of activity are not presented for simplicity.

Therefore, to estimate the effect of guarantees we use equation (1) using beneficiary firms and firms in the control group. Finally, we use standard errors clustered at the firm level so that the statistical inference is robust to

the serial correlation in the error of each firm (Bertrand et al., 2004).

5 Empirical results

Table 5 shows our main results for each type of guarantee. The first four columns show the effect of the guarantees on firms' financing: the probability of getting a loan, the amount of credit, the number of banks in which the SME has credit, and the probability of default. The last two columns show the effect of the guarantees on the performance variables: probability of survival and employment.

Table 5: Main results of the SGR Program

	Financing conditions				Performance variables	
	Access prob. (1)	Credit (in log) (2)	# of banks (3)	Default (4)	Survival (5)	Employment (in log) (6)
DPC	0.091***	0.393***	0.400***	0.019***	0.017***	0.037*
	(0.013)	(0.085)	(0.081)	(0.007)	(0.004)	(0.021)
Observations	14,761	9,329	9,329	9,329	14,761	14,761
Firms	1,868	1,177	1,177	1,177	1,868	1,868
R2 adjusted	0.119	0.159	0.242	0.143	0.0713	0.120
FG	0.245***	0.899***	0.495***	-0.003	0.016***	0.089***
	(0.013)	(0.077)	(0.071)	(0.005)	(0.003)	(0.019)
Observations	19,787	11,111	11,111	11,111	19,787	19,787
Firms	2,503	1,400	1,400	1,400	2,503	2,503
R2 adjusted	0.164	0.178	0.217	0.104	0.0812	0.125

*** Significance at 1% level; ** significance at 5% level; *significance at 10% level. Robust standard errors between brackets.
Note 1: The variables DPC and FG are binary variables that take value one from the year in which the company receives the respective benefit. All regressions models include the age of the firm, firm level fixed effects, year-industry dummies, year-province dummies, and year-cohort dummies. Standard errors are clustered at the firm level.
Note 2: The survival variable is a binary variable equal to 1 in t if the firm declares formal employment in t + 1.

The effect of receiving a guarantee on the probability of getting a loan is positive and significant for both types of guarantees. The effect is larger for financial guarantees. While receiving a financial guarantee increased the probability of receiving a loan by 24.5 pp, receiving a guarantee to discount a deferred payment check increased the probability of receiving a loan by

7.9 pp. In this last case, the effect on access to credit is indirect; i.e., the possibility of discounting checks in the capital market also increased the likelihood of getting a loan from the financial system. Finally, getting a guarantee also increased the number of banks where SMEs have a loan.

Another important finding is that the probability of default does not increase in the case of financial guarantees. This shows that SGRs were doing a good in selecting firms that has the capacity and willingness to repay the loans. The firms that received a guarantee for the discount of deferred payment checks on the other hand increased the default probability.

In terms of firms survival, both instruments increased the survival probability by almost 1 pp.

The effect on employment, on the other hand, showed clear differences. While the financial guarantees that allowed for long term financing increased employment by 9%, the guarantees for the discount of deferred payment checks showed a barely significant effect.

6 Extensions

Effect by size. Table 6 shows the effect of each instrument by size of the beneficiary firm. We consider micro, small, and medium-sized firms. The largest effect of guarantees on access to credit are observed for micro and small firms. In these group of firms is also where the default rate increased in the case of guarantees for deferred payment checks. The effect on employment is also observed in micro and small firms. On the other hand, the effect on survival is similar for firms of different size.

Dynamic effect and Placebo. To analyze the dynamic impact of the guarantees as well as testing for pre-existing differences between treatment and control groups we also estimate the following dynamic-specification:

$$Y_{it} = \sum_{k=-4}^{4} \beta_k D_{i,t}^k + \gamma X_{it} + \eta_{jt} + \eta_{rt} + \alpha_i + \delta_t + \varepsilon_{it} \tag{2}$$

where $D_{i,t}^k$ is equal to one the kth year before/after the benefit for beneficiary firms. Table 7 shows the estimation results. This estimation provides evidence on an increasing effect of both guarantees on the survival probability. We only find an increasing effect on employment for financial guarantees; the effect on employment of guarantees for discounting checks is not significant.

Another interesting fact is that the default seems to be increasing over time for the beneficiaries of the deferred payment checks (while it tends to decrese in the financial guarantees, although not significantly).

Table 6: Effect of guarantees by size of the firm

	Financing conditions				Performance variables	
	Access prob. (1)	Credit (in log) (2)	# of banks (3)	Default (4)	Survival (5)	Employment (in log) (6)
A. DPC						
Micro	0.108***	0.303***	0.176*	0.019**	0.012***	0.084***
	(0.018)	(0.104)	(0.094)	(0.009)	(0.004)	(0.026)
Small	0.095***	0.461***	0.416***	0.023**	0.022***	-0.006
	(0.018)	(0.110)	(0.103)	(0.012)	(0.004)	(0.027)
Medium	0.001	0.440***	0.870***	0.005	0.024***	-0.038
	(0.023)	(0.137)	(0.186)	(0.016)	(0.005)	(0.038)
Observations	14,761	9,329	9,329	9,329	14,761	14,761
Firms	1,868	1,177	1,177	1,177	1,868	1,868
R2 adjusted	0.117	0.159	0.244	0.143	0.0718	0.115
B. FG						
Micro	0.323***	0.827***	0.306***	-0.006	0.011**	0.119***
	(0.018)	(0.097)	(0.085)	(0.005)	(0.004)	(0.026)
Small	0.212***	0.985***	0.589***	-0.006	0.019***	0.082***
	(0.017)	(0.089)	(0.090)	(0.006)	(0.003)	(0.023)
Medium	0.084***	0.805***	0.601***	0.012	0.026***	-0.003
	(0.021)	(0.126)	(0.136)	(0.009)	(0.003)	(0.030)
Observations	19,787	11,111	11,111	11,111	19,787	19,787
Firms	2,503	1,400	1,400	1,400	2,503	2,503
R2 adjusted	0.171	0.177	0.218	0.103	0.0817	0.120

*** Significance at 1% level; ** significance at 5% level; *significance at 10% level. Robust standard errors between brackets.

Note 1: The treatment variables, one for each group, are binary variables that take value one from the year in which the firm receives the corresponding guarantee. All models are estimated by Ordinary Least Squares (OLS) and include firm and year fixed effects. The age, industry-year and region-year fixed effects are also included as controls. Standard errors are clustered at the firm level.

Note 2: The survival variable is a binary variable equal to 1 in t if the firm declares formal employment in t + 1.

Note 3: Firms that had between 2 and 10 average registered workers in the four years prior to the cohort are considered micro firms; those that had between 11 and 50 registered workers are taken as small firms; finally, firms with more than 50 registered workers are considered medium.

This dynamic specification also allows us to run a placebo test by testing whether the effect of the guarantees is different from zero before firms received the guarantee. This finding is very important given the nature of the selection problem. Given that SGRs might select firms with a better performance, it is important to check that that firms in the control group are on average equal to the firms that received the guarantees before they receive the guarantees.

7 Conclusions

One of the main reasons why firms face financial constraints is asymmetric information. To face this problem, the banking system uses collateral both as a way to reveal the type of borrower and to recover part of the loan in case the borrower defaults the debt. SMEs are in general more constrained than large firms because asymmetric information affects them in to a greater extent and because they usually do not have good collateral.

In this paper we provide evidence on the effectiveness of guarantees as a tool to improve access to credit and the performance of SMEs, by evaluating the effect a regulation that created a new type of commercial society, Mutual Guarantee Companies, in Argentina. This new type of society provided guarantees to SMEs to discount deferred payment checks on the capital market or to apply for loans in the financial market. We used information about the whole population of firms in Argentina for the period 2007-2017 to assess the effectiveness of each type of guarantee. This information allowed us to construct a panel of firms and to control for the selection of firms that received guarantees by using a combination of propensity score matching and fixed effects.

Our results confirm the importance of guarantees to improve access to credit for SMEs. Firms that received guarantees for the discount of deferred payment checks in the capital market increased their probability of having a loan from a financial institution by 9.1%. Firms that received financial guarantees increased the probability of having a loan from a financial institution by 24.5%.

Our results also show that SGR were effective in assessing credit risk of SMEs. The default rate of the guaranteed loans did not increased and in several cases decreased compared to non-beneficiaries.

In addition, our results show that firms that received financial guarantees increased their survival probability and created more jobs. On the other hand, firms that only received short-term guarantees for the discount of

Table 7: Dynamic effect of guarantees

	Financing conditions				Performance variables	
	Access prob. (1)	Credit (in log) (2)	# of banks (3)	Default (4)	Survival (5)	Employment (in log) (6)
A. DPC						
DPC Year -3	0.000	0.032	0.051	0.003	-0.000	-0.019
	(0.017)	(0.046)	(0.057)	(0.006)	(0.000)	(0.016)
DPC Year -2	-0.007	0.086	0.029	0.003	-0.001	-0.010
	(0.019)	(0.057)	(0.074)	(0.005)	(0.001)	(0.022)
DPC Year -1	-0.007	0.060	0.039	0.006	-0.001	0.000
	(0.020)	(0.063)	(0.090)	(0.006)	(0.001)	(0.026)
DPC Year 0	0.066***	0.366***	0.306***	0.000	0.019***	0.047
	(0.021)	(0.093)	(0.101)	(0.007)	(0.005)	(0.029)
DPC Year +1	0.082***	0.442***	0.454***	0.018*	0.018***	0.038
	(0.022)	(0.109)	(0.114)	(0.010)	(0.005)	(0.031)
DPC Year +2	0.093***	0.462***	0.473***	0.032**	0.022***	0.011
	(0.022)	(0.118)	(0.120)	(0.012)	(0.006)	(0.033)
DPC Year +3	0.103***	0.475***	0.444***	0.037***	0.008	0.006
	(0.023)	(0.151)	(0.128)	(0.013)	(0.006)	(0.036)
Observations	14,761	9,329	9,329	9,329	14,761	14,761
Firms	1,868	1,177	1,177	1,177	1,868	1,868
R2 adjusted	0.115	0.159	0.240	0.144	0.0719	0.113
B. FG						
FG Year -3	-0.005	-0.001	-0.043	-0.004	0.000	-0.013
	(0.014)	(0.045)	(0.051)	(0.005)	(0.000)	(0.014)
FG Year -2	-0.009	0.058	-0.048	-0.001	0.000	-0.002
	(0.017)	(0.055)	(0.068)	(0.004)	(0.001)	(0.019)
FG Year -1	-0.002	0.019	-0.042	-0.001	0.000	0.007
	(0.019)	(0.060)	(0.080)	(0.004)	(0.001)	(0.022)
FG Year 0	0.193***	0.690***	0.295***	-0.003	0.014***	0.064**
	(0.019)	(0.086)	(0.094)	(0.005)	(0.004)	(0.025)
FG Year +1	0.250***	1.041***	0.510***	-0.005	0.020***	0.082***
	(0.019)	(0.096)	(0.097)	(0.007)	(0.005)	(0.027)
FG Year +2	0.249***	0.870***	0.505***	-0.010	0.015***	0.089***
	(0.020)	(0.113)	(0.106)	(0.009)	(0.006)	(0.030)
FG Year +3	0.270***	1.074***	0.533***	0.001	0.018***	0.108***
	(0.021)	(0.132)	(0.108)	(0.009)	(0.005)	(0.032)
Observations	19,787	11,111	11,111	11,111	19,787	19,787
Firms	2,503	1,400	1,400	1,400	2,503	2,503
R2 adjusted	0.163	0.179	0.217	0.103	0.0813	0.119

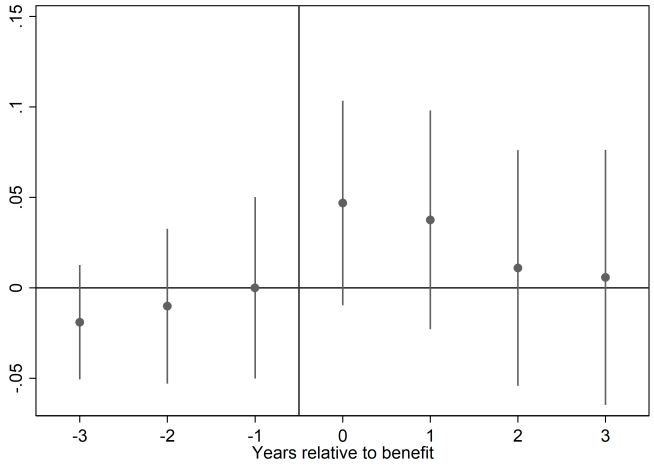
*** Significance at 1% level; ** significance at 5% level; *significance at 10% level. Robust standard errors between brackets.

Note 1: The variables DPC and FG Year 'k' are binary variables that take value one k years before or after the company receives the respective benefit. All regressions models include the age of the firm, firm level fixed effects, year-industry dummies, year-province dummies, and year-cohort dummies. The comparison baseline is Year -4. Standard errors are clustered at the firm level.

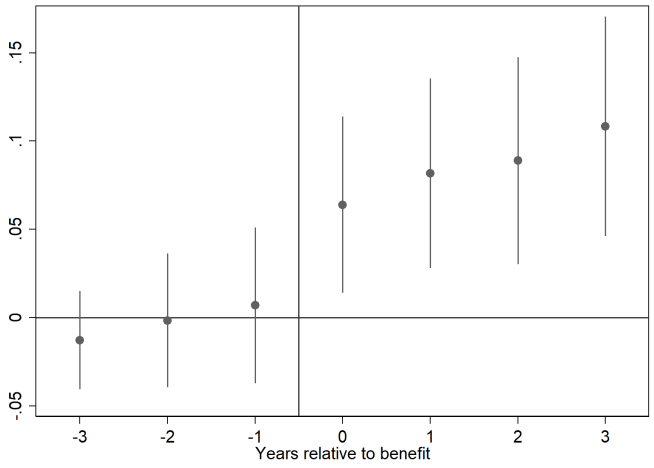
Note 2: The survival variable is a binary variable equal to 1 in t if the firm declares formal employment in t + 1.

Figure 1: Dynamic effect of guarantees on employment

(a)DPC



(b) FG



checks, improved their survival probability but did not created more jobs.

In terms of firms size, we found higher impact in terms of access to credit and employment in micro and small firms.

Finally, we also estimated the dynamic effect of the guarantees. This estimation confirmed previous findings and provided evidence on an increasing effect of financial guarantees on survival and employment. This dynamic specification also allowed us to run a placebo test and to provide evidence in favor or our identification strategy.

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Appendix A

Table A1: Groups' balance in the pre-treatment period by type of guarantee (Full Sample vs Treatment).

	DPC			FG		
	Treat. (1)	F.S. (2)	p value (1)-(2)	Treat. (1)	F.S. (2)	p value (1)-(2)
Access (1 year before benefit)	0.85	0.31	0.00	0.79	0.31	0.00
Access (2 years before benefit)	0.81	0.29	0.00	0.74	0.29	0.00
Access (3 years before benefit)	0.77	0.28	0.00	0.71	0.28	0.00
Access (4 years before benefit)	0.70	0.26	0.00	0.64	0.26	0.00
Credit (in log) (1 year before benefit)	7.39	2.18	0.00	6.22	2.18	0.00
Credit (in log) (2 years before benefit)	6.94	2.05	0.00	5.81	2.05	0.00
Credit (in log) (3 years before benefit)	6.49	1.96	0.00	5.55	1.96	0.00
Credit (in log) (4 years before benefit)	5.83	1.85	0.00	5.00	1.85	0.00
# Banks (1 year before benefit)	2.91	1.12	0.00	2.41	1.12	0.00
# Banks (2 years before benefit)	2.60	1.04	0.00	2.15	1.04	0.00
# Banks (3 years before benefit)	2.29	0.96	0.00	1.93	0.96	0.00
# Banks (4 years before benefit)	1.93	0.87	0.00	1.68	0.87	0.00
Default	0.01	0.02	0.08	0.01	0.02	0.00
Bounced checks	0.13	0.11	0.03	0.09	0.11	0.05
Employment (in log) (1 year before benefit)	2.57	1.81	0.00	2.61	1.81	0.00
Employment (in log) (2 years before benefit)	2.53	1.83	0.00	2.57	1.83	0.00
Employment (in log) (3 years before benefit)	2.46	1.81	0.00	2.51	1.81	0.00
Employment (in log) (4 years before benefit)	2.37	1.76	0.00	2.41	1.76	0.00
Avg. wage (in log) (1 year before benefit)	9.93	9.80	0.00	9.94	9.80	0.00
Avg. wage (in log) (2 years before benefit)	9.90	9.77	0.00	9.91	9.77	0.00
Avg. wage (in log) (3 years before benefit)	9.87	9.73	0.00	9.88	9.73	0.00
Avg. wage (in log) (4 years before benefit)	9.83	9.70	0.00	9.84	9.70	0.00
Exports	0.20	0.07	0.00	0.23	0.07	0.00
Exports (in log) (1 year before benefit)	1.53	0.46	0.00	1.80	0.46	0.00
Exports (in log) (2 years before benefit)	1.47	0.48	0.00	1.70	0.48	0.00
Exports (in log) (3 years before benefit)	1.34	0.49	0.00	1.77	0.49	0.00
Exports (in log) (4 years before benefit)	1.34	0.49	0.00	1.72	0.49	0.00
Imports	0.26	0.11	0.00	0.31	0.11	0.00
Imports (in log) (1 year before benefit)	1.79	0.79	0.00	2.29	0.79	0.00
Imports (in log) (2 years before benefit)	1.88	0.81	0.00	2.21	0.81	0.00
Imports (in log) (3 years before benefit)	1.82	0.83	0.00	2.27	0.83	0.00
Imports (in log) (4 years before benefit)	1.77	0.82	0.00	2.23	0.82	0.00
Age	24.78	26.57	0.07	25.53	26.57	0.23
# Activities	3.52	1.86	0.00	2.60	1.86	0.00

Note: This table includes the collapsed information of the treatment group and the full sample (F.S.). Variant-in-time variables are average values for both groups 1,2,3 and 4 years before the intervention. The dummy variables of province and sector of activity are not presented for simplicity.