

The Effect of Partial Credit Guarantees on the Credit Market for Small Businesses

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Abstract

Understanding the extent to which interventions in financial markets can reduce liquidity constraints is of crucial importance to researchers and policymakers. Even though there is consensus that limited access to financing can reduce the number of profitable projects undertaken by entrepreneurs, there is little conclusive research on how well governmental interventions address this problem. We explore this question by examining the Partial Credit Guarantee Intervention in Chile between 2003 and 2006. We shed light not only on how credit insurance affects the access of entrepreneurs to the financial system, but also on how it affects the default rates of entrepreneurial endeavors.

1 Introduction

An important body of literature documents a positive and significant relationship between market development and entrepreneurship.¹ This strong tie has motivated interventions by several governmental and international financial institutions in financial markets.² Anecdotal evidence suggests that these interventions improve the access of small entrepreneurs to the financial markets. However, there are not many studies testing and documenting this effect.

Many policymakers believe that lack of collateral reduces access to finance for small businesses and new ventures. That is, they feel that banks would be reluctant to grant large or long-term loans in the absence of collateral. This belief may explain the adoption of partial loan guarantees as a way to facilitate access to financing in many countries. However, it is unclear whether the lack of collateral is in fact a barrier to entrepreneurship. After all, money is fungible, and banks could use other strategies to overcome the costs associated with loans to low collateral investors. On the other hand it is not clear that loan guarantees will alleviate the problems associated with the lack of collateral. And even if they do, they may generate other distortions in the economy that could potentially be as costly as the liquidity constraints associated with the lack of collateral.

In this paper we investigate the effects of a partial credit guarantee in the market of credit for small entrepreneurs. We use a database on the Partial Credit Guarantee (PCG) Intervention in Chile between 2003 and 2006. We study both the effect of PCG on small entrepreneurs' access to financing, and its effect on the incentives of entrepreneurs and creditors.

We find a significant effect of PCG on the availability of credit for medium and small businesses and no significant effect in the default rates of entrepreneurs and creditors using PCG. The explanation for this finding is that PCG alleviates a market failure in the equity markets, increasing the availability of financing for entrepreneurs with low level of wealth.

According to the standard asymmetric information literature, we will expect higher risk associated with PCG loans, because of the moral hazard and adverse selection problems associated with low levels of equity. Nonetheless, we do not find a higher risk of default associated with PCG loans. We can explain this finding if the risk aversion of investors in the economy is wealth dependent and investors getting PCG loans are relatively poor, which is probably the case given the structure of PCG.

The rest of the paper is organized as follows. In section 2 we present a description of the Partial Credit Guarantee Intervention in Chile, in section 3 we describe the data, the econometric procedures and the results, in section 4 we present an analysis of the results, and in section 5 we present the conclusions.

¹ Rajan & Zingales 1998, 2003, Bertrand, Schoar & Thesmar 2004, Gompers, Lerner & Desai 2003, Jayaratne & Strahan 1996, Evans & Jovanovic 1989.

² For example, the Inter-American Development Bank estimates that their interventions to reduce the financial market deficiencies in the Caribbean and Latin-America during 1990 and 2004 account for a total of US\$ 22 billion dollars.

2 Description of the Fund

The Partial Credit Guarantee Fund in Chile is administrated by a governmental agency. It has capital of 60 million dollars, which can be levered up to 10 times according to the current law. Therefore the administration can allocate insurance funds for a total of 600 million dollars.

Between January 2003 and September 2006 (the period of analysis) the fund insured approximately 100,000 operations at an average coverage ratio of 68%. The average amount for these loans was 15,000 dollars and the average maturity was 22 months. The maximum maturity is regulated by law and equal to 120 months.

The administrator does not insure the individual loans but uses formal financial institutions (banks and credit cooperatives) as the intermediaries. The insurance funds are allocated to the financial institutions through a sealed bid auction. Each institution submits a bid which consists of a total amount and a coverage ratio. The funds are allocated according to the lowest coverage ratio (the criterion is that institutions offering a lower coverage ratio have priority in getting the funds over institutions requesting higher coverage ratios), in the event of a tie in the coverage ratio, the funds are allocated in proportion to the requested amount. The institutions can allocate the insurance among their clients according to their own commercial policies, subject to satisfying the following restrictions:

- 1- Only new loans can be insured.
- 2- Only loans below US\$ 200,000 can be insured
- 3- The maximum coverage ratio for loans below US\$ 120,000 is 80%
- 4- The maximum coverage ratio for loans above US\$ 120,000 is 50%
- 5- Clients getting insurance can not have delayed payments in the financial system at the time the loan is issued
- 6- Only clients with sales below US\$ 1,000,000 can get insured loans

The administrator charges a different fee to each financial institution, the fee depends on the institution default probability (based on its previous history). The fee can not exceed 2%, and the administrator has the right to exclude a financial institution from the system if its default probability is too high.

There are three different types of insurance offered by the fund: insurance for working capital loans, insurance for short time investment loans, and insurance for long run investment loans. The insured working capital loans work as a credit line. There is a maximum amount that the debtor can get, but the money is given to the clients only when he requests it, and the investor only pays interest for the amount that he requests (not for the maximum amount he can get). This type of loan has a flexible repayment structure and a maximum maturity of 24 months. The short run investment loans have fixed payments and a maximum maturity of 36 months, and the full amount for the loan is disbursed at the time of the issuance. The long run investment loan has fixed payments a minimum maturity of 37 month and a maximum maturity of 120 months, and the total amount is also disbursed in total at the time the loan is issued. For the present study we are focusing on the long run investment loans, which represent 16% to 25% of the operations depending on the year. The reason for using only long run investments loans is that it is difficult to distinguish between a short run investment loan

and a working capital loan using the available data, making the analysis of this type of insurance problematic.

Currently there are 17 institutions participating in the auctions, however the 5 biggest institutions account for 90% of the insured loans. In the present study we are only using information from these 5 institutions.

The following table presents the number and amount of operation by year and the percentage of long run investments operations

year	operations	ammount US\$ millions	mean (US\$)	Long run operations %
2001	2228	16	7405	13
2002	28924	227	7864	12
2003	30867	310	10032	12
2004	34683	431	12433	15
2005	33030	468	14173	22
2006	25673	448	17466	24
2007	15225	292	19203	25

2 Data and Results

Data

The data for the study were obtained by merging two datasets; the dataset of the Partial Credit Guarantee Administrator, containing the bids and results of each institution in every insurance auction, and the dataset of the bank regulation office, containing the loans and delayed payments of every individual and company in the financial system.

Using this information we constructed the 7 variables we use in the regression analysis. Each variable has the subscripts i, t meaning institution i at time t .

We restricted the analysis to loans under US\$ 200,000 to reduce the noise added by the credit market for big companies.

- Loan $_{i,t}$: Total amount of loans under US\$ 200,000 issued by institution i at time t .
- Bid $_{i,t}$: Amount of insurance bid by institution i at time t
- Allocated $_{i,t}$: Amount of insurance allocated to institution i at time t
- Delay1 $_{i,t}$: Percentage of clients with delayed payments (30 to 60 days delay) at the time the loan was issued ($t=0$)
- FDelay1 $_{i,t}$: Percentage of clients with delayed payments (30 to 60 days delay) one year after the loan was issued
- Delay2 $_{i,t}$: Percentage of the clients with delayed payments (60 to 90 days delay) at the time the loan was issued ($t=0$)
- FDelay2 $_{i,t}$: Percentage of clients with delayed payments (60 to 90 days delay) one year after the loan was issued

The explanatory variable is Allocated. The dependent variables are Loan, FDelay1 and FDelay2. The variable Bid is used as a control in all the regressions, the variables Delay1 and Delay2 are used as controls in the regressions for payment delays.

The Loan regression explores whether the amount of loans issued by institution i at time t depends on the amount of insurance provided by the insurance administrator.

The FDelay1 and FDelay2 regressions, investigate whether the insured loans have a higher probability of default than the loans issued without insurance. Delay1 and Delay2 are used to control for financial health at the time the loan was issued.

All regressions include institution and time fixed effects.

Results

Total Loan Regression

In this regression we are testing whether institutions that get more insurance funds issue more loans. Alternatively, financial institutions could use the insurance to reduce the risk exposure of loans they would have issued independently of receiving insurance; if that is the case we would observe no effect of the allocated insurance on the total amount of loans.

The following table presents the effect of allocated insurance on the total amount of loans for new and old clients

Total Loans for New Client and Old Clients as a Function of Allocated Insurance

	New clients	Old Clients
ins_cod==A	2.00E+08 [1.228e+08]	-1.29E+09 [2.178e+08]***
ins_cod==B	-1.14E+08 [1.356e+08]	-9.49E+08 [2.405e+08]***
ins_cod==C	2.60E+08 [1.141e+08]**	1.09E+09 [2.024e+08]***
ins_cod==D	1.65E+08 [1.249e+08]	-6.90E+08 [2.215e+08]***
Allocated	0.857 [0.094]***	0.705 [0.166]***
Bid	0.025 [0.094]	0.186 [0.167]
Observations	223	223
Adj. R-squared	0.69	0.58

Standard errors in brackets

* significant at 10%;

** significant at 5%;

*** significant at 1%

We see in the table that there is a statistically significant (at the 1% level) effect of the allocated insurance on the amount of Loans issued by financial institutions. The effect on loans to new clients is bigger than the effect on loans to old clients, but the difference is not statistically significant.

The problem with these regressions is that we can not reject reverse causality. In other words, we cannot reject an explanation that “when financial institutions are planning to lend more money they request more insurance,” which *is apriori* as likely as the direct causality; “when financial institutions get more insurance funds they issue more loans.” We are in part addressing this problem by including the control variable Bid. Bid is highly correlated with each financial institution’s investment opportunities, and therefore helps in reducing the probability that reverse causality is explaining the observed effect. This control does not totally eliminate the possibility of reverse causality as the allocated amount is still endogenous.

Robustness Analysis

To help rule out reverse causality we are dividing the sample into “insurance intensive economic sectors” and “non insurance intensive economic sectors.” If reverse causality is driving the results we should observe that the allocated insurance has a positive effect on both insurance intensive and non insurance intensive economic sectors. Indeed, if banks get more insurance funds each time they are planning to expand their operations, the correlation should be positive regardless of whether insurance is being used for a specific economic activity.

To run this analysis, we constructed a table showing the share of the insurance that is allocated to each economic sector. We also include in the table the fraction of loans in each economic sector that is insured (as a fraction of all the loans in that economic sector).

	Share of Insurance	Percentage of the economic sector using insurance
Agriculture	10.3%	11%
Fruit growing	1.3%	6%
Forestry	0.9%	8%
Fishing	0.6%	6%
Mining	0.3%	5%
Oil and gas	0.1%	3%
Food	0.8%	6%
Textile	0.9%	5%
Wood and furniture	1.0%	8%
Paper	0.6%	8%
Oil derived chemicals	0.5%	4%
Other chemicals	2.1%	6%
Other manufactures	0.7%	7%
Electricity, gas and water suply	0.3%	7%
Housing	1.7%	4%
Construction	4.0%	7%
Wholesale trading	6.3%	7%
Retail	28.7%	13%
Transportation	17.7%	21%
Communications	0.5%	6%
Finance and insurance	0.3%	1%
Services for companies	6.5%	5%
Social services	13.8%	4%

We observe that almost 60% of insurance goes to agriculture, retail and transportation. And for these specific economic sectors the insured loans represent more than 10% of the total loans. On the other hand, the share of insurance that goes to other sectors like housing, construction, services to companies, and wholesale trade, among others, is less than 10% for each of these sectors, and it represents a similarly small fraction of insured loans as a fraction of the total loans. Therefore I divided the sample into two groups: more than 10% insurance (using both criteria) and less than 10% insurance (using both criteria). The only sector that was excluded from both samples was social services. The reason is that the fraction of insured loans in this sector is small, but the fraction of the insurance that goes to this sector is big. Therefore the interpretation of a regression for this sector would not be straightforward.

Insurance Intensive Sectors

	New Clients	Old Clients
ins_cod==A	5.42E+08 [6.957e+07]***	-1.01E+08 [8.624e+7]
ins_cod==B	1.27E+08 [7.679e+07]	-3.52E+08 [9.519e+7]***
ins_cod==C	1.69E+07 [6.466e+7]	-1.80E+08 [8.015e+7]**
ins_cod==D	3.08E+08 [7.018e+7]***	-5.29E+07 [8.700e+7]
allocated	0.543 [0.053]***	0.383 [0.066]***
bid	-0.033 [0.053]	0.116 [0.066]*
Observations	224	224
Adjusted R-squared	0.74	0.59

Standard errors in brackets

* significant at 10%; ** significant at 5%; *** significant at 1%

Non Insurance Intensive Sectors

	New Clients	Old Clients
ins_cod==A	-6.26E+08 [1.343e+08]***	-1.33E+09 [1.346e+08]***
ins_cod==B	-4.85E+08 [1.483e+08]***	-9.19E+08 [1.485e+08]***
ins_cod==C	-6.22E+08 [1.248e+08]***	-7.27E+08 [1.251e+08]***
ins_cod==D	-5.02E+07 [1.355e+08]	-5.82E+08 [1.357e+08]***
allocated	0.164 [0.103]	0.054 [0.103]
bid	0.073 [0.103]	0.116 [0.103]
Observations	224	224
Adjusted R-squared	0.19	0.36

Standard errors in brackets

* significant at 10%; ** significant at 5%; *** significant at 1%

As we can see, the regressions for the insurance intensive sectors continue to show a significant effect of allocated insurance on the total loans. On the contrary, the non

insurance intensive sectors show no significant effect of allocated insurance on total loans.

This result suggests that the direction of causality is: more insurance → more loans.

Default Analysis

In this section, we explore the relation between insurance and loan performance, measured as likelihood of having the loan in arrears 1 year after the loan is issued. As we will argue in the analysis of the data, an important body of research establishes that in the absence (reduction) of private collateral, the investor will have fewer incentives to repay the loan. On the other hand, in presence of insurance and/or private collateral the bank will have fewer incentives to screen and monitor. This reasoning implies that there should be a positive correlation between allocated insurance and the probability of having the loan in arrears.

To test this hypothesis we regress the probability that a loan issued by institution i is in arrears one year after the loan was issued (measured as number of investors with loans in arrears over total number of loans) on the amount of insurance allocated to that institution. As before, we control for Bid. In these regressions, we also control for financial health at the time the loan was issued, measured as number of loans given to investors with loans in arrears over total number of loans. We use two different measures for loan arrears: Delay1 for delays in the payment between 30 and 59 days and Delay2 for delays in the payment between 60 and 89 days. The future operator is represented by the letter F, therefore FDelay1 means Delay1 one year after the loan was issued, and FDelay2 means Delay2 one year after the loan was issued.

All Sectors

	New Clients FDelay1	New Clients FDelay2	Old Clients FDelay1	Old Clients FDelay2
ins_cod==A	-1.81E+10 [9.980e+09]*	9.67E+09 [4.618e+09]**	-1.07E+10 [7.124e+09]	2.07E+09 [4.293e+09]
ins_cod==B	-4.85E+10 [1.062e+10]***	1.33E+10 [4.916e+09]***	-1.30E+10 [7.930e+09]	4.06E+09 [4.779e+09]
ins_cod==C	-1.05E+09 [9.424e+09]	2.34E+10 [4.361e+09]***	-1.03E+10 [8.502e+09]	1.25E+10 [5.123e+09]**
ins_cod==D	-2.10E+10 [9.931e+09]**	-6.96E+08 [4.596e+09]	2.02E+10 [7.421e+09]***	7.81E+09 [4.472e+09]*
Allocated	-11.006 [7.223]	-1.368 [3.343]	-4.178 [5.521]	-1.79 [3.327]
Bid	4.491 [7.307]	-4.453 [3.382]	7.335 [5.510]	0.035 [3.320]
Delay1	0.746 [0.140]***	0.023 [0.065]	0.612 [0.067]***	0.159 [0.041]***
Delay2	-0.075 [0.386]	0.459 [0.179]**	0.179 [0.186]	0.383 [0.112]***
Observations	224	224	224	224
Adjusted R-squared	0.25	0.2	0.55	0.43

Standard errors in brackets

* significant at 10%; ** significant at 5%; *** significant at 1%

Insurance Intensive Sectors

	New Clients FDelay1	New Clients FDelay2	Old Clients FDelay1	Old Clients FDelay2
ins_cod==A	-6.69E+09 [9.644e+09]	-2.29E+09 [5.445e+09]	-2.30E+10 [9.455e+09]**	-8.74E+08 [5.996e+09]
ins_cod==B	-1.45E+10 [1.064e+10]	-2.05E+09 [6.007e+09]	-2.10E+10 [1.048e+10]**	-1.56E+09 [6.647e+09]
ins_cod==C	3.53E+09 [9.036e+09]	7.50E+09 [5.102e+09]	-7.89E+09 [9.106e+09]	6.43E+09 [5.775e+09]
ins_cod==D	1.90E+09 [9.713e+09]	-2.93E+09 [5.485e+09]	7.10E+09 [9.553e+09]	3.03E+09 [6.058e+09]
Allocated	1 [7.376]	3.069 [4.165]	-6.398 [7.225]	-5.008 [4.581]
Bid	-6.694 [7.444]	-4.731 [4.203]	10.682 [7.281]	4.751 [4.617]
Delay1	0.703 [0.236]***	-0.031 [0.133]	0.166 [0.150]	0.06 [0.095]
Delay2	0.396 [0.326]	0.714 [0.184]***	0.164 [0.244]	0.371 [0.154]**
Observations	224	224	224	224
Adjusted R-squared	0.12	0.03	0.01	0.1

Standard errors in brackets

* significant at 10%; ** significant at 5%; *** significant at 1%

Non Insurance Intensive Sectors

	New Clients FDelay1	New Clients FDelay2	Old Clients FDelay1	Old Clients FDelay2
ins_cod==A	1.19E+09 [1.342e+10]	1.97E+10 [6.375e+09]***	1.69E+08 [1.037e+10]	4.70E+09 [6.229e+09]
ins_cod==B	-7.39E+10 [1.479e+10]***	2.11E+10 [7.027e+09]***	-5.83E+09 [1.150e+10]	6.04E+09 [6.904e+09]
ins_cod==C	-3.74E+09 [1.302e+10]	2.85E+10 [6.187e+09]***	-5.05E+09 [1.170e+10]	1.60E+10 [7.026e+09]**
ins_cod==D	-2.88E+10 [1.371e+10]**	-6.24E+08 [6.514e+09]	3.37E+10 [1.064e+10]***	1.12E+10 [6.390e+09]*
Allocated	-21.619 [10.086]**	-4.208 [4.791]	-1.549 [7.969]	-0.886 [4.785]
Bid	4.983 [10.187]	-5.237 [4.839]	5.537 [7.881]	-1.772 [4.733]
Delay1	0.658 [0.140]***	0.046 [0.067]	0.633 [0.055]***	0.073 [0.033]**
Delay2	-0.307 [0.454]	0.381 [0.216]*	0.056 [0.190]	0.575 [0.114]***
Observations	224	224	224	224
Adjusted R-squared	0.22	0.16	0.55	0.32

Standard errors in brackets

* significant at 10%; ** significant at 5%; *** significant at 1%

As we can see in the regressions, after controlling for Delay1, Delay2 and Bid, the amount of insurance allocated to institution i has no significant effect on the probability of having a loan in arrears. The only exception is the probability of having a loan in arrears for a new client getting a loan in a sector that is not insurance intensive. In that

case an increase in the amount of insurance funds allocated has a negative effect on the probability of having a loan in arrears, meaning that this client is less likely to default. It is always possible that this result is driven by a type 2 error.³ It could also be the case that banks getting more insurance funds reallocate capital from non insurance intensive sectors to insurance intensive sectors, and at the same time “cherry pick” in the non insurance intensive sectors.

4 Analysis of the results

In the previous section we showed that there is a significant positive correlation between credit insurance and the total amount of loans under US\$ 200,000 that are issued by financial institutions. This positive correlation is evidence that PCG allow banks to serve a set of clients that would have, in the absence of PCG, stayed out of the financial system. We also find no evidence of a correlation between PCG and the average default rates of loans under US\$ 200,000 that are issued by the financial institutions. The absence of a correlation is evidence that PCG is not creating moral hazard and/or adverse selection problems in the lender debtor relation.

In this chapter we try to explain the economics behind these findings. If PCG is generating more loans among clients that were previously out of the financial system, there has to be a market failure that PCG is helping to solve. We first discuss whether PCG is helping to reduce the traditional market failure that arises in an asymmetric information environment. As we explain later in the chapter, PCG will increase rather than decrease any asymmetric information problem, therefore the positive correlation between PCG and total amount of loans is not explained by this phenomena. A second explanation we analyze is a failure in the private equity markets; we find that in a developing country a failure in the equity market is likely to happen. Further we show how PCG may alleviate this market failure by mitigating the risk that financial institutions face when issuing debt to low equity investors. The only shortfall of the equity market failure interpretation is that it does not explain the absence of correlation between PCG and default rates. Indeed, *ceteris paribus*, PCG replacing equity in a bank debtor relation would result in lower incentives to exert effort for both the bank and the debtor. At the end of the chapter we explain why in this particular setting PCG will not result in lower incentives to exert effort. We do that by analyzing how PCG affects the incentives of the people who make loan decisions at the bank for amounts less than US\$ 200,000, and by analyzing how PCG affects the incentives of the debtors that are targeted with this instrument; investors with profitable investment opportunities but low personal equity.

Asymmetric Information Problem

In a bank debtor relation PCG usually replaces private collateral. Therefore, to understand the implications of PCG on the total amount of loans we first want to understand to what extent PCG will emulate the incentive implications that private collateral has on debtors.

In their seminal work, Myers and Majluf described the moral hazard problem faced by a debt holder if the investor is highly levered. In an unsecured loan, the loss to the

³ Type 2 error is the probability of finding a significant effect when the real effect is not significant.

investor is limited by the equity, but the gain is unlimited and equals the total revenue less the payment to the bank. On the other hand, the return for the bank in the case of project success is limited to the repayment of the loan capital plus the interest rate, and the loss in case of failure equals the total loss minus a constant (the equity). Therefore, in a low equity loan contract relation, the creditor receives the marginal loss in case of failure and the debtor receives the marginal gain in case of success. This means that the optimal investment for the bank will be different from the optimal investment for the debtor. If the bank makes the investment decision it will choose conservative projects (low losses in case of failure and low profits in case of success). On the other hand, if the investor makes the decision, he will choose risky projects (high losses in case of failure, high profits in case of success). If the bank cannot observe and/or enforce the debtor investment decision, the investor will maximize his own utility and choose high risk projects. This problem is in part alleviated if the creditor can take possession of private collateral in the event of a project failure. Indeed, by giving the bank access to some of the debtor's private assets in case of failure we are reallocating part of the loss in case of failure from the bank to the investor, thereby reducing the investor's incentives to take excessive risk. When collateral is replaced by PCG, we are still reducing risk for the bank in case of a project failure, but the risk is not reallocated to the investor, but to the government instead. From the investor's perspective, a PCG loan contract has the same return structure as an unsecured loan contract, and therefore its investment decision will remain unchanged. Therefore PCG does not alleviate moral hazard.

The second problem that could occur under asymmetric information is adverse selection. In their seminal work, Stiglitz and Weiss showed that even in well-developed markets credit rationing could arise if banks are not able to distinguish safe from risky investors. Stiglitz and Weiss model a market with two types of investors: risky and safe. The expected return from both types of investors is the same but the probability of failure is higher for the risky investors. In this setup the banks will sometimes choose an interest rate that does not clear the market. The reason is that if the interest rate is low enough, both investors will be willing to take the loan and the risk of failure will be equal to the average risk of failure of the risky and the safe type. As the bank increases the interest rate it will reach a value C where only risky investors will be willing to accept the loan contract⁴ and therefore the risk of default will be equal to the risk of the risky type. Depending on the fraction of risky and safe investors and the probability of default of each one, the interest rate that maximizes the bank's return will be set below C which could be too low to clear the market, generating liquidity constraints in the economy. This happens if the bank is unwilling to increase the interest rate to avoid attracting only bad clients. Bester (1985) showed that collateral could be used to screen safe from risky investors, which will eliminate the asymmetric information problem that generates credit rationing. Bester's basic reasoning is that the bank could offer two different contracts--one with a high interest rate and low collateral and one with a low interest rate and high collateral. Bester shows that these two contracts can be designed

⁴The reason is that in the event of a failure both the risky and the safe clients get $-E$, as the losses are limited to the value of the equity. On the other hand in the event of a success the risky clients get a profit $R-d(1+i)$ which is bigger than $r-d(1+i)$, the profit of a safe client. In these equations R and r represent the return of a risky and a safe investor in the event of a success, i represents the interest rate and d represents the face value of the loan. Assuming risk neutrality and the same probability for a success and for a failure, an investor will be willing to accept a loan only if, in the event of a success, the profit is at least E . It is clear from the profit equation that risky clients are willing to accept a higher interest rates than safe clients.

in such a way that risky clients prefer the high interest, low collateral loans while safe clients prefer the high collateral, low interest rate contract. This self-revealing mechanism works because collateral is relatively more costly for risky clients. If the probability of default is not observable, the bank cannot offer a different PCG price to safe and risky investors, and therefore it cannot replicate Bester's self-revealing mechanism.

We conclude that asymmetric information does not explain why PCG generates more loans in the credit markets. Other than that, the former analysis suggests that loans issued with PCG may be riskier than loans issued with private collateral. In the next sections we provide an alternative explanation of why PCG generates additional loans in the economy and explain why a loan issued with PCG shows similar levels of default to other loans in the financial system

Equity market explanation

In the last years the private equity markets have exhibited significant growth in developed countries. The difference between private equity contracts and regular debt contracts is that holders of private equity retain a much higher fraction of control rights over the project (in a regular debt contract the debt holder only gets the control rights in the event of a default). Kaplan and Stromberg (2003) show that private equity contracts regulating the relation between the equity holders and the management are extremely sophisticated in terms of the allocation of control rights under different states of the world. To make these contracts effective, you need a high level of enforceability and a legal system that can resolve economic matters in a relatively short time. In developing and underdeveloped countries this market is very small compared to traditional financial markets. Low enforceability and legal delays in solving economic matters are potentially two important reasons to explain why this market has developed so slowly in developing countries.

In the absence of private equity markets, the only alternatives to raising equity are to use the public equity markets or to use personal funds.

The problem with public equity markets is that the fixed costs of issuing stock is high and the asymmetry of information between potential buyers of the stock and the management of a small businesses or start-up is important. These two problems make it too expensive for these type of businesses to raise equity in the public markets.

When there is no private equity market and the public equity market is too expensive, the only way to raise equity is to use personal funds. People usually use this type of funding for traditional business projects where risk is limited and capital needs are relatively low. In well developed countries with high levels of wealth and/or high saving capacity, raising the funds to open a small business is possible in a reasonable amount of time. In developing and underdeveloped countries the savings capacity and wealth levels of individuals are often too low to raise the levels of equity that are needed to start a business.

The combination of the lack of private equity markets, the high cost of public equity markets, and relatively low private wealth and saving capacity creates a market failure where only relatively rich people have access to equity. The key characteristic of this

failure is that access to equity is not only related to the quality of investment opportunities, but also to the wealth level of the investor.

This market failure would be solved or at least alleviated if low equity individuals had access to the banking system based only on their financial opportunities. This will happen only if banks were able to diversify all the investors' risk. The problem is that some of the clients' risk is systematic; this part of the risk cannot be diversified, and can only be mitigated by lending to high equity individuals. This implies that low equity individuals will also have limited access to the banking system.

PCG mitigates this failure because the government assumes a fraction of the systematic risk for low equity investors, and therefore this investor get better access to the banking system.

Asymmetric information and incentives to default

In the former section we explained why partial credit insurance does not solve moral hazard and adverse selection on the side of the investor, which creates potential problems for PCG. These problems can be aggravated if moral hazard and adverse selection occur on the creditor side. There is an important body of research documenting that banks have an important role in screening and monitoring the projects of the creditors. As we previously explained, when a bank issues an unsecured loan it faces most of the risk of the project, therefore they have strong incentives to invest in screening and monitoring to reduce the probability of failure. More specifically, banks issuing unsecured loans will invest in screening and monitoring until the marginal return for the bank for screening and monitoring equals the marginal cost they exert on these activities.

When a loan is issued with PCG at a k coverage ratio, the bank only faces a fraction $(1-k) < 1$ of the marginal losses. In this situation the bank will invest in screening and monitoring until the marginal cost of screening and monitoring equals $(1-k)$ times the marginal gain of these activities. Assuming a concave cost function, the bank will maximize its utility by exerting lower effort in screening (selection of worse project) and lower effort in monitoring (less control over clients performance).

Given that PCG does not preclude moral hazard and adverse selection on the debtor side, and also reduces the incentives of the banks to screen and monitor the investors' projects, we should expect that credit issued with PCG underperforms credit issued without PCG. The reason is that in the absence of PCG, credit will be either unsecured or issued with private collateral, and in both cases the incentives to exert effort will be higher at least for some of the participants in the loan contract. If the credit is unsecured the bank will have more incentives to screen and monitor, and if the credit is associated with collateral the investor will have more incentives to reduce the risk of failure.

We observe in the data that credit issued with PCG shows no significant difference in default rates than the average credit issued in the market. This observation is puzzling given the analysis we presented in the former paragraphs. This means that there may be some other economic mechanisms that are missing from the analysis which work in the opposite direction from those implied by the traditional asymmetric information literature. In the next paragraphs I will analyze the specific incentives that both the bank

and the debtor have for the particular case of PCG backed loans. It is important to note that PCG credit will present some particularities that help explain these findings: It targets relatively small loans and it targets relatively low equity individuals. We show that both the creditor and the debtor having a PCG loan contract could have similar incentives than creditors and debtors having non PCG contracts.

The bank

In the traditional analysis the bank chooses screening and monitoring to maximize its total utility. If PCG entered in the maximization as we previously discussed we would observe a reduction in the marginal utility of screening and monitoring and hence the bank would maximize its total utility by reducing these activities.

One way to explain similar levels of screening and monitoring would be that the marginal income of the decision maker in the bank is not affected by PCG. For big loans the decision maker will be a high rank manager which will probably include the bank aggregated utility in the optimization (as long as his wage is linked to the total banks' profits). For small loans, the decision maker is often a loan officer, even though in some cases the loan officer's decision has to be approved by a risk committee. The information the risk committee gets is mainly provided by the loan officer, and therefore subject to his manipulation. In our conversations with the management of the Chilean banks, we realized that the loan officers' wage is not linked to collateral of PCG levels, but only to the amount of loans they issue and the default rate of their loan portfolio, we have to further investigate the reasons for this wage structure.

Given the wage structure of loan officers they have incentives to minimize the default probability independent of the amount of collateral or PCG associated with the loan.

The debtor

As mentioned earlier, if the debtor had no cost in case of default he would have incentives to maximize only the cash flows of the project in case of a success, resulting in excessive risk taking. We observe that this does not happen and clients with loans backed with PCG behave similarly to regular clients.

This implies that furthermore, the cost they face in the event of a project failure is similar to the cost faced by regular clients.

There are two factors that can explain this observation. In the first place, the law regulating PCG contracts allow banks to ask for private collateral on top of the PCG. In the previous section we explain that PCG generates additional loans in the economy because it reduces the bank's exposure to systematic risk, this implies that clients getting PCG could have relatively less equity than regular clients. Nonetheless this equity may represent the same or even a higher fraction of the investors' total wealth, if PCG is being used for relatively poor investors. If the risk aversion of the investors is wealth dependent, the disutility of the investor in the event of a default will not only depend on the total amount of collateral but also on the fraction of his total wealth that this collateral represents. This means that, for a relatively poor investor, losing collateral of 20% of the total loan could be as costly as losing collateral of 70% of the total loan for a relatively rich investor.

Other than that, a relatively poor agent will be more dependent on the banking system for the financing of future projects, because he has low personal assets. Therefore the cost of defaulting will be not only the collateral but also the present value of the projects he will not be able to finance.

These two effects at the debtor side together with the incentives at the loan officer's side explain why loan with PCG could have similar levels of default than other loans in the economy.

5 Conclusions

The empirical analysis shows a robust and statistically significant effect of PCG in the market for credit under US\$ 200,000 in Chile. This is evidence that PCG is generating loans that would have not been issued without PCG.

We analyzed the causes of this impact. We first rejected the hypothesis that PCG is solving an asymmetric information problem, which is usually the most important role of collateral reported in the literature. As an alternative explanation, we argued that the strong effect of PCG on the credit market is explained by a failure in the market of private equity. Indeed, in an economy where sophisticated contracts are difficult to enforce and where legal matters take a long time to be settled, private equity markets will be underdeveloped, and therefore personal wealth and/or saving capacity will be excessively important as an equity source, creating a market failure. We also explained that if access to the banking system were related to levels of equity, which happens when there is systematic risk in projects, access to bank financing will be reduced for relatively poor individuals, exacerbating the market failure previously described. PCG alleviates this market failure, because the government assumes a fraction of the systematic risk for relatively poor individuals, making it more attractive for financial institutions to lend to this segment of the market.

The results also show that PCG credit does not show a significant difference in default rates with respect to the rest of the credit in this segment of the market, even though the standard asymmetric information theories would predict higher risk for PCG backed loans. We explain this finding in terms of incentives at both the bank and the creditor level. At the bank level, the wages of loan officers, who are usually the decision makers in this segment of the market, does not depend on the amounts of collateral or PCG but only on default rates and amount of loans issued. This generates incentives to monitor and screen private collateral loans and PCG loans with the same intensity. At the debtor level, the incentives to reduce the probability of default will not be reduced if PCG went to relatively poor individuals with wealth dependent risk aversion, or if the PCG went to agents whose only source of financing was the bank, which is likely the case given the structure of PCG.

Summarizing, PCG is effective in reducing liquidity constraint for relatively low wealth individuals, and generates low distortions to the performance of banks and investors.

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