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Macroprudential Policies, Credit Guarantee Schemes and Commercial Loans: Lending Decisions of Banks

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Abstract

We study the effect of two counter-cyclical credit policies on banks' lending decisions using a unique matched bank-firm-loan micro level data. These two policy actions; the implementation of commercial real estate loan-to-value (LTV) ratio and an expansion of a collateral guarantee scheme, stand out as they give banks the freedom of choice over which customers would be subject to the policy and to what degree. When faced with a tightening LTV policy banks elect to issue loans above the LTV cap to firms with better credit history and with whom they had a longer established relationship while charging higher interest rates. Firms constrained by the policy see an increase in their other borrowing while the policy is in effect, suggesting the existence of credit spillover across loan types. In the second policy, banks again prefer firms with healthier credit histories and with whom they have a longer relationship into the credit guarantee scheme. In contrast to the existing literature, we do not see a preference for riskier firms under the scheme. At the same time, among the recipients of scheme loans, those with stronger relationships but relatively lower past credit performance have larger amounts of loans. Scheme loans are issued for larger amounts, longer periods and at higher interest rates compared to loans issued to non-participating firms during the same period. Finally, we show that the increase in scheme utilization has resulted in lower other corporate credit and general-purpose loans in banks with larger utilization rates.

JEL Codes: E51, E61, G20, G21, G28, G32

Keywords: Macroprudential Policy, Commercial Real Estate, Corporate Loans, Loan-to-Value, Relationship Banking, Credit Guarantee Schemes

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Non-Technical Summary

In response to the economic and financial fluctuations seen in the post-Global Financial Crisis era, many economies resorted to the use of macroprudential tools as well as fiscal measures help reduce financial volatilities and maintain economic stability through well-functioning markets. This study elaborates on the impacts of two such counter-cyclical policies on banks' lending behavior through the credit channel utilizing bank-firm-loan level micro-data. The first policy we investigate is a widely implemented macroprudential policy limiting the loan-to-value (LTV) ratio of commercial real estate (CRE) loans to 50%. The second policy provided government collateral guarantees up to 100% for collateral constrained firms through the Credit Guarantee Fund (CGF), a policy that aimed to ease access to credit frictions for SMEs.

The implementation of these two widely used policies in Turkey stand out by design, as they give banks the freedom to choose which firms are restricted by or participate in the policies and to what degree. In particular, the LTV regulation allowed banks to issue CRE loans above the LTV cap at a capital cost, presenting the opportunity to investigate the impact of changes in macroprudential policies on banks' decision making on and selection criteria in firms that exceeded the limit. In CGF loans, banks were again free to choose among applicant firms which ones would be selected into the scheme. In other words, while the policies gave the outline of the rule set, the transmission of both policies were subject to banks' risk and prudence preferences, expectations, and balance sheet constraints. Therefore, we use these settings to examine how banks have exercised their freedom of choice over which firms are selected to participate or are held exempt from the policies, as well as to what extent are the firms participating in the policies.

Results suggest that while the LTV ratio cap was in effect, banks chose to issue CRE loans above the cap to firms they had longer established relationships with, and firms with a healthier default history. However, banks reflect the capital cost of issuances above the cap onto the loan by charging a higher interest rate. This interest rate impact on loans above the cap reverses after the abolition of the policy, as these same firms start receiving loans with interest rates lower than peers, further corroborating that the increase in the interest rates was due to banks reflecting their costs onto the CRE loans. Firms that are constrained by the LTV policy see an increase in their other borrowing while the policy is in effect, and a decline in these loans after the conclusion of the policy compared to other firms.

Moreover, we find that banks prefer to issue the CGF loans to firms with longer established relationship, and have a healthy credit history. Firms with CGF loans have larger amounts issued to them for longer periods and at a higher interest rate compared to non-CGF firms. Among firms with CGF loans, those with stronger relationships but relatively lower past credit performance have larger volumes in both CGF and non-CGF loans. Firms that receive larger amounts of CGF loans see an increase in their amount, maturity and interest compared both to firms that use smaller CGF loans and also compared to their own past loans. Finally, we show that the increase in CGF utilization has resulted in lower other corporate credit and general-purpose loans in banks with larger utilization rates.

1 Introduction

In the aftermath of the global financial crisis, various new monetary policy instruments were introduced to create an easing cycle supportive of the macroeconomic outlook. In this setting, a divergence occurred between countries directly impacted by the crisis, and those peripherally impacted in terms of economic fundamentals and macroeconomic outlook. On one hand, as the use of unconventional monetary policy measures heightened, the economic downturn in directly impacted economies was softened but lasted a long time. On the other, peripheral emerging economies were now satiated with cash as the easing cycle in developed economies created a higher risk appetite and search-for-yield investment in emerging economies. As a result, policy makers in emerging economies had to supplement monetary policy tools with macroprudential instruments aimed at increasing the resilience of their financial systems. Over time, as the financial cycle slowed down for emerging economies, easing of macroprudential tools as well as the introduction of fiscal measures helped reduce financial volatilities and maintain economic stability through well functioning markets. This paper looks at the effects of two such counter-cyclical policies, a widely implemented macroprudential policy on leverage ratios and a collateral guarantee scheme, on banks' risk taking behavior through the credit channel in a large emerging economy using bank-firm-loan level micro-data in a quasi-experimental setting.

The policies are namely a loan-to-value (LTV) restriction on commercial real estate (CRE) loans implemented between 2011-2013, and the intensified utilization of the Credit Guarantee Fund (CGF), a collateral guarantee scheme, since the beginning of 2017. These two policy instruments are widely used globally, employed across both advanced and emerging economies. LTV in retail and commercial loans ranks as the most widely used macroprudential policy given its ease in implementation and effective outcomes in targeting the credit cycle.¹ Many countries such as Korea and Ireland have been able to curb house price and housing credit growth with the utilization of LTV restrictions.² CGFs on the other hand, are used to provide a targeted section of the economy facing difficulties in accessing external financing with the opportunity to do so by alleviating some of the financial frictions they face especially as a counter-cyclical tool during economic downturns (The EBCI Vienna Initiative, 2014). In fact, CGFs are not only used at the national level in over 70 economies but also by international global banks (Gozzi and Schmukler, 2016).

Both policies discussed were used as counter-cyclical measures whose mechanisms work through collateral constraints, target the credit channel, and their unique set-up allowed banks the flexibil-

¹IMF-FSB-BIS, 2016 lists LTV related measures as having the highest cumulative 'usage' number as well as the highest average cumulative tightening rate compared to all other macroprudential policies globally.

²Cerutti et al, 2017 provide a global overview, see Hallissey, 2014; Kim, 2014; Igan and Kang, 2011 for country-specific outcomes.

ity to *chose* which customers would be subject to these policies and to what degree.³ The way in which banks exercise this choice is important as their intermediation effects not only the financials of the recipient or non-recipient firms, but it impacts the monetary policy transmission mechanism (Bernanke and Gertler, 1995) and it can have real outcomes on the economy (Bernanke and Gertler, 1989; Gilchrist and Zakrajšek, 2007; Matsuyama, 2007). The LTV cap on CRE loans was introduced at the time of high capital inflows as a means to prevent a build up in leverage and slow down the heating real estate market. The introduction of the cap impacted the opportunity cost of the real estate investment by requiring a portion of the value of the real estate be presented as down payment at the time of purchase.⁴ This created a financial constraint for firms that were unable to provide said down payment, and deterred them from investing in the CRE, lowering their demand for credit. The CGF as a collateral guarantee scheme works in the other direction, alleviating the collateral constraints inherent in SME lending to stimulate credit growth.⁵

In addition to the parallels in their mechanisms, the implementation of both of these policies by design allowed banks freedom in both the choice of participants and the choice of their degree of exposure to the policy. This design feature stands in contrast to many other examples where loan recipients are restricted by sector, geography, or the pre-existing real estate investments (Beck et al, 2010; Hallissey et al, 2014). It is this freedom of choice present in the design of both of these policies, which gave banks the opportunity to differentiate between firms motivates our approach to study them together using the Turkish example. The analysis will therefore focus on this choice, and investigate the mechanism and motivating factors of the resulting effects on bank credit channel. Below, we detail the choice mechanism present in both of the policies further.

The LTV cap limited credit utilization in CRE loans by 50% of the value of the real estate starting in 2011 in an effort to slow down both CRE loan growth and real estate prices.⁶ While the cap was completely lifted in April 2013, when in effect for 27 months, the policy allowed for a flexible

³Both of the measures discussed are generally utilized counter-cyclically globally. While this was also true in the implementation of both policies in the Turkish example, the CGF does not necessarily have to be a counter-cyclical policy by design. Rather, it signals a state where a certain group of firms, which are targeted by the policy, are experiencing tight credit conditions which may have a high correlation with the financial cycle, but may also reflect a change in investor preferences and lending criteria by financial intermediaries.

⁴Firms were faced with the comparison of foregone returns of the down payment in another investment avenue versus investing in the CRE. Meanwhile, firms which did not have the required capital at hand, but had access to other types of financing, such as working capital loans, may have rerouted funds that would have been used for other purposes to complete the CRE investment. If their alternative method required uncollateralized loans - which are priced higher than collateralized loans such as CREs - this would have increased the average cost of their investment.

⁵A large portion of the literature looks at SME lending particulars which is well summarized in Beck et al, 2010. Agency problems as well as the weak capital structure and lack of collateral dominate most of the discussions on obstacles to SME access to financing. As we discuss below, the Turkish CGF was particularly designed to alleviate agency/moral hazard problems.

⁶See Baziki and Çapacıoğlu, 2017 for a study of the retail LTV cap and its impact on the credit market and financial soundness of the banking sector.

implementation: the bank could choose to issue a CRE loan with an LTV ratio above the cap, in which case the loan amount above the cap would be deducted from the banks' capital in the calculation of its capital related vitals. In other words, banks were given a *choice* to lend at LTV ratios exceeding the limit subject to the capital cost mentioned. Figure 1 shows that banks were taking advantage of this set-up, and a sizeable number of the loans issued during these 27 months were leveraged above the LTV cap.

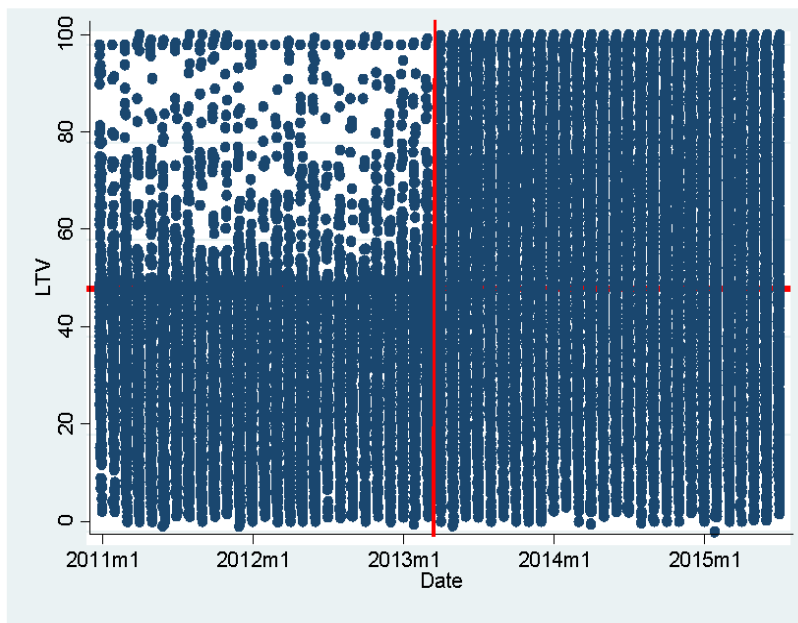


Figure 1: CRE LTV ratios after the introduction (left half) and conclusion (right half of the graph) of the LTV restriction. The dots show the LTV ratio of every CRE loan issued between 2011 and 2016. There is a high number of dots above 50% during the implementation period equivalent to more than 17% of the value of all CRE loans issued at the time.

This brings about two questions regarding the choice by banks to lend at levels exceeding the cap which we aim to answer. First, we investigate the conditions of and motivations behind above-the-cap lending: Do banks change their lending conditions in amount, maturity, or interest rate to compensate the higher capital cost of these loans or do the firms they chose to exceed the cap have special characteristics that make the cost worthwhile? Next, we are interested in any potential spillovers from the macroprudential policy into the firms' other loans: In what ways was the *other* borrowing of firms affected during contractionary and expansionary periods in the macroprudential policy (i.e. is there a spill-over of macroprudential policy in one area to another)?

The second policy in question was implemented at a different point in the cycle, following the slow down in credit growth in the second half of 2016 in an effort to revive the credit channel by alleviating some of the financial constraints faced by SMEs. Starting in January of 2017, the CGF scheme started to provide up to 100% collateral guarantees to SMEs in their loan applications

to financial intermediaries. The scheme announced a lending limit to each participating financial institution which in practice implied that in the event that credit demand was higher than the limit assigned, then the bank was able to choose which firms it included in its CFG bracket.⁷ Figure 2

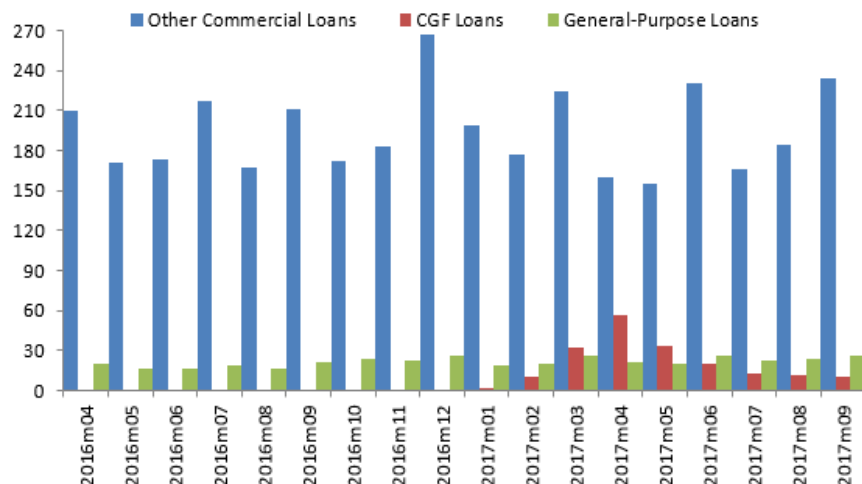


Figure 2: Loans issued under the CGF scheme saw a sharp increase following the revival of the program in 2017 (Billion TL).

indicates that over the course of the first four months of 2017, monthly loan issuances to both CGF and non-CGF loans experienced a sharp increase, and CGF loans accounted for about a third of all loan issuances by April. In addition, as shown in Figures 4 and 5 which document the development of the number of firms in and out the CGF scheme: of the firms that were issued a commercial loan in April 2017, almost a third of old firms, and more than three quarters of new firms were CGF recipients. The aggregate data shows that the policy was successful in reviving the credit channel, and the micro data shows some interesting facts: some firms only have loans issued through the CGF collateral guarantee, whereas some firms have loans both in and outside the scheme issued at the same time. Since each bank was given the freedom to chose whether and to what degree it would like participate in the CGF scheme, and furthermore, which firms they would like to include in the CGF scheme, we aim to take the analysis a step further to investigate the dynamics behind how these choices are made.

We first set out to investigate firm selection on the extensive margin by looking at what type of firms banks select into the CGF scheme at the extensive margin. We compare how the differences in loan characteristics of CGF and non-CGF firms changed with the intense utilization of the scheme. Next, we investigate the intensive margin, and document the motivating factors behind asymmetries in loan characteristics of firms within the CGF scheme. To complete the picture,

⁷Banks exercised this freedom of choice within the rules and screening of the fund regarding rules on tax and other public debt of the firm among others. Full details of the program are disclosed in Section 2.2.

given the micro-level detail of our database, we also compare and contrast the CGF and non-CGF loans of the very same firm in terms of loan characteristics. Finally, we set out to examine lending differences by banks: How and to what extent were the other commercial and general-purpose lending of banks with a higher share of CGF scheme loans affected from the policy to address whether there were any spillovers of macroprudential policy.

To address the impact of both of the policy changes, we examine how banks have exercised their freedom of choice over which firms selected to participate or are held exempt from the policies on the extensive margin, to what extent are the firms participating in the policies on the intensive margin. We allow for an adjustment in not only loan amounts but also other loan characteristics of maturity and interest. We analyze which firms were chosen under which conditions through the use of our micro-data which allows us to extract demand and supply factors that may have played a role in the determination of these outcomes. We do this first by focusing on the loans of the same firm: we compare the loan characteristics of the same firm issued in and outside policies. Our next approach, which compares the loans of the same firm over time supplements the findings of the within comparison. In addition, we also look at the ways in which banks' *other* lending was affected as a result of these policies, and examine if there were any unintended spillovers of macroprudential and fiscal policies to other items on bank balance sheets.

Banks may exercise their freedom of choice in favor or against a certain type of risk represented by the applicant. In cases where screening costs are high banks may opt for less risky firms with stronger ties (i.e. firms they already have screened), reducing the risk-taking channel of macroprudential policies. On the other hand, if faced with a high level of demand exceeding available funds, banks can prefer and actively seek to lend in excess of the LTV limit, or through the CGF scheme, to riskier firms or firms with which they have a weaker relationship with, as they can then charge a higher interest rate and make a larger profit under a search-for-yield motivation. In cases where the collateral is guaranteed through a government scheme, then the search-for-yield incentive may override. Depending on the strength of credit demand and coverage of the government guarantee schemes, banks may try to find a middle ground to charge higher interest rate and to behave more prudently at the same time. To identify the preferences at play, we examine firms mainly based on three risk and relationship characteristics: i) Strength of bank-firm relationship measured by the duration of their relationship (Boot, 2000), ii) bank's internal rating of the firm, and iii) a dummy variable reflecting the firm's credit default status for the past three years.⁸

⁸Duration is taken to be a widely used relationship measure in the literature as the very nature of relationship banking depends on repeated interactions between the bank and the firm (Boot, 2000). Our tests of other measures of relationship strength defined in Boot, 2000, such as the depth of relationship relative to other banks (the share of loans from a particular bank out of all bank loans obtained by the firm in the past 12 months) produce similar results. Deposit relationship in particular is another decisive factor in lending (Berlin and Mester, 1999) however we do not have access to firm level deposit information.

In the first policy, since the LTV cap limits access to financing for CRE purchases, we could expect that firms who are credit constrained by the cap, i.e. firms who could not otherwise afford to purchase CRE would be the ones to demand an exception to the rule with CRE loans above the LTV cap. This presents the main dilemma of the bank: as the policy allows banks to choose which firms are exempt from a restriction at a cost to the bank, the bank would be expected to assess applications from profit and risk perspectives and prefer to lend above the cap only where they can extract some compensating benefits, such as through the pricing of the loan or cross sale of other services by furthering their relationship with a firm. The feature of the policy which deducts the above-the-cap lending from the bank's capital adds a final point; having already been punished for this lending in their capital, banks would be expected to seek minimal additional risk exposure in these loans. In this setting, one could expect banks to pick firms with which they have a more established relationship, or firms with lower levels of risk.

In the CGF scheme where banks are free to choose which SMEs get to participate, the expectations are not as clear cut since there is no immediate penalty for the bank as in the LTV case. The absence of an immediate penalty could have motivated banks to select risky firms into the scheme in a search for yield motivation. In fact, the presence of the collateral backing itself could have led to an agency problem where the bank could decide to concentrate its costly screening efforts on loans outside the collateral guarantee program, paving the way to more riskier lending under the scheme.⁹ However, by design the CGF scheme provided coverage for delinquencies up to a certain level of asset quality deterioration, which heavily dampens this channel of risk motivation.¹⁰ Another factor decreasing the risk taking motivation on the extensive margin would be the presence of information asymmetries between lenders and borrowers, which is even larger for SMEs who tend to be less transparent (Rajan, 1992 and Kashyap et al, 1993). The presence of potentially higher risk and relative lack of transparency in SMEs could have motivated banks' lending preferences towards relationship lending while simultaneously charging a higher interest rate; in this setting the strength of relationship would play a positive role in the selection into the CGF program to reduce information asymmetries meanwhile the bank would charge a premium to the firms with relatively less favorable history.

We find that banks chose firms for exemption from or participation in a program carefully. Banks' choices for each policy indicate an active preference over the type of firm measured by our three indicators depending on the policy. Controlling for supply factors, we find that banks prefer firms with lower risk and stronger relationship profiles on the extensive margin, but at the same time, banks reflect the risk assumed on the lending as higher interest rates. The results are replicated

⁹For more on screening costs and their impact on intermediation, see Diamond, 1991; Bernanke et al, 1996; Bernanke and Gertler, 1989; Bharath et al, 2011; Agarwal and Hauswald, 2010; Puri et al 2011 and 2017.

¹⁰See Section 2.2 for more details.

when controlling for demand side factors. These findings stand to add to the existing financial frictions literature. In the presence of asymmetric information between the bank and the firm, the lender will charge a risk premium over the prime rate to firms they have limited information of (Bernanke and Gertler, 1989; Bernanke et al, 1996; Carlstrom and Fuerst, 1997). In this setting, relationship banking is beneficial for both the borrower and the bank; the bank gathers information on the customer over time to alleviate asymmetric information frictions and agency problems, this in turn means a lower risk premium over the firm's borrowing costs. We show that for both of our policies, relationship lending helps on the extensive margin, that banks prefer to lend to firms they have a history with. Below we list the findings for each policy in more detail.

We find that banks chose firms for exemption from or participation in a program carefully. Banks' choices for each policy indicate an active preference over the type of firm measured by our three indicators depending on the policy. The results are replicated when controlling for demand side factors. In further detail, we find that while the LTV ratio cap was in effect, banks chose to issue CRE loans above the cap to firms with a healthier credit history with lower defaults and to firms with whom they had a longer established relationship. At the same time, banks reflect the capital cost of exceeding the LTV cap onto the loan itself by charging a higher interest rate on the loans compared to loans abiding the LTV cap. This finding is especially striking, considering that these firms with better credit history and established financial relationships would normally reflect a lower risk profile, and would be charged a lower interest rate *ceteris paribus* (Berger and Udell, 1995). This positive effect on the interest rates reverses after the conclusion of the policy, as these firms start receiving loans with interest rates lower than peers (as predicted by the literature), further corroborating that the increase in the interest rates was due to banks reflecting their costs onto the CRE loans.

Firms that are financially constrained by the LTV policy, i.e. firms with LTV ratios between 45% to 50% during the policy and higher LTV ratios after the conclusion of the policy see an increase in their *other* borrowing while the policy is in effect, and a decline in these *other* loans after the conclusion of the policy compared to other firms. Controlling for supply side factors, we show that these firms demand more *other* corporate loans during the policy and less after. This confirms that the spillover to other types of loans as a result of macroprudential policies exists in corporate loans.¹¹

In our next policy, similar to CRE loans exceeding the LTV ratio cap, CGF loans are issued to firms with a longer established relationship, and have a healthier credit history, showing that the information asymmetry motivation overrides on the extensive margin. These firms have larger amounts

¹¹Examining the loan utilization effects of an expansionary change in residential LTV ratio caps, Baziki and Çapacıoğlu, 2017, show that this effect is also present in retail loans.

issued to them for longer maturities and at a higher interest rate compared to non-CGF firms borrowing in the same month which shows the presence of yield motivations by banks. However, having established that stronger relationship and healthier credit history are powerful determinants at the extensive margin, among those issued CGF loans, those with stronger relationships but relatively poorer credit history receive larger amounts of total loans (both CGF and non-CGF loans) on the intensive margin.

We perform two sets of comparisons for CGF firms: to control for how the banks assess the very same firm with and without collateral guarantees, we compare CGF firms' loans to their recent non-CGF loans. This approach allows us to assume away the time invariant firm unobservables that may have motivated the results and isolate the impact of the collateral guarantee. Next, we also compare loan conditions on non-CGF loans issued at the same time as the CGF, to control for any time-related unobservables that could motivate the results. We find that firms that receive larger amounts of CGF loans see an increase in their loan amounts, maturities and interest rates compared both to their past loans and also to firms that use less amount of CGF loans. This finding supports the premise of CGF schemes, which aim to bridge the financial reach gap between firms in good standing and financial intermediaries by removing the collateral constraint. Once the collateral gap is accounted for by the CGF scheme, the firm is able to borrow larger volumes, and for a longer duration which helps with the firms' debt servicing capacity.

Finally, from the perspective of the intermediation sector, we show that the increase in CGF utilization has resulted in lower other corporate credit and general-purpose loans in banks with larger CGF loan shares. This finding should be evaluated within the liquidity structure of the banking sector as well as the context that the policy was introduced. The banking sector in Turkey is dependent on deposits as its main source of funding, majority of which are short term.¹² In this set-up, as the loan-to-deposit ratio was leveling at around its long-term averages at the time, deposit growth may have acted as an additional constraint on loan growth for the banking sector (Alper and Çapacıoğlu, 2018). Under this budget constraint, banks faced a tradeoff between lending at favorable conditions through the scheme versus regular loan issuances. In addition, the policy allowed many banks access to the SME loans market without the restrictive effect of collateral related risks which could be motivated a race to establish market share, or strengthen existing commercial relationships for banks.

Tying the results together, we find strong evidence that relationship lending plays a role in the way borrowing conditions and constraints are reflected in the loan terms. As touched upon by the relationship banking literature, banks are more lenient towards firms that have a long established relationship with them as they can use existing information on firms and especially SMEs who tend

¹²Deposits make up about 60% of funding sources of the sector, and on average have a maturity less than 2 months.

to be relatively less transparent and therefore present a higher level of costs.¹³ Boot (2000) motivates the difference between relationship banking and transactional banking through the screening (Ramakrishna and Thakor, 1984) and monitoring (Diamond 1984 and 1991) services provided by banks to customers with which they have repeated interactions. Diamond, 1991, specifically highlights that firms with higher opacity and information asymmetries have a larger potential gain from the monitoring services they receive from the bank. The long term gains from relationship banking may include accessing other forms of financing for the firm. Diamond 1991 states that through repeated successful interactions with banks, firms build up a reputation which they can then use to increase their access to financing in other avenues, such as the stock market (Slovin et al, 1990 and Slovin et al, 1993). However, the established relationship may also signal a difficulty or resistance to leave (the so called hold-up problem, Sharpe, 1990), or a systematic institutional setup such as the lack of proper access or competition from other banks. On the contrary, competition theory would imply that firms that work with many different banks would pose a flight risk, and that banks that have larger marginal gains from these types of customers would be more inclined to lure them in with special offers.¹⁴

In addition to the gains to firms, banks also stand to gain from relationship banking in several avenues. Ongena and Smith, 2000 and Bharath et al, 2007 state that over the years, banks may extract important information about the firm which would allow them to engage in additional new business with the firm with tailored and information-sensitive products. Multiple interactions also make it possible for banks to balance competitive and profitable pricing across different products (Berlin and Mester, 1999). Kane and Malkiel (1965) highlight the potential for the relationship to spillover from the asset side to liabilities, as the firm holds its deposits at their high relationship bank, providing them with relatively cheaper and stable core funding.

Finally, there are macroeconomic gains from relationship banking as well. Through services of monitoring, banks can improve firm performance through a better selection of projects and investments (Rajan, 1992). On the other hand, the loss of relationship results in lower real activity (Gray

¹³See Rajan, 1992 for the seminal discussion; Kashyap, Stein, Wilcox, 1993; Boot, 2000 and Boot et al. 1993; Ongena and Smith, 2000; Berger and Udell, 1995 for a focus on SME lending; Berlin and Mester, 1998 for a case study and Schwert, 2018 for a recent summary of the literature.

¹⁴The banking sector makes up more than 90% of the financial sector assets in Turkey and remains as the initial source to access external financing for firms in Turkey. The financial intermediary sector is competitive in Turkey with firms working with more than one bank on average, and prevents banks from taking monopoly rents or constraining credit (Boot, 2000). It should also be noted that a higher level of competition could also be associated with a lower level of risk in general as lending rates converge down, and less risky projects can be financed (Boyd and De Nicoló, 2005). In Turkey, the market share motivation is not only driven by asset profitability, but also driven by access to corporate deposits which make up more than 60% of core funding for the banking sector (Kane and Malkiel, 1965). On the other hand, competitive banking markets may be difficult for small and new firms to engage in business with (Petersen and Rajan, 1995). This is where schemes such as the credit guarantee fund will be beneficial to increase their access, and also start building a relationship in the financial intermediation.

and Ongena, 1996).

Previously, Jiménez and Saurina, 2004, touch upon the special impact of collateral in lending with rather interesting results. Over the cycle, they find that collateralized loans are riskier and that an established intermediation relationship between the lender and the borrower increases lender's willingness to take risk. Literature on CGF lending is rather limited to a list of regional papers. Beck et al. 2008 provide an early study on the subject followed by many regional studies such as Saadani et al. 2011 reviews the practices seen in the Middle East and North Africa, while the OECD has a discussion paper on its own jurisdiction. Mazreku et al. 2016 provides a good summary of recent work.

Bernanke et al, 1996, state that collateral is a key factor in borrowing. Linking the two strands of literature, using survey data from the U.S. Petersen and Rajan (1994) find that relationship banking increases the availability of funds to firms and Berger and Udell (1995) find that relationship lending is associated with lower lending costs and most related to our study; lower collateral requirements. Kiyotaki and Moore, 1997, also state that leverage ratios over collateral value increase as information asymmetries decrease. More recently, Anderson et al, 2018, find that longer firm-bank relationships are not impacted by changes in collateral value over the cycle. Degryse et al, 2019, find that with increasing long-term relationship potential, banks lower collateral requirements to loyal customers at the beginning of the relationship. This is especially important for small young firms who face relatively larger difficulty in accessing external financing at a point when they need it the most. This setup brings support to schemes in support of credit access by alleviating collateral requirements such as the CGF. In their 2010 review of more than 70 countries' partial CGF schemes, Beck et al. find that there is a very limited use of risk-related pricing in loans while Jimenez and Saurina, 2004 find that closer banking relationship induces higher risk taking by banks. Our findings relate to both, we find that banks chose less risky and stronger-relationship firms into the CGF scheme, however grant larger loans to those at the lower end of their accepted pool.

In the rest of the paper, Section 2 of the paper presents the legislative background, Section 3 introduces and discusses the data and presents some summary statistics, Section 4 presents and discusses the empirical strategy, Section 5 summarizes the results followed by Section 6 which concludes.

2 'Bank Choice' Policies

Much like episodes of too fast credit growth, too slow credit growth can also hinder the well functioning of the intermediary sector and monetary policy transmission mechanism; and may

impose long lasting effects on the real economy. Following Tinbergen, 1952, who calls for a unique tool for each additional policy goal, new policies paying special attention to targeting the credit channel were introduced in the post Global Financial Crisis era. We examine two widely used counter-cyclical measures targeting the two opposite ends of the financial cycle.

The first policy is a loan-to-value limit imposed on CRE purchases. This policy requires the investor to present a portion of the value of the loan out of pocket, and protects the lender against potential fluctuations in asset values, especially in bust periods following bubbles. The second policy again protects the lender against potential losses, but this time through a collateral guarantee.

This highlights the second common factor of the policies that we consider: the collateral channel. The first policy provides us with the opportunity to investigate the lending behavior of banks in response to a reduction in the loss given default (LGD) on a self-collateralized loan. The second policy, provides access to finance to firms with insufficient collateral and allows us to investigate changes in lending behavior in response to a collateral guarantee scheme. Both of the policies reduce the potential losses of the lender and provide an opportunity to investigate how lending behaviour is impacted as a result of this. We give further specifics of the policies in the remainder of Section 2.

2.1 Commercial Real Estate Loan-to-Value

The heightened levels of global liquidity created and environment of favorable credit conditions which increased the potential for high levels of credit growth. Amid concerns over a heating credit market in Turkey, the Banking Regulation and Supervision Agency (BRSA) issued a restriction on CRE loans' LTV ratio of 50% effective on January 1, 2011 as a precautionary measure. The policy had dual impact on the loan market as it was designed both as a borrower based measure and a capital based measure. On the borrower side, the LTV cap required half of the value of the loan to be presented as down-payment at the time of issuance. Agents constrained by this restriction would be pushed out of the market, or would have to downsize their CRE investment to more affordable levels. By design, the policy would curb loan demand and help ease pressures on asset prices.

From the perspective of the bank's balance sheet risks, an LTV cap is a favorable policy on two accounts. First, through a positive selection criteria, it restricts the pool of applicants to those with sufficiently large own-funds who would relatively be more likely to have a better debt repayment performance and also engage in additional business with the bank. Having paid for a portion of the CRE investment, the borrower may also be less subject to moral hazard issues. Second, the policy protects the bank against a potential loss on a self-collateralized loan with a share of the value of the asset as a buffer against potential losses in the event of a fall in asset values. Even though this

buffer in the Turkish example was at a high level of 50%, it should be noted that as LTV itself is a ratio of the value of the asset, its binding power over asset prices and therefore potential losses for the financial intermediary is limited (IMF, 2014). As such, the LTV policy alone can slow down movements in real estate prices. In fact, previous work by Jung and Lee (2017), Kim (2014), and Kuttner and Shim (2016) show that policies targeting relative debt measures such as debt to income or debt service to income when used jointly with LTV measures produce a more pronounced effect on housing market, credit growth and financial stability.

The particular implementation of the policy in Turkey had one additional feature that impacted the bank's balance sheets directly. The policy allowed for flexibility in implementation as banks were free to lend at LTV ratios above the limit however this came at the cost of capital to the bank. The bank would then have to deduct the amount exceeding the limit on each loan (i.e. the amount corresponding to the difference between the LTV ratio on the loan and 50%) from its capital when calculating capital related bank vitals such as its capital adequacy ratio.¹⁵ This brings about a question of which type of customers would banks agree to bear this cost for since we see in the implementation that banks were exceeding this limit as seen in Figure 1.

The LTV cap was lifted completely in April 2013, allowing firms from there on to be fully levered in their real estate acquisitions. While the distribution of the firms under the regime is heavily compliant with the cap as seen in Figure 3, the lifting of the restriction could be evaluated as a dynamic response to the macroeconomic cycle, as well as being linked to the large volume of loans exceeding the CRE LTV cap during its implementation. As seen in the left panel of Figure 1, loans exceeding the cap during the policy accounted for about 17% of the CRE loans issued.

2.2 The Credit Guarantee Fund

To increase the credit access of the corporate sector, several supportive measures were put in place in the period end-2016 to mid-2017.¹⁶ The largest initiative within this set of policies was a collateral support scheme of the CGF which was backed by the Treasury and rolled out in 2017.¹⁷

¹⁵This ratio is one of the balance sheet ratios monitored by the BRSA. On top of the 8% legal limit in line with the Basel III accord, the BRSA targets a minimum ratio of 12% for each institution. With additional buffers such as the systemically important institution buffer, Turkish banks are subject to a high level of targeted CAR.

¹⁶Most of these measures targeted SME credit access through the use of low-interest loan facilities (TOBB, about TL5 billion), interest-free loans (KOSGEB, about TL11 billion), and the bulk of the support came from the Credit Guarantee Fund at TL250 billion. For further details on the policies and CGF in particular, please see Baziki and Çapacıoğlu, 2020, and the CBRT Financial Stability Report, 2017.

¹⁷The CGF was set up in 1991 and issued its first loan guarantee in 1994 (KGF, 2019). Rapidly expanding its coverage over financial institutions through shareholder protocols since 2003, the fund signed a protocol with the Treasury at the end of 2016 for the Treasury support to be provided to the loans issued under the scheme. The CGF receives annual fees from shareholders comprised of the Union of Chambers and Commodity Exchanges of Turkey (28.3%), KOSGEB (28.3%), TESK, TOSYOV, MEKSA and 29 financial institutions each with a 1,5% share. When issu-

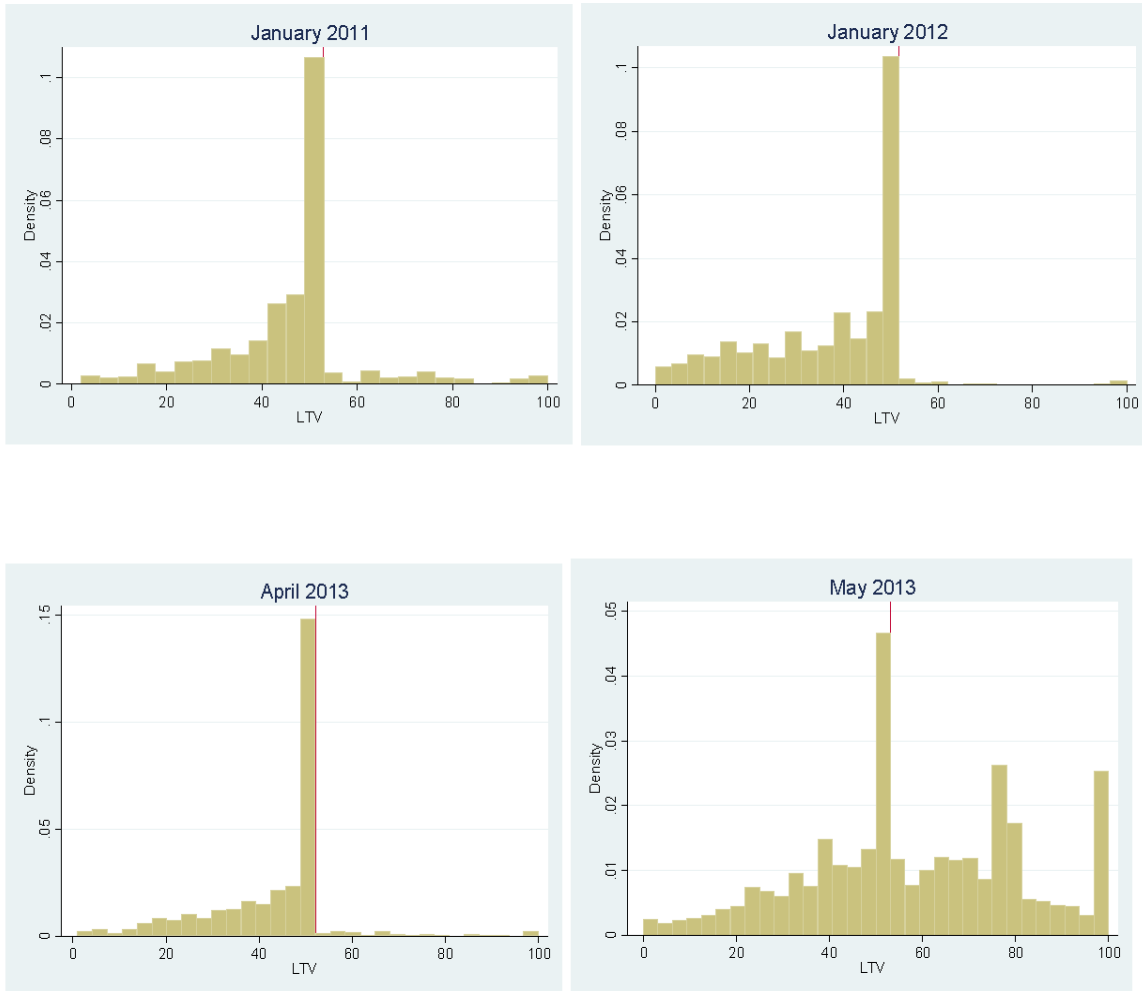


Figure 3: CRE LTV distributions at the time of policy introduction (top row) and conclusion (bottom row).

The CGF scheme aimed to reduce the financing-gap in SMEs by mainly targeting the frictions in SME access to external financing. The motivation in SME focused policies is generally two-fold; they recognize that SMEs have unique needs and face particular challenges in accessing external financing, and that they play a propelling role in job creation and carry a large potential in boosting economic growth (OECD, 2019). Indeed, in addition to bank loans, large firms and corporations enjoy additional avenues of external financing through local and international capital markets. SMEs on the other hand usually lack the reputation, relationship and know-how present in larger firms, and as a result are more dependent on the banking sector as a source of external financing (Gertler and Gilchrist, 1994; Lang and Nakamura, 1995). In this setting, any frictions present in the SME’s access to banking credit will directly impact its financials with real economic outcomes (Gertler and Gilchrist, 1993; Beck et al, 2005; Beck and Demirgüç-Kunt, 2006; The World Bank,

ing letters of guarantee for loans under the scheme, the CGF receives a commission totalling 0.3% of the guarantee amount on the loan. For more details, refer to KGF, 2019.

2015). The collateral requirement may be even more binding for SMEs who may present a higher level of information asymmetry, especially in a developing country setting (Berger and Udell 1990, 1995; Berger et al, 2016; and Hanedar et al, 2014).

Lack of sufficient collateral is chief among the frictions SMEs face in accessing bank credit (Gozzi and Schmukler, 2016; The EBCI Vienna Initiative, 2014; and OECD, 2013). This collateral constraint may be binding for SMEs' access to credit at two stages; first, insufficient collateral may prevent them from borrowing a loan, and second, existing loans may not be rolled especially due to a revaluation of the collateral which may present a collateral gap the SME may not have the means to meet. The macro-financial cycle may amplify this outcome as asset prices fall with economic slowdown, putting SMEs with less collateral at a relatively disadvantageous position. A longer slowdown in the economic activity, or the expectation of a slowdown in the near future, may alter banks' risk preferences and decrease external credit growth for SMEs as banks chose to issue loans to less risky borrowers (Bernanke et al, 1996; and Bernanke and Gertler, 1989).

The CGF scheme as a counter-cyclical policy plays a pivotal role at this point, and lowers the collateral gap faced by SMEs so that otherwise economically sound firms will have access to external financing especially during an economic downturn when cash flows ebb and their demand for external funds increase (Gertler and Gilchrist, 1994). With the purposes of overcoming the financing frictions related to collateral, and also to allow SMEs to establish a point of first contact with financial intermediaries, CGF schemes have been put to use in many economies both developing and developed (The EBCI Vienna Initiative, 2014; Green, 2003, Beck et al, 2010).

CGF schemes generate positive financial and economic 'additionalities' for both the targeted firms, and also the economy in general (The EBCI Vienna Initiative, 2014). Financially, they may generate additional credit by facilitating loans that would not have been issued otherwise (OECD, 2013; Levitsky, 1997). Through this effect, they serve their primary purpose of providing credit access to firms that otherwise face a financing-gap, impacting the external margin and enlarging the credit base.¹⁸ Furthermore, CGF schemes provide economic welfare spillovers into the real economy (Beck et al, 2008; Udell, 2015). Firms that access external financing through the scheme may hire more workers and grow their businesses, invest in physical capital and assets (The EBCI Vienna Initiative, 2014), as well as engage in technological innovation and knowledge spillovers (OECD, 2013) all of which will impact the real economy in the medium term.

Recent investigations into individual government guarantee schemes have generally found positive impact of the programs with respect to credit growth. Cowan et al, 2015 find a positive effect of guarantee schemes on aggregate SME credit in Chile. Uesugi et al, 2010 find that the Japanese

¹⁸In fact, we find that about 14% of the recipients of CGF in the first three months are firms with no previous financial history.

guarantee scheme increased credit availability, in line with Konishi and Hasebe, 2002 who find an increase in both in and out of scheme lending to SMEs as well as Wilcox and Yasuda, 2019, who estimate and empirically test a model for Japan where they find that lending increased across the board. Cowling, 2010 examines the Small Firms Loan Guarantee Scheme in the U.K. and finds that the scheme has been successful in removing barriers to external finance for the targeted firms who have not been successful in securing funding in their previous loan applications. Having had this positive impact on credit growth, at the same time, the presence of government guarantee or even the expectation of government support may generate additional risk taking in banks (Black and Hazelwood, 2013; Brandao-Marques et al, 2013).¹⁹ To prevent this, an incentive compatible design becomes of paramount importance.

In the Turkish case, the initiative aimed to alleviate the frictions SMEs face in accessing external financing due to insufficient collateral through two supply-side factors; the collateral channel and balance sheet channel effects. First, to ease the collateral channel frictions, loans covered under the scheme received a collateral guarantee from the CGF at varying degrees depending on their size and economic activity. In addition, to help ease credit conditions, risk weights on loans granted through the CGF scheme were also lowered, improving CAR valuations for the banks and thus supporting loan growth (Alper et al, 2016; BRSA, 2018, Gambacorta and Mistrulli, 2004).

Loans guaranteed under the CGF scheme were issued through existing financial intermediaries, allowed a maximum maturity of 5 years for working capital loans and 10 years for investment loans, with 1 and 3 year long grace periods respectively.²⁰ SME loan guarantees could be up to 12 million TL per business, whereas non-SMEs could be financed up to 200 million TL.²¹ Exporting firms were fully covered with a 100% collateral guarantee, SMEs were supported at 90% and non-SMEs at 85%. In addition to these guarantee limits on each individual loan, the Fund also applied a collateral guarantee coverage cap on the guaranteed loan portfolio for each participating institution. The collateral guarantees were secured for each intermediary institution up to a delinquency cap of 7% per loan portfolio.

¹⁹The literature has also touched upon the long term loan performance of guarantee recipients with mixed results. Cowan et al, 2015 do not find any long term effects of guarantee programs on performance, however firms with scheme loans had an overall higher likelihood of default. Conversely, Uesugi et al, 2010 find a decline in loan performances in the long-run, and Wilcox and Yasuda, 2019, find that risk taking increased in Japanese banks. Given our focus and analysis time frame, we treat this issue as outside the scope of our paper and leave this investigation for future research.

²⁰Interest on the loans accrue and are collected once a year at most.

²¹Additional rules on participation: beneficiary firm should be legal proprietors or legal entity companies established in Turkey. The recipient firm should not have an existing decision of bankruptcy, undergoing liquidation, or should not hold more than 25% of another company under bankruptcy related proceedings, it should not have any overdue payments to the Tax Office nor the Social Security Institution, and its existing loans from the financial sector should not be classified under non-performing loans portfolio with exceptions for loans classified under group 3 and 4. For several further details, refer to the KGF website.

With these built-in checks, the Turkish CGF scheme aimed to increase the asset quality of the secured loan portfolios. First, similar to other examples from peer countries, the lending is done through experienced intermediaries already actively present in the loan market. As such, financial institutions can use sector, market or macroeconomic level know-how as well as firm-specific idiosyncratic information in selecting projects with higher economic value and expected return. The partial coverage over each loan, as well as the institution-level delinquency cap of 7% ensures that both the borrowing firm and the lending institution have a stake in the loan's success and may lead to better performance by the firm, and a more thorough screening by the bank. In particular, Beck et al (2010) and Gozzi and Schmuckler (2016) report that a mechanism design that allows the bank to assess the risk level of the application is associated with lower delinquencies. In further support of these two factors, The World Bank (2015) states that a CGF system with market-based features and partial coverage aligns the interests of both borrowers and lenders and provides a backdrop of correct incentives for both.

Perhaps most importantly, diverging from common practices elsewhere (Beck et al, 2010), the collateral guarantee scheme at hand did not bring any regional or industry specific restrictions on recipients; which gave banks freedom and complete control over which participants they chose into the scheme.

3 Data

Table 1 shows the summary statistics of the data.

While the restriction is applied to LTV ratios above 50%, we take firms that are above 45% to be credit constrained, as in they are firms that would like to borrow at rates above the cap, but are unable to due to the restrictive policy. Other thresholds yield similar results, but the cutoff we present is our baseline cutoff since it is evident in the data that banks prefer to lend round numbers which are multiples of thousands (and a large share of the loans are likely multiples of 5 thousands) which puts firms at LTV ratios between 45 to 50%.

Balance sheets and income statements of banks are available from the CBRT. Our matched dataset comprises of 30 banks. We use loan data from all banks in our sample, which includes private, state-owned, foreign-owned and participation banks.²² and excludes investment banks and development banks, which have a different business model aligned with social welfare goals. At the bank level, we use data on real assets size, loan to assets ratio, deposits to assets ratio, the ratio of capital and liquid assets to total assets, non-performing loans ratio and return on equity ratio, all on

²²The term "participation banks" is used in Turkey to refer to banks that engage in Islamic banking.

a monthly frequency from the CBRT. The definitions of the variables, data sources, and summary statistics are given in Table 1.

Macro-economic aggregates in Turkey may affect demand and supply of consumer loans. Hence, we need to control for the business cycles and monetary policy stance in Turkey. This will allow us to better isolate changes in policy rates and implementation of schemes from other changes in economic activity or monetary conditions. At the macro level, we use data on domestic interest rates, industrial production index (as an indicator of economic activity), consumer price index (CPI), all on a monthly frequency from the CBRT. The definitions of the variables, data sources, and summary statistics are given in Table 1.

We investigate some of the summary statistics about the CGF scheme and partaking firms in Figures 4 to 4. Figure 4 shows that the number of firms borrowing corporate loans from the banking sector around the CGF scheme for a total of 20 months. We see that on average about 23,000 firms without any prior financial history in the database enter the loans market every month, constituting about 9% of the 270,000 firms entering the market in total.²³ We see a spike in the number of firms entering the market for loans during the CGF scheme, on average 377,000 firms borrow during the heightened utilization of the CGF scheme. What is more striking is that the increase in the number comes from both existing loan customers and new customers alike: an average of 64,000 firms without any prior loan history enter the market each month, raising their share out of all firms to about 16% of firms borrowing between March and May of 2017. At the same time, by September 2017, the limits issued to these firms made up about 3.5% of the total CGF scheme loans. The fact that the number share of the new firms are more than four-fold the limit share speaks to the success of the scheme in creating access to finance for a high number of firms with no previous history by lowering barriers to entry, with a smaller risk exposure that is supportive of financial stability.

Figure 5 repeats the same exercise for firms borrowing under the scheme. Excluding the months of heightened use, of the 21,500 firms that participate in the scheme, about 12% are new to the financial borrowing market. During the heightened utilization of the fund, the average number of firms in the scheme increase to a monthly 140,000, more than a quarter of which (27%) are new entrants. This finding is suggestive of an additional success of the scheme, either newly formed firms, or firms that had never borrowed from the banking sector before, in other words firms which likely lacked either previous financial history or necessary collateral have increasingly participated in the scheme, contributing to financial deepening. A further motivating reason for the higher share under CGF could be due to the participation restrictions of no bankruptcy and no outstanding debt

²³We define firms who do not have any financial history on the credit registry database since December 2002 until the moment of credit issuance as new entrants to the financial borrowing market. Firms who have borrowed from the banking sector at least once since December 2002 are referred to as existing/old firms.

to the social security system, which could have made some older firms ineligible.

The next set of three graphs are in-sample comparisons of firms already present in the credit registry versus firms with no previous financial history over their CGF scheme loan characteristics. Figures 6, 7, and 8 show the average loan amount, maturity and interest rates charged under the CGF scheme for existing firms and new entrants respectively. Figure 6 shows that on average the CGF scheme loans issued to new entrants amounted to about 20% of average monthly issuance, and during the height of the implementation the share was halved down to 10.5%. Together with the findings reported in Figure 5, this implies that even though during this time new entrants made up more than a quarter of all the loans in firm count, they make up a much smaller share in terms of loan amount. Figure 7 shows that the maturities for existing firms are slightly higher by about 2 to 3 months, although the standing reverses in favor of new entrants later on in the year. The interest rates on these two group's CGF scheme loans and the spread of new entrants over existing firms is shown in Figure 8. In the earlier part of the year, new entrants on average are paying a relatively higher interest rate for smaller loans of shorter maturity compared to existing firms. This could be explained by a prudent pricing stance by banks due to these firms' lack of previous financial history. In the second half of the year, new entrants take out on average larger loans for longer, both of which increase expected loss given default, and therefore add to the positive spread.

Next, we show the in and out of sample comparisons of loan characteristics between firms that have at least one CGF scheme loan versus firms with no CGF scheme loans. Figures 9, 10, and 11 show the average loan amount, maturity and interest rates charged on TL-denominated loans to firms in and out of the scheme. Firms with at least one CGF scheme loan on average take out loans twice as large for about twice as long. As a natural outcome of the higher potential risk they carry, they also pay a positive spread over non-participating firms.

Final set of three graphs continue the in and out of sample comparison, this time over firm characteristics. Figures 12, 13, and 14 show the depth of the firm-bank relationship, the bank's rating of the firm, and the firms' NPL ratios as a measure of riskiness. We use the time distance between the most recent two loans from the same bank as a measure of bank-firm relationship strength (Jiménez et al, 2014). On average, the distance between two loans is uniform across groups, at 45.1 months for the in-sample firms and 44.8 months for the firms out of CGF scheme. During the first half of the year, especially in the high volume months, we see that the in sample duration of distance between loans have increased. This finding fits with the general purpose of the scheme rather well, increasing financial access to firms that otherwise were unable to participate in the loan market. The comparison of bank ratings reveals that firms with at least one CGF scheme loan and firms without any CGF scheme loans have very similar bank ratings; 2.39 for in sample, and 2.48 for out of sample firms. The ratings diverge around the height of the implementation due to

the higher share of new entrants which bring the in sample average down. CGF scheme firms on average have much better previous loan performances, as the share of firms with delinquencies in the past three years is much smaller for CGF scheme firms. We assess that this could be due to selection of firms with better performance into the program and also partially to the higher share of new entrants without previous records of NPLs.

4 Empirical Strategy

We begin the analysis with examining loan characteristics under the different policies using the following equation:

$$\begin{aligned} Loan_{b,f,c,t} = & \beta_0 + \beta_1 Indicator_{b,f,t} + \zeta Bank_{b,t-1} + \gamma Macro_{t-1} + \alpha_b \\ & + \eta_f + \theta_t + \varepsilon_{b,f,c,t} \end{aligned} \quad (1)$$

where for bank b , firm f , and time t ; the dependent variable $Loan_{b,f,c,t}$ takes one of the following three values of loan characteristics: the amount, maturity or interest rate of loans denominated in currency c . $Indicator_{b,f,t}$ is our main explanatory variable of interest capturing banks's *choice* in terms of relationship and risk and also takes one of three values: i) the strength of the bank-firm relationship, i.e. the relationship duration measured as the natural logarithm of the number of months since the date of the first loan borrowed by firm f from bank b , ii) banks' internal rating of borrower firms, and iii) a dummy variable that indicates whether firm f has had a loan default within the last 3 years.²⁴ The next two items control for bank's own balance sheet characteristics and the state of the economy which could impact lending outcomes during this period. To address concerns over endogeneity of variables, we utilize the observations from one period before, $t - 1$. $Bank_{b,t-1}$ are the balance sheet items of bank b at time $t - 1$ that may influence its credit growth observed over the period of interest. At the bank level, we use data on real assets size, loan to assets ratio, deposit to assets ratio, the ratio of capital and liquid assets to total assets, non-performing loans ratio and return on assets, all at monthly frequency obtained from the CBRT. $Macro_{t-1}$ are the macro indicators of the Turkish economy at time $t - 1$. At the macro level, we use data on industrial production index as an indicator of economic activity (Aruoba and Sarikaya, 2013), consumer price index (CPI), effective policy rate and reel effective exchange rate, all on a monthly frequency from the CBRT. The definitions of these variables, data sources, and summary statistics are given in Table 1. Finally, to control for time-invariant unobservables, we include a set of fixed effects; α_b is fixed effects for bank b ; η_f is fixed effects for firm f and θ_t is the fixed effects for

²⁴The default indicator is not specific to the lending bank, the variable captures if the firm has had a default from any bank in the past three years.

the year of time t . The analysis based on equation 1 is performed over the entire time frame, from January 2008 to September 2017, and the results are presented in Table 2.

For all the equations investigated, including Equation 1, we perform a slight modification when the dependent variable is the interest rate of loans. In order to control the maturity structure of the yield curve, we also add the natural logarithm of amount and maturity of new commercial loans to the models. Moreover, in order to control for supply side effects and to focus on the variation among firms which are borrowing from the same bank in the same month, we add bank-month fixed effects for each bank b and month t ; $\alpha_{b,t}$ in each model. On the flipside, to control for firm demand, we also add firm-month fixed effects, $\eta_{f,t}$, in some models.

To further investigate the *choice* banks exercise over the two policies, we perform additional exercises based on Equation 1 by replacing our dependent variable with the following two values: i) a dummy variable that takes the value 1 if borrower firms have LTV ratio higher than 50 percent, and 0 otherwise, and ii) a dummy variable that indicates whether borrower firms use CGF loans (extensive margin). The results of the analysis performed around the policy dates, January 2011 to April 2013 for LTV and January to September 2017 for CGF, are presented in Tables 3 and 8. As a final variation, we also replace our dependent variable as the natural logarithm of the amount of CGF and non-CGF loans of CGF borrower firms, and results are reported in Table 10 (intensive margin).

Next, we investigate changes in loan conditions in varying windows around the policies based on the following model;

$$\begin{aligned} Loan_{b,f,c,t} = & \beta_0 + \beta_1 After_t + \beta_2 Dummy_{f,t} + \beta_3 After * Dummy_{f,t} \\ & + \zeta Bank_{b,t-1} + \gamma Macro_{t-1} + \alpha_b + \eta_f + \theta_t + \varepsilon_{b,f,c,t} \end{aligned} \quad (2)$$

where the dependent variable $Loan_{b,f,c,t}$ again takes three values: the amount, maturity and interest rate of loans. $After_t$ is a dummy variable that takes the value of 1 after the policy implementation. Since the LTV cap on CRE loans was introduced in January 2011 and concluded in April 2013, with all CRE loans issued during this period subject to it, we are able to perform two sets of analysis around these two critical policy dates.

Our first study is around the LTV introduction date and covers the 27-month period before the introduction of the policy as well as the 27 months of its implementation (covering the period September 2008 to April 2013) where we define $After1$ in the regression tables to represent the period following the introduction of the policy in 2011. A similar analysis is performed around the conclusion of the policy starting in January 2011 to August 2016 where we utilize the dummy $After2$ to represent the period after the conclusion of the policy. This means that the period

'before' for *After2* is the period during the implementation of the policy (January 2011- April 2013), not the pre-implementation period. Since the CGF policy does not have a clear end period as the LTV policy, our approach for the CGF loans focuses on the intense utilization of the scheme in the first half of the year. $Dummy_{f,t}$ is a dummy variable that takes the value of 1 if i) borrower firms have LTV ratio higher or lower than 50 percent or ii) borrower firms use CGF loans depending on the focus of our exercise. Tables 4, 5, 9, and 11 rely on this model.

Finally, we complement the analysis by investigating the spillovers of the two policies onto other lending. First, we focus on how the LTV cap on CRE loans impacts lending to constrained firms with the following approach

$$Loan_{b,f,c,t} = \beta_0 + \beta_1 After_t + \beta_2 LTVconst_{f,t} + \beta_3 After * LTVconst_{f,t} + \zeta Bank_{b,t-1} + \gamma Macro_{t-1} + \alpha_b + \eta_f + \theta_t + \varepsilon_{b,f,c,t} \quad (3)$$

where the dependent variable $Loan_{b,f,c,t}$ is the amount of loans excluding CRE loans of borrower firms. $After_t$ is a dummy variable that takes the value of 1 after the policy implementation. $LTVconst_{f,t}$ is a dummy variable that indicates the borrower firms which become constrained due to LTV regulation and have LTV ratio higher than 45 percent. The results are presented in Table 6 for a window around the introduction of the policy, and in Table 7 for a window around the conclusion of the policy.

Next, we investigate how the CGF policy has impacted the non-CGF commercial or uncollateralized consumer lending of banks. We differentiate between banks with low and high participation rates in CGF loans relative to their asset size using the following model;

$$Loan_{b,f,c,t} = \beta_0 + \beta_1 After_t + \beta_2 CGFRatio_b + \beta_3 After * CGFRatio_b + \zeta Bank_{b,t-1} + \gamma Macro_{t-1} + \alpha_b + \eta_f + \theta_t + \varepsilon_{b,f,c,t} \quad (4)$$

where the dependent variable $Loan_{b,f,c,t}$ is the amount of commercial loans excluding CGF or all consumer GPL loans of lender banks. $After_t$ is a dummy variable that takes the value of 1 after the policy implementation. $CGFRatio_b$ is the ratio of CGF loans of banks within their total loans. Tables 12 and 13 presents the results over 18 months around the policy date using this model.

5 Results

We first present our results on how firm risk and relationship characteristics relate to loan issuances in general, followed by an analysis of the two policies. Each panel shows results for different dependent variables, policy setting or time frame as indicated analysis begins with separate bank

and time fixed effects as well as firm fixed effects where applicable. The final columns in each panel either control for the supply or demand side in the credit relationship through the use of interacted fixed effects such as a bank-month fixed effect which controls for the supply side and compares parameters on different firms borrowing from the same bank, or firm-month fixed effects which contrast the lending behavior of different banks that lend to the same firm.

5.1 Relationship Banking and Risk Taking in Corporate Loans

Table 2 shows how our main three firm characteristics of strength of firm-bank relationship, firm's rating and its past default history have an effect on the amount, maturity and interest rate characteristics of newly issued loans. We also employ bank-month and firm-month fixed effects. This approach allows us to control for supply and demand side factors in the following way: by using firm-month effects, we are comparing the loan characteristics of the same firm in the same month for loans issued by different banks. Assuming that firms have demand for funds regardless of which specific intermediary they come from, this approach controls for the demand for credit, and allows us to compare differences in bank behaviors in setting loan conditions.²⁵ In the same light, through the use of bank-month effects, we compare the loan characteristics of firms that borrow from the same bank in the same month which controls for supply side factors (the bank lending channel) and compares the different loan behaviors of contemporarily borrowing firms.

In regressions presented in columns 2, 6 and 9, controlling for bank observables as well as bank, firm and time fixed effects to control for time invariant unobservables that may play a role on lending outcomes, we find that firms with higher riskiness use loans by lower amounts and for shorter periods, and pay a higher interest while doing so. This shows that in general Turkish banks exercise prudent lending practices rather than employing the risk taking channel. The strength of the firm-bank relationship also plays a role in the amount, as shown in columns 2 to 4, as firms with longer relationships have higher amounts in their borrowing compared to firms with weaker ties, although for shorter maturities (Boot, 2000). This final point about maturities is contrary to our expectations, however, this could be tied to these firms' use of short period loans for working capital needs instead of longer term borrowing, by relying on the established relationship with a bank to roll-over their debt to circumvent the term premium associated with longer maturities (Çapacıoğlu, 2017). These results are robust to the inclusion of factors controlling for demand and supply through the specifications in the last columns that include bank-month (columns 3, 7 and 10) or firm-month fixed effects, except for the directional impact of relationship strength on interest rates which remains ambiguous. Firms that have a relatively worse risk standing take

²⁵This approach builds on Khwaja and Mian (2008), Jimenez et al (2014) among others in the literature. Firms in our database work with on average more than 2 banks, which makes the identification and coverage reliable.

out loans with lower amounts, shorter duration and higher interest rates compared to other firms with better risk standing borrowing from the very same bank. Similarly, banks that have a weaker relationship with a firm issue lower amounts in credit compared to other banks lending to that firm.

5.2 CRE Loans

Tables 3 to 7 look at banks' lending decisions during the CRE loan LTV cap policy in further detail. Since the implementation of the LTV cap policy allows the banks to choose if they would issue a loan exceeding the cap accepting the capital cost, it becomes of paramount importance to analyse for which firms the bank chooses to undergo this deduction. Since the previous section established that banks in general exercise prudent lending practices, they could be expected to exceed the cap in their CRE lending not for riskier firms with a rent seeking motivation, but for firms with whom they have a long-standing relationship and firms that have a robust credit risk history. In other words, firms with whom they could further their business and reap additional gains from. This could be in the form of deposit collection from the firms to ensure a robust core funding channel, or establishing payroll accounts to increase retail banking market share.

The estimations in Table 3 show that during the implementation of the 50% CRE LTV cap policy between January 2011 and April 2013, lending with LTV ratios above the cap was done to firms with stronger relationships and lower risk/NPL history. The results are robust to the joint examination of relationship strength with risk indicators, as shown in column pairs 10-11 (with rating) and 12-13 (with NPL history), as well as controlling for the supply side effects through the employment of bank-month fixed effects (in the last column of all the panels in this table) and looking at banks that have lent at ratios both above and below the threshold in a given month. Banks are willing to undertake the capital cost for firms they have established relations with and/or are less risky. This begs the question what is the motivating factor for these banks to undertake the capital cost for these firms and how does that translate to credit conditions? To this end, the following tables compare and contrast the loan characteristics of firms borrowing above and below the cap by utilizing a quasi-experimental approach for the start and end dates of the policy.

5.2.1 Differences in Differences Study of the CRE LTV Cap

First, we test if with the implementation of the LTV cap in 2011, banks started charging firms they lend to above the cap a higher interest rate. To this end, in Table 4, we focus on the firms that borrowed CRE loans during the implementation of the cap, and compare their borrowing costs before and after the policy introduction based on their LTV ratios during the policy.

We find that, controlling for time varying bank and macro observables, banks in fact reflect the

capital cost of the loans exceeding the LTV cap onto the same loan by charging a higher interest rates on them compared to the same firms' CRE borrowing rates before the policy over shorter (6 to 12 months before and during) windows as well as the entire duration of the policy implementation (27 months before and during). The positive interaction variable implies that firms with loans exceeding the cap were charged a higher interest rate, or a 'premium' on these loans compared to firms with CRE loans below the cap during the implementation of the policy. The effect is valid for windows of 12 months as well as the entire duration of the policy. Even though the sign is still positive, we fail to identify the presence of the interest rate premium within the first 6 months. We attribute this to the transitioning phase into the new policy in the few early months. The premium is present even between firms with CRE levels above and below the cap borrowing within the same month from the same bank, presented in the last column in each panel. Over the full policy implementation period window of 27 months, firms with loans exceeding the cap were charged a higher interest rate by 19bps compared to firms with CRE loans as shown in column 9.

Table 5 replicates the study in the previous table for windows around the conclusion date of the cap in April of 2013. The analysis compares rates on CRE loans above the LTV cap during the policy implementation to rates on CRE loans after the conclusion of the policy for the same firm. The previous analysis has established that banks extend loans at LTV levels above the cap while reflecting the capital cost associated with this decision onto the loan conditions by charging a higher interest rate. However, since more CRE loans were issued above the cap for less risky firms, or firms with longer financial relationships with banks, the cost premium on their loan rates are expected to be low. As such, the comparison of the loan rates of these firms during and after the cap policy will reveal the lower bound of how banks price their capital costs into a loan rate. In a diff-in-diff analysis performed on windows of 6, 12 and 27 months covering up to the entire duration of the policy, we compare the rates on CRE loans of the same firms during and after the termination of policy, and we find that firms which had CRE loans above the cap see a higher reduction in their borrowing rates - by 23 bps in the analysis shown in column 9 - in the same type of loans following the conclusion of the policy.

Putting the results presented in tables 4 and 5 together where the analysis compares the borrowing rates of the same firm before, during and after the policy implementation shows that interest rates for the same type of loan increased during the policy implementation for firms borrowing at rates above the cap, and decreased after the conclusion of the policy. The fact that interest rates were higher for firms borrowing at ratios above the cap compared to their borrowing rates before and after suggests that banks have applied higher interest rates to firms they have elected to lend at LTV ratios above the cap, directly reflecting the capital cost of exceeding the cap onto the consumer. This finding is especially striking since in Table 3, we had established that banks lend at LTV ratios

above the cap to firms with better relationship and lower risk. Thus, the increase in their relative cost of funding compared to firms with CRE loans at LTV ratios below the cap is not related to their relative riskiness, but instead the capital cost of lending above the cap. In other words, ultimately, even though the cost comes at a reduction of capital for the bank, the cost is borne by the customer.

5.2.2 Spillover Effects of CRE LTV Cap

After having examined how loan conditions for firms exempted from the restriction has evolved, we turn to look at the impact of the LTV cap on loan utilization and loan conditions of policy constrained firms. The introduction of the cap could have barred some firms with insufficient own funds from investing in CRE, or alternatively motivated them to engage in other forms of financial contracts for the downpayment as a form of "spill-over borrowing". We define a potential pool of policy constrained firms as those with LTV ratios between 45 to 50% during the implementation of the policy. First, we investigate if the spillover effects of this macroprudential policy are present in our data. In this light, Table 6 shows how the *other* corporate loans of LTV constrained firms have changed during the policy implementation in an analysis performed over various windows around the introduction of the tightening policy.

Since CRE loans are self-collateralized forms of borrowing, they carry less exposure at default risk compared to other commercial loans, and therefore should be priced lower than uncollateralized commercial loans. As such, firms for which the LTV cap still applies, i.e. firms that the banks have not chosen to exceed the cap for, could prefer to pay as much of the CRE loan as possible out of a CRE loan and then top it up with other forms of borrowing if needed. This would imply that our definition of constrained could include both financially constrained firms, and also financially rational firms who are not constrained but chose to maximize the CRE portion of the loan. To address this concern, next, we perform a complementary analysis on the LTV constrained firms (those with LTV ratios between 45 and 50%) with the additional restriction that they should also have a CRE loan in the post-implementation period with a LTV ratio above 50% in similar windows of 6, 12 and 27 months and report the results in Table 7. This approach will compare the CRE loan conditions of the same firm which was constrained during the policy implementation not only per our definition but also through their preferences after as they opted for LTV ratios above the cap in the post-implementation period.

Together, the tables show that compared to other firms, LTV constrained firms saw a larger increase - by 5.7% - in their non-CRE loans while the cap was in effect, and a relatively larger decline - by 6.9% - in their non-CRE loans following the termination of the macroprudential policy. Furthermore, when we restrict the sample to a comparison of cap-constrained and unconstrained firms borrowing from the same bank in the final columns, we see that while constrained firms demand

more non-CRE loans during the policy implementation compared to unconstrained firms, their demand for non-CRE loans is less than that of unconstrained firms in the post-policy period.

These findings imply that there may be an unintended spill-over from CRE loans to other types of corporate loans as a result of the macroprudential policy restricting LTV ratios on CRE loans. Firms may be using the additional loans as a means to cover part or all of the down payment required under the LTV cap regime. This raises several financial stability issues on the part of banks and the financial system in general. First, while banks and firms may be entering into CRE loan contracts with an official LTV ratio on the loan, through these additional uncollateralized commercial loans the firm, the loan may be leveraged at rates above the LTV cap. This suggests that the individual bank issuing the CRE loan may have accepted a riskier item on its balance sheet than what the official LTV ratio suggests. Coupled with the fact that banks have already exceeded the cap for firms with better credit performances and relationship status, this additional balance sheet risk is brought on by firms which already present a relatively higher risk profile. Finally, if the additional loans are issued by other financial intermediaries than the bank issuing the CRE loan, this suggests a higher level of bank interconnectedness, and potential for contagion. These factors suggest a deeper supervisory approach and a linkage between loan leverage and income could be a more comprehensive approach to macroprudential policymaking.²⁶

5.3 CGF Loans

Subsequently, tables 8 to 13 look at the effects of the CGF collateral guarantee scheme on firm financing and bank lending decisions. The policy implementation gave each bank a loan collateral guarantee as long as the asset quality of the portfolio remained below a pre-determined level. Within the bounds of this limitation, banks were free in their choice of which type of firms were granted a CGF collateral guarantee as well as other characteristics of the loan such as amount, maturity and interest rates. This implies that the bank can select a combination of external and internal margin factors to suit its risk appetite given the collateral guarantee. As an initial step, we begin the credit channel analysis of the CGF implementation by looking at which types of firms, measured by our three risk-type indicators (relationship strength, riskiness, NPL history) banks chose to service under the CGF scheme. Next, we will focus on the particulars of the loan, to see if the loan conditions are in line with the risk appetite exercised at the extensive margin.

Table 8 shows the type of firm chosen by banks using our three benchmark firm characteristics: those with whom the bank has stronger ties with, those with higher risk rating, or those with a

²⁶Kim, 2014 finds that for Korea, a retail LTV cap restriction was successful in ensuring financial stability when implemented together with DTI ratio limits. Baziki and Çapacıoğlu, 2017 find similar results for the retail real estate LTV ratio cap.

healthier past credit performance. Results shown in columns 2, 5, 8, 10 and 12 in analyses that includes bank and macro observables as well as bank, firm and time fixed effects imply that banks have elected firms with whom they have stronger relationship with, as well as those with lower risk ratings and stronger past credit performance. This result is reassuring in that the scheme has been successful in its implementation by creating better access to credit for firms that are traditionally deemed creditworthy, but lacked the sufficient collateral to secure funding from banks. We add to this banking-sector level analysis by introducing bank-month fixed effects which allows us to compare lending behaviors *within* banks across CGF and non-CGF lending in the same month. The results reported in the last column of each panel show that the same results hold for within banks, and that there is higher credit utilization in firms with better credit and relationship history as well as rating. Relationship lending, by nature, results in lending with lower agency costs and information asymmetry, which are both linked to better loan performance. Higher ratings are also indicative of both better past loan performance as well as higher future performance. In other words, not only has the policy been successful in stimulating the bank credit channel for the targeted audience, it has also been successful in generating relatively healthier SME credit growth during this period. Similar to the banking sector level results reported in previous columns, recent history of credit performance, measured here as the presence of NPL in a loan in the past three years, is a more powerful determinant of SME credit access compared to the firm rating.

5.3.1 Differences in Differences Studies of the CGF Scheme

Next, we investigate how the differences credit conditions between firms with and without CGF loans in terms of loan amount, maturity and interest rate has evolved over time with the introduction of the CGF scheme in Table 9. We perform the analyses over a window of 5 months around the CGF scheme, as this period allows for a cleaner identification of the results due to the absence of other stimulating policies. Extending the window to 9 months as a robustness check, also reported in the table, increases the sample size with no significant difference in the outcomes. Loan conditions can change over time in response to changes in local and global macroeconomic or financial conditions, the changes we captured in the previous analysis could reflect a general shift in preferences by banks. To address this issue, this exercise will compare firms with commercial loans issued under and outside the scheme in the same month to see how their conditions have evolved relative to each other. Results reported in column 2 show that firms with loans issued under the CGF scheme saw an increase in all three credit conditions with the program, as they took out larger loans with longer maturities and the longer and larger risks reflected a higher cost of borrowing for these firms.

Through the employment of bank-month fixed effects, we restrict the analysis to a comparison

of firms with and without CGF scheme loans borrowing from the same bank in the same month and report the results in column 3. In this setup, firms with no CGF related loans come out to have smaller loans with shorter maturities compared to their loans in the period leading up to the program corroborating the findings presented in Figure 10. This represents a shift in lending preferences away from non-CGF to CGF lending by banks; banks substitute non-CGF lending with larger and longer CGF loans, in a way crowding out other types of commercial lending. Despite the smaller risk they hold during the policy window, the non-CGF firms also are paying a higher interest rate in the non-CGF loans they took out during the CGF program, partly due to the concurrent increase in the policy rate as seen by the coefficient represented by the After variable. The same bank lends larger amounts, by 32%, to firms with CGF loans to for longer periods, by 24%, and charges them a higher interest rate by 11bps compared to firms with no CGF association borrowing from them. The difference in the cost could have been a reflection of the higher credit volume and longer maturities, but in our analysis we control amount and maturity of loans, thus the results suggest that banks charge a lower interest rate to firms having loans with larger amounts and shorter maturity. Therefore, this margin reflects banks' return/yield as a result of the freedom of choice in CGF.

So far, we have investigated what firms are selected into the program and in what ways do they differ from the rest of firms in terms of loan characteristics. We supplement this extensive margin analysis with a look within the group of firms that were selected to participate in the CGF scheme. Table 10 focuses on firms that were selected into the scheme and compares their loan characteristics to see if firm-level relationship and riskiness factors impacted the loan outcomes. We look at two indicators i) the natural log of the amount of loans with CGF collateral guarantees per firm, and ii) the natural log value of the amount of other loans of these firms. First, we find that during the policy implementation, among those firms participating in the CGF scheme, firms with relatively stronger relationship, but worse risk levels/default history have been issued larger amounts of both CGF and non-CGF loans. The results are robust to restricting the sample to firms borrowing from the same bank in the same month through the use of bank-month fixed effects. Next, we compare firms with high or low loan issuances from the same bank in the same month, which allows us to isolate the differences in lending between two groups, without the influence of time or bank related factors that could impact the outcomes, such as the bank's unique liquidity standing, or profitability levels. In this comparison, we similarly find that firms with stronger relationships and worse risk/credit history standing are issued larger loans from the same bank in the same month.

This finding signals the presence of two factors: a) that there is a strong relationship banking effect in lending, which increases exposures to firms with longer established relationships and b) that this effect holds even when firms have worse credit histories, which increases the banks' probability

of default (PD) evaluations on the loan itself, and its loan portfolio in general. The two factors together, larger exposures and higher PD, increase the exposure at default (EAD) on the portfolio.

From a financial business point of view, issuing a larger loan to a firm with longer relationship standing and higher risk under a CGF scheme makes sense as a profitable stance: this approach allows the bank to continue their working relationship with the firm, while sharing some of the potential EAD with scheme. Furthermore, banks are also choosing to issue larger non-CGF loans to these firms at the same time which could be a sign of risk sharing between the CGF loan and the non-CGF loan, making it possible to lend larger amounts of non-CGF to the same firm.²⁷

Next, we investigate how firms with high and low levels of CGF collateralized loans differ in terms of amount, maturity and funding cost with the introduction of the policy. Using the natural logarithm of the firm's CGF loans as an indicator (which we call dummy in tables for continuity), Table 11 shows that firms with larger amounts of CGF loans see a relative increase in their loan amounts, maturities and interest rates following the introduction of the scheme compared to firms with lower amounts of CGF loans. In other words, the average loan size, maturity and interest rate increases with the share of CGF loans in the firm's balance sheet. This makes sense in light of the literature: all else equal, a loan with a longer maturity has a higher term cost, as well as a higher probability that the loan may default before full repayment, and thus should be subject to a larger cost. The relative difference remains even when the comparison is restricted to firms that borrow from the same bank in the same month: following the scheme, relative to firms with smaller loans, firms with larger CGF loans start to receive larger loans with longer maturities but face higher interest rates compared to the period before the scheme. In sum, the findings in Table 11 highlight that firms with higher CGF loan amounts are indeed receiving greater access to funds, but they are also charged for it.

5.3.2 Spillover Effects of the CGF Scheme

Finally, we investigate whether the introduction of the CGF scheme has affected banks' balance sheets through a substitution within corporate or across corporate-retail loans. Banks' asset structures are dynamic as they re-optimize the distribution of their assets among different types of loans given macroeconomic or financial conditions, expectations, their balance sheet restrictions and risk preferences. New to this set-up, the CGF scheme changes the risk associated with guaranteed (mostly SME) loans, and provides banks with a window in which they could reduce potential losses on said loans while seeking a high return by maximizing their participation in the new scheme. This could have stimulated banks to optimize the distribution of their assets across different types of loans at rates beyond what would be observed otherwise. Such a scenario would

²⁷See Brandao-Marques et al, 2013 for more on risk shifting.

especially be relevant if banks were to meet this large change in credit demand/preferences over a short period of time with frictions in accessing immediate sources of funding, as in the Turkish case. In addition, taken as a signal of their asset and liability management power and long-term liquidity outlook, banks in Turkey favor their loan to deposit ratio to remain at stable levels. This may have acted as a further motivation to shift assets across different types, rather than an absolute expansion of balance sheet assets.²⁸ The analyses presented in Tables 12 and 13 investigate if the policy has altered the loan portfolio of banks by causing a substitution between different types of loans, namely if the CGF collateral guarantee has affected banks' other corporate and retail general-purpose lending in a quasi-experimental setting where we aim to control for loan demand through the use of location, time and sector specific fixed effect interactions.

To this end, we first investigate the spillover effects onto other (non-CGF) corporate lending in Table 12. To control for demand-side factors, we employ firm-month fixed effects in Panel A followed by city-sector-month fixed effects in Panel B. Next, we present the results of the analysis on retail general purpose loans where demand in general-purpose loans are controlled for by the use of city-month fixed effects in Table 13. For both tables, we discuss results that also control for bank-level observables.

The results show that, controlling for demand-side factors, banks that issue larger amounts of CGF loans (at least 75% of their portfolio) see a simultaneous decline in their other corporate and general-purpose lending compared to banks with lower CGF participation (25% of their portfolio). As shown in column 8 for an analysis over a 9-month window, the decline in this other lending is about 4.0% with firm-month fixed effects in Panel A, and 2.8% with city-sector-month fixed effects employed in Panel B.²⁹ This lends initial proof that banks, faced with constraints, have re-optimized their lending away from other lending outside the scope of the program. This finding is especially stark when we consider the results within the context of other macroprudential policies that could stimulate lending in the opposite direction. Several months prior to the initial phase of the scheme, the maturity cap on retail general-purpose loans were extended by a year. This step supported households' debt servicing capacities by reducing the monthly payments of a loan,

²⁸While the Turkish banking sector is dependent on external sources of funding, core funding through deposits makes up about 60 percent of all funding sources. As explained above, even though there is no official limit exercised on the loan to deposit ratio, this ratio derived from the relevant balance sheet items of the sector becomes one of the key budget constraint indicators on liquidity. With this motivation, banks shifted their portfolio across different types of loans, rather than an alternative state where other types of loans would have also grown on trend along with the scheme related loans. In addition, the fact that given the set-up of the scheme a majority of the lending was done over the span of three months, would have been a further factor hindering banks' ability to gain access to other external sources of funding. With that, we consider the assumption on liquidity limitations reasonable and proceed to explore the credit substitution effect in the Turkish case.

²⁹We calculate the effects as follows: $(2.87-1.55)*(-0.03)=0.0396$ for Panel A and $(2.87-1.55)*(-0.021)=0.0277$ for Panel B.

and increased demand for general-purpose loans. Yet, we see that banks, despite seeing better debt servicing potential and demand from households, have chosen to substitute funds away from general purpose loans, to the CGF scheme. This choice may have played a role in the success of the CGF program in disseminating funds to the commercial sector, and highlight the rising presence of a larger share of SME lending in the economy.

6 Conclusion

Using a detailed bank-firm-loan level microdata from Turkey, we analyse the impact of two counter-cyclical policies - LTV and credit guarantee scheme - on banks' lending decisions. The implementation of these two widely used policies in Turkey stand out as they give banks the freedom to chose which firms are restricted by/participate in the policies and to what degree. While the policies give the outline of the rule set, the transmission of both policies were subject to banks' risk preferences, rationality, balance sheet restrictions, and prudence levels. Through an approach that allows us to disentangle supply and demand side factors, we shed light onto the exact working mechanism of both of the policies.

The first policy we investigate is a macroprudential policy limiting the LTV ratio of CRE loans to 50% which was in effect for about 2 years. Banks however were able to issue CRE loans above the limit at a cost, presenting the opportunity to see the impact of a tightening and easing in macroprudential policies on banks' decision making and selection criteria in firms that exceeded the limit. The second policy provided government collateral guarantees up to 100% for collateral-constrained firms, a policy that aimed to ease credit conditions for SMEs. Banks were again free to choose which firms they would select into the scheme.

Controlling for supply factors, we find that in both policies, firms with higher risk and weaker relationship with a bank are given less amount of funding, and they are exposed to higher interest rates when they borrow from the same bank. The results are replicated when controlling for demand side factors. These findings show that Turkish banks have exercised their choices in lending prudently, favoring firms with lower relative risk and lower information asymmetries. As such, the implementation of both polices has been supportive of financial stability.

In more detail, while the LTV ratio cap was in effect, banks chose to issue CRE loans above the cap to firms with whom they had a longer established relationship, and had a healthier default history. However, the banks reflect the capital cost of this loan onto the loan issued by charging a higher interest rate. The interest rate impact on the firms with loans above the cap reverses after the conclusion of the policy, as these firms start receiving loans with interest rates lower than peers, further corroborating that the increase in the interest rates was due to banks reflecting their costs

onto the CRE loans. Firms that are constrained by the LTV policy, i.e. firms with LTV ratios between 45% to 50% during the policy and higher LTV ratios after the conclusion of the policy see an increase in their *other* borrowing while the policy is in effect, and a decline in these loans after the conclusion of the policy compared to other firms. Results that control for the supply side factors show that these firms demand more corporate loans during the policy and less after. This confirms that the spillover to other types of loans as a result of macroprudential policies exists in corporate credits too as well as residential.

The CGF loans are issued to firms with a longer established relationship, and have a healthy credit history. This finding stands in stark contrast with the rest of the literature which finds increasing risk taking in similar schemes. We attribute this to the gainful design of the policy which benefits from the sectoral and firm-specific know-how of the financial intermediary sector as well as the delinquency cap imposed on the loan portfolio. Firms with CGF loans have larger amounts issued to them for longer periods and at a higher interest rate compared to non-CGF firms. However, among those issued CGF loans, those with stronger relationships but worse credit history receive larger amounts of loans (both CGF and non-CGF loans). Firms that receive larger amounts of CGF loans see an increase in their amount, maturity and interest increase compared to firms that use less amount of CGF loans and also compared to their own past loans. Finally, we show that the increase in CGF utilization has resulted in lower other corporate credit and general-purpose loans in banks with larger utilization rates.

While the implementation of both policies have been supportive of financial stability, the design of these policies raise an important point from a macroprudential perspective. In the Turkish example, policy design factors such as the capital cost introduced for loans exceeding the CRE cap, or the dissemination of the loans through existing intermediaries with sectoral or firm-specific knowledge may have helped guide banks towards more prudent lending preferences. In addition, the portfolio delinquency cap on CGF loans works to eliminate moral hazard problems present in agency use. In other settings however, especially for policies with dual goals such as promoting growth or employment on the side of credit access; the goals of the policy and banks' risk appetites and return for investment targets may not necessarily be aligned. In these environments, a more detailed setup may help prevent unintended policy consequences such as moral hazard or balance sheet risk build-up all of which threaten financial stability. A detailed policy setup will also drive down monitoring costs for policy makers while ensuring the policy target and financial stability gains.

7 References

- Agarwal, S., & Hauswald, R. (2010). Distance and private information in lending. *The Review of Financial Studies*, 23(7), 2757-2788.
- Alper, K., & Çapacıoğlu, T. (2018). The Dynamics of Loan-to-Deposit Ratio in Turkey. CBRT Blog.
- Alper, K., Çolak, M. S., & Tok, E. (2016). Capital constraints and loan growth: A mechanical analysis (No. 18), CBRT Research Notes in Economics.
- Anderson, G., Bahaj, S., Chavaz, M., Foulis, A., & Pinter, G. (2018). Lending relationships and the collateral channel (No. 768). Bank of England Staff Working Paper Series.
- Aruoba, S. B., & Sarikaya, C. (2013). A Real Economic Activity Indicator for Turkey. *Central Bank Review*, 13(1).
- Baziki, S.B., & Çapacıoğlu, T. (2017). Loan-to-Value Caps, Riskier Bank Lending, and Spill-over to General-Purpose Loans. Unpublished mimeo.
- Baziki, S.B., & Çapacıoğlu, T. (2020). Bank Lending and Maturity: the Anatomy of the Transmission of Monetary Policy. CBRT Working Paper, No. 20/05, March.
- BRSA (2018). Development and performance of CGF loans. Banking Regulation and Supervision Authority Information Notes, June.
- Beck, T., & Demirgüç-Kunt, A. (2006). Small and medium-size enterprises: Access to finance as a growth constraint. *Journal of Banking & Finance*, 30(11), 2931-2943.
- Beck, T., Demirgüç-Kunt, A., & Levine, R. (2005). SMEs, growth, and poverty: cross-country evidence. *Journal of Economic Growth*, 10(3), 199-229.
- Beck, T., Demirgüç-Kunt, A., & Maksimovic, V. (2008). Financing patterns around the world: Are small firms different?. *Journal of Financial Economics*, 89(3), 467-487.
- Beck, T., Klapper, L. F., & Mendoza, J. C. (2010). The typology of partial credit guarantee funds around the world. *Journal of Financial Stability*, 6(1), 10-25.
- Berger, A. N., Frame, W. S., & Ioannidou, V. (2016). Reexamining the empirical relation between loan risk and collateral: The roles of collateral liquidity and types. *Journal of Financial Intermediation*, 26, 28-46.
- Berger, A. N., & Udell, G. F. (1990). Collateral, loan quality and bank risk. *Journal of Monetary Economics*, 25(1), 21-42.
- Berger, A. N., & Udell, G. F. (1995). Relationship lending and lines of credit in small firm finance. *Journal of Business*, 351-381.
- Berlin, M., & Mester, L. J. (1998). On the profitability and cost of relationship lending. *Journal of Banking & Finance*, 22(6-8), 873-897.

- Berlin, M., & Mester, L. J. (1999). Deposits and relationship lending. *The Review of Financial Studies*, 12(3), 579-607.
- Bernanke, B., & Gertler, M. (1989). Agency costs, net worth, and business fluctuations. *American Economic Review*, 79(1), 14-31.
- Bernanke, B. S., & Gertler, M. (1995). Inside the black box: the credit channel of monetary policy transmission. *Journal of Economic Perspectives*, 9(4), 27-48.
- Bernanke, B., Gertler, M., & Gilchrist, S. (1996). The financial accelerator and the flight to quality. *Review of Economics and Statistics*, 78(1), 1-15.
- Bharath, S., Dahiya, S., Saunders, A., & Srinivasan, A. (2007). So what do I get? The bank's view of lending relationships. *Journal of Financial Economics*, 85(2), 368-419.
- Bharath, S. T., Dahiya, S., Saunders, A., & Srinivasan, A. (2011). Lending relationships and loan contract terms. *The Review of Financial Studies*, 24(4), 1141-1203.
- Black, L. K., & Hazelwood, L. N. (2013). The effect of TARP on bank risk-taking. *Journal of Financial Stability*, 9(4), 790-803.
- Boot, A. W. (2000). Relationship Baking: What Do We Know?. *Journal of Financial Intermediation*, 9(1), pp.7-25.
- Boot, A. W., Greenbaum, S. I., & Thakor, A. V. (1993). Reputation and discretion in financial contracting. *American Economic Review*, 1165-1183.
- Boyd, J. H., & De Nicoló, G. (2005). The theory of bank risk taking and competition revisited. *The Journal of Finance*, 60(3), 1329-1343.
- Brandao-Marques, L., Correa, R., & Sapriza, H. (2013). International evidence on government support and risk taking in the banking sector (No. 1086). FRB International Finance Discussion Paper.
- Çapacıoğlu, T. (2017). The Impact of Reserve Requirement Policies on the Maturity of Banks' External Debts. CBRT Blog.
- Carlstrom, C. T., & Fuerst, T. S. (1997). Agency costs, net worth, and business fluctuations: A computable general equilibrium analysis. *American Economic Review*, 893-910.
- CBRT Financial Stability Report (2017). Special Topic IV.2: Measures on corporate sector's access to finance (Vol. 24). 71-76.
- Cerutti, E., Claessens, S., & Laeven, L. (2017). The use and effectiveness of macroprudential policies: New evidence. *Journal of Financial Stability*, 28, 203-224.
- Cowan, K., Drexler, A., & Yañez, Á. (2015). The effect of credit guarantees on credit availability and delinquency rates. *Journal of Banking & Finance*, 59, 98-110.
- Cowling, M. (2010). The role of loan guarantee schemes in alleviating credit rationing in the UK. *Journal of Financial Stability*, 6(1), 36-44.

- Degryse, H., Karapetyan, A., & Karmakar, S. (2019). To Ask or Not To Ask? Bank Capital Requirements and Loan Collateralization (No. 778.). Bank of England Staff Working Paper Series.
- Diamond, D. W. (1984). Financial intermediation and delegated monitoring. *The Review of Economic Studies*, 51(3), 393-414.
- Diamond, D. W. (1991). Monitoring and reputation: The choice between bank loans and directly placed debt. *Journal of Political Economy*, 99(4), 689-721.
- Gambacorta, L., & Mistrulli, P. E. (2004). Does bank capital affect lending behavior?. *Journal of Financial Intermediation*, 13(4), 436-457.
- Gertler, M., & Gilchrist, S. (1993). The cyclical behavior of short-term business lending: Implications for financial propagation mechanisms. *European Economic Review*, 37(2-3), 623-631.
- Gertler, M., & Gilchrist, S. (1994). Monetary policy, business cycles, and the behavior of small manufacturing firms. *The Quarterly Journal of Economics*, 109(2), 309-340.
- Gilchrist, S., & Zakrajšek, E. (2007). Investment and the cost of capital: New evidence from the corporate bond market (No. w13174). National Bureau of Economic Research.
- Gozzi, J. C., & Schmukler, S. (2016). Public credit guarantees and access to finance (No. 1122). Warwick Economics Research Paper Series.
- Gray, J. A., & Ongena, S. (1996). Bank Relationship Benefits, Bank Risk and the Paper-Bill Spread. Mimeo. University of Oregon.
- Green, A. (2003). Credit guarantee schemes for small enterprises: an effective instrument to promote private sector-led growth? (No. 10). UNIDO, Programme Development and Technical Cooperation Division.
- Hallissey, N., Kelly, R., & O'Malley, T. (2014). Macro-prudential tools and credit risk of property lending at Irish banks (No. 10/EL/14). Central Bank of Ireland.
- Hanedar, E. Y., Broccardo, E., & Bazzana, F. (2014). Collateral requirements of SMEs: The evidence from less-developed countries. *Journal of Banking & Finance*, 38, 106-121.
- Igan, D., & Kang, H. (2011). Do loan-to-value and debt-to-income limits work? Evidence from Korea (No. 11/297). IMF Working Papers.
- IMF (2014). IMF Staff Guidance Note on Macroprudential Policy. IMF Policy Paper.
- IMF-FSB-BIS (2016). Elements of Effective Macroprudential Policies Lessons from International Experience.
- Jiménez, G., & Saurina, J. (2004). Collateral, type of lender and relationship banking as determinants of credit risk. *Journal of Banking & Finance*, 28(9), 2191-2212.
- Jiménez, G., Ongena, S., Peydró, J. L., & Saurina, J. (2014). Hazardous times for monetary policy: What do twenty-three million bank loans say about the effects of monetary policy on credit risk-taking?. *Econometrica*, 82(2), 463-505.

- Jung, H., & Lee, J. (2017). The effects of macroprudential policies on house prices: Evidence from an event study using Korean real transaction data. *Journal of Financial Stability*, 31, 167-185.
- Kane, E. J., & Malkiel, B. G. (1965). Bank portfolio allocation, deposit variability, and the availability doctrine. *The Quarterly Journal of Economics*, 113-134.
- Kashyap, A. K., Stein, J. C., & Wilcox, D. W. (1993). Monetary policy and credit conditions: Evidence from the composition of external finance. *American Economic Review*, 83(1), 78-98.
- KGF (2019). The Credit Guarantee Fund, www.kgf.org.tr.
- Khwaja, A. I., & Mian, A. (2008). Tracing the impact of bank liquidity shocks: Evidence from an emerging market. *American Economic Review*, 98(4), 1413-42.
- Kim, C. (2014). Macroprudential policies in Korea—Key measures and experiences. *Financial Stability Review*, (18), 121-130.
- Kiyotaki, N., & Moore, J. (1997). Credit cycles. *Journal of Political Economy*, 105(2), 211-248.
- Konishi, M., & Hasebe, K. (2002). Kouteki sinyouhoshou no seisaku kouka (Effective policy in public credit guarantees). *The Hitotsubashi Review*, 5, 36-47.
- Kuttner, K. N., & Shim, I. (2016). Can non-interest rate policies stabilize housing markets? Evidence from a panel of 57 economies. *Journal of Financial Stability*, 26, 31-44.
- Lang, W. W., & Nakamura, L. I. (1995). 'Flight to quality' in banking and economic activity. *Journal of Monetary Economics*, 36(1), 145-164.
- Levitsky, J. (1997). Credit guarantee schemes for SMEs—an international review. *Small Enterprise Development*, 8(2), 4-17.
- Matsuyama, K. (2007). Credit traps and credit cycles. *American Economic Review*, 97(1), 503-516.
- Mazreku, I., Shabani, H., & Morina, F. (2016). Credit Guarantee Schemes, the Importance of Collateral and the Impact of the Creation of SMEs Network in the Process of Bank Crediting.
- OECD (2013). Improving Access to Finance for SMEs in Central Asia through Credit Guarantee Schemes. *Private Sector Development Policy Handbook*.
- OECD (2019). *OECD SME and Entrepreneurship Outlook*.
- Ongena, S., & Smith, D. C. (2000). What determines the number of bank relationships? Cross-country evidence. *Journal of Financial Intermediation*, 9, pp.26-56.
- Petersen, M. A., & Rajan, R. G. (1994). The benefits of lending relationships: Evidence from small business data. *The Journal of Finance*, 49(1), 3-37.
- Petersen, M. A., & Rajan, R. G. (1995). The effect of credit market competition on lending relationships. *The Quarterly Journal of Economics*, 110(2), 407-443.
- Puri, M., Rocholl, J., & Steffen, S. (2011). Global retail lending in the aftermath of the US financial crisis: Distinguishing between supply and demand effects. *Journal of Financial Economics*, 100(3), 556-578.

- Puri, M., Rocholl, J., & Steffen, S. (2017). What do a million observations have to say about loan defaults? Opening the black box of relationships. *Journal of Financial Intermediation*, 31, 1-15.
- Rajan, R. G. (1992). Insiders and outsiders: The choice between informed and arm's-length debt. *The Journal of finance*, 47(4), 1367-1400.
- Ramakrishnan, R. T., & Thakor, A. V. (1984). Information reliability and a theory of financial intermediation. *The Review of Economic Studies*, 51(3), 415-432.
- Saadani, Y., Arvai, Z., & Rocha, R. (2011). A review of credit guarantee schemes in the Middle East and North Africa Region. The World Bank.
- Schwert, M. (2018). Bank capital and lending relationships. *The Journal of Finance*, 73(2), 787-830.
- Sharpe, S. A. (1990). Asymmetric information, bank lending, and implicit contracts: A stylized model of customer relationships. *The Journal of Finance*, 45(4), 1069-1087.
- Slovin, M. B., Sushka, M. E., & Hudson, C. D. (1990). External monitoring and its effect on seasoned common stock issues. *Journal of Accounting and Economics*, 12(4), 397-417.
- Slovin, M. B., Sushka, M. E., & Polonchek, J. A. (1993). The value of bank durability: Borrowers as bank stakeholders. *The Journal of Finance*, 48(1), 247-266.
- The EBCI Vienna Initiative (2014). Credit guarantee schemes for SME lending in Central, Eastern and South-Eastern Europe. Report by the Vienna Initiative Working Group on Credit Guarantee Schemes.
- The World Bank (2015). Principles for public credit guarantee schemes for SMEs. Report by the Task Force for the Design, Implementation and Evaluation of Public Credit Guarantee Schemes for Small and Medium Enterprises.
- Tinbergen, J. (1952). *On the Theory of Economic Policy*. North-Holland Pub. Co.
- Udell, G. F. (2015). SME Access to intermediated credit: What do we know and what don't we know. Reserve Bank of Australia, Small Business Conditions and Finance Conference Volume, 61-109.
- Uesugi, I., Sakai, K., & Yamashiro, G. M. (2010). The effectiveness of public credit guarantees in the Japanese loan market. *Journal of the Japanese and International Economies*, 24(4), 457-480.
- Wilcox, J. A., & Yasuda, Y. (2019). Government guarantees of loans to small businesses: Effects on banks' risk-taking and non-guaranteed lending. *Journal of Financial Intermediation*, 37, 45-57.

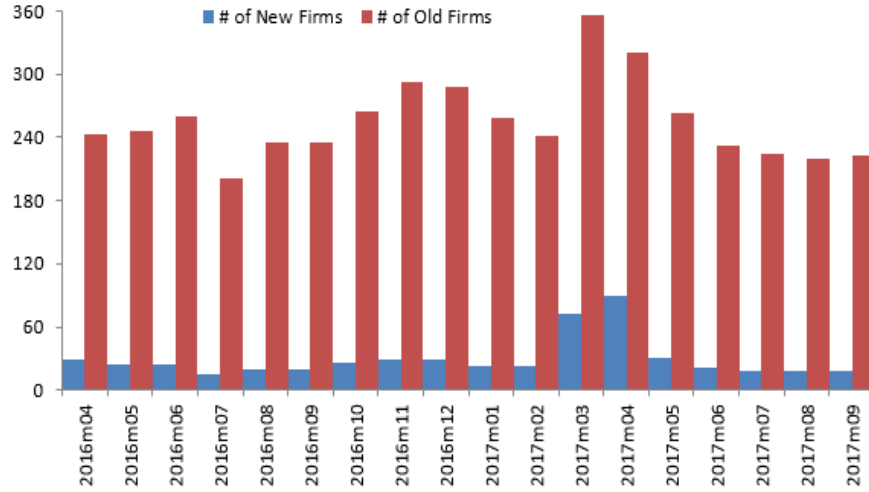


Figure 4: Participation in the corporate loan market by existing and new (without a previous financial history) firms for 2016m1-2017m9, in thousands.

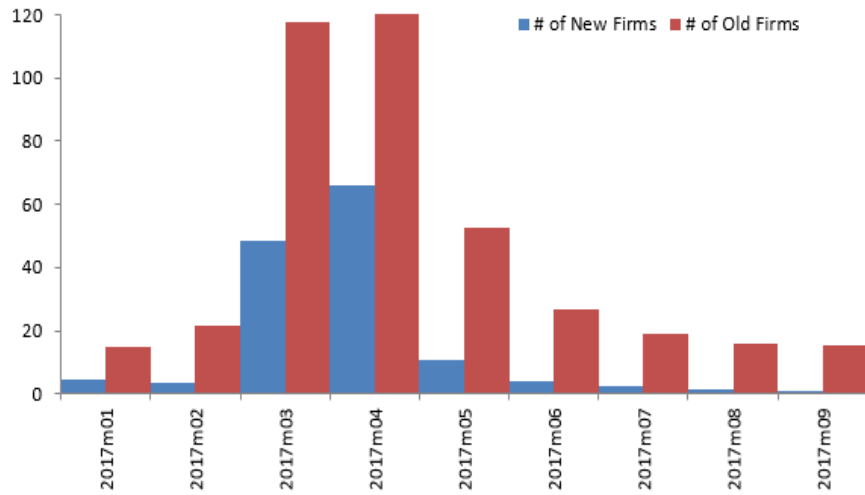


Figure 5: Participation in the CGF scheme by existing and new (without a previous financial history) firms for 2016m1-2017m9, in thousands.

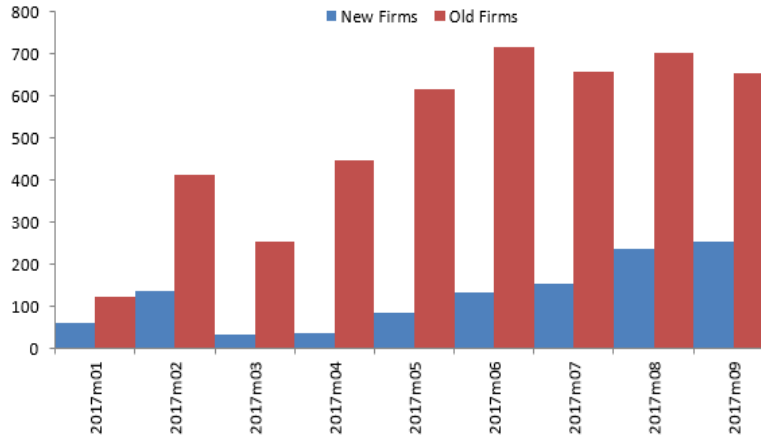


Figure 6: Credit utilization under the CGF scheme by existing and new (without a previous financial history) firms for 2017m1-2017m9, in thousand TLs.

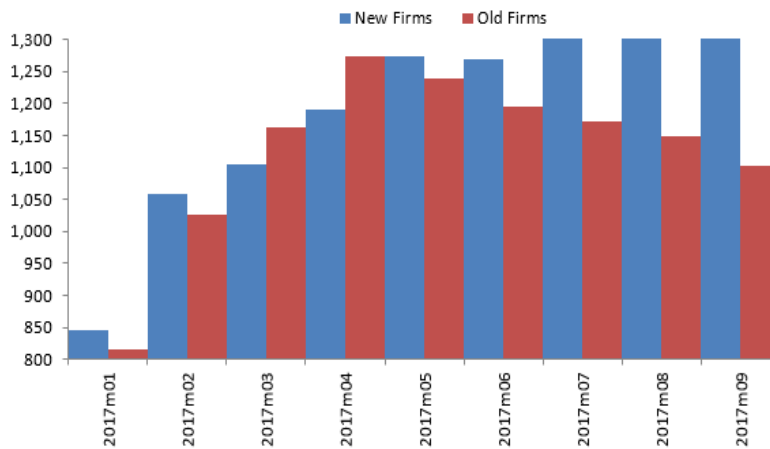


Figure 7: CGF scheme loan maturities by existing and new firms for 2017m1-2017m9, in days.



Figure 8: CGF scheme loan interest rates of and the spread between new and existing firms for 2017m1-2017m9, percent.

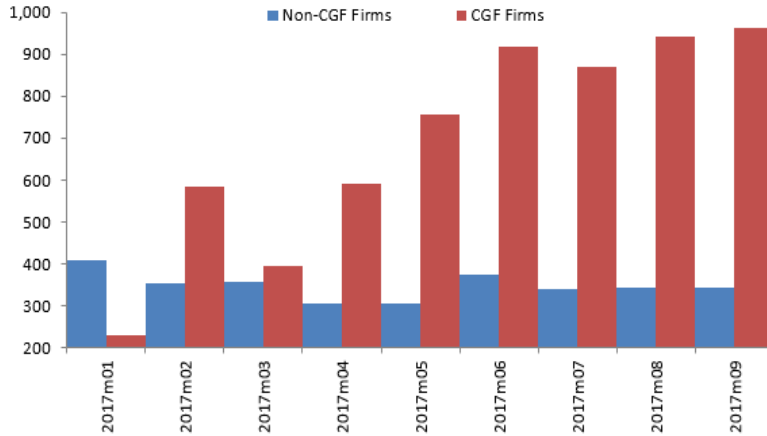


Figure 9: TL-denominated credit utilization by firms that have at least one CGF scheme loan vs firms without any CGF loans for 2017m1-2017m9, in thousand TLs.

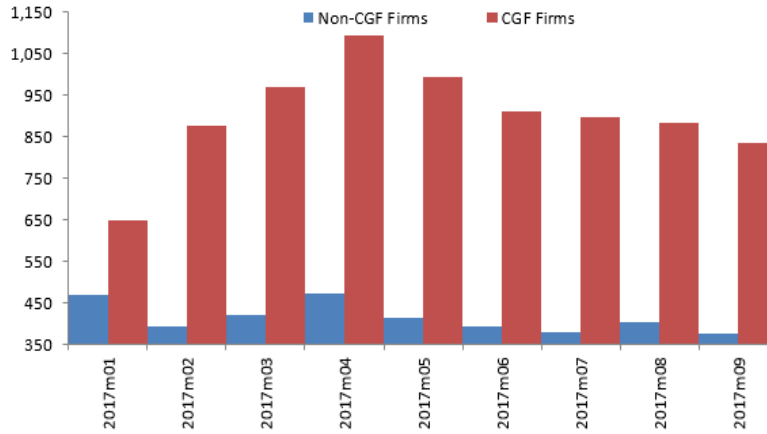


Figure 10: Average maturity on TL denominated loans for firms that have at least one CGF scheme loan vs firms without any CGF loans for 2017m1-2017m9, in days.

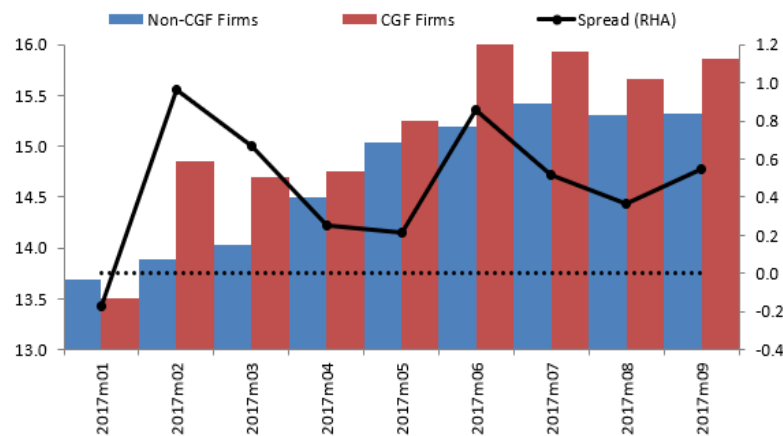


Figure 11: Average interest rate on TL denominated loans for firms that have at least one CGF scheme loan vs firms without any CGF loans, and the interest rate spread between for 2017m1-2017m9, percent.

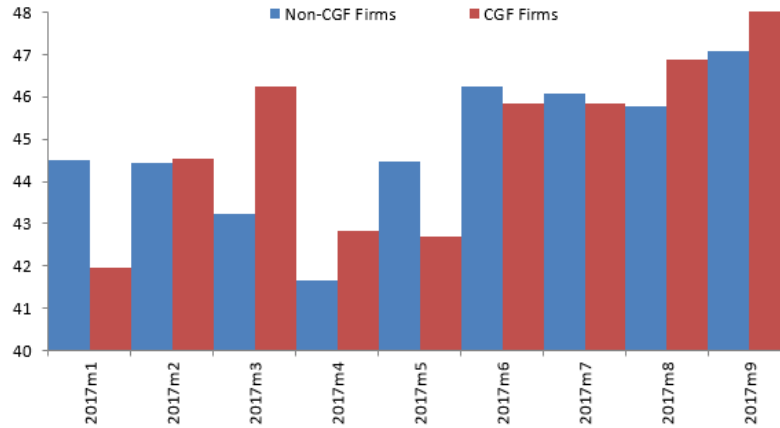


Figure 12: Relationship strength measured as the time between the current and the previous loans issued from the same bank for firms that have at least one CGF scheme loan vs firms without any CGF loans for 2017m1-2017m9, in months.

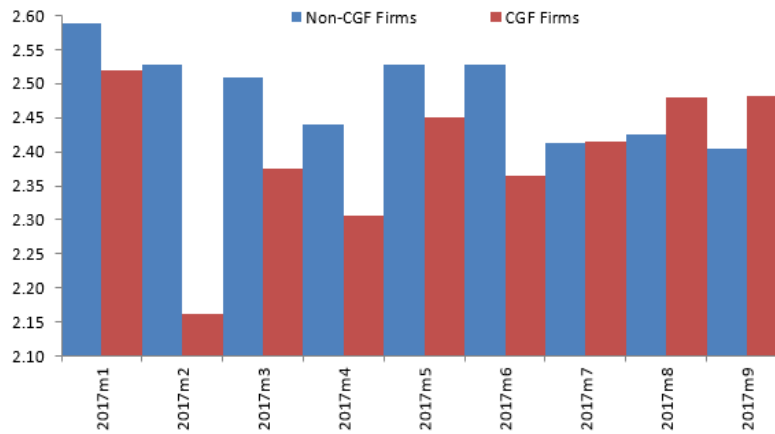


Figure 13: Credit issuing banks' risk rating for firms that have at least one CGF scheme loan vs firms without any CGF loans for 2017m1-2017m9, index.

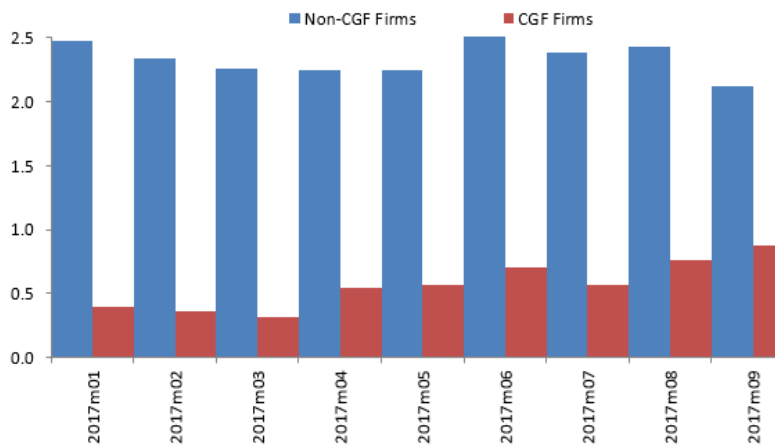


Figure 14: NPL rates for firms that have at least one CGF scheme loan vs firms without any CGF loans for 2017m1-2017m9, percent.

Table 1: Summary Statistics

Variable Names	Definition	Source	Period	N	Mean	SD	Min.	0.25	0.50	0.75	Max.
Dependent Variables											
The Amount of New Domestic Lending	The natural logarithm of the amount of new loans (Million TL) granted by Turkish bank b to firm f in currency c at time t	CBRT	2008M01-2017M09	24,747,970	4.04	1.64	0.00	3.00	3.91	5.00	15.10
The Maturity of New Domestic Lending	The natural logarithm of the maturity of new loans (day) granted by Turkish bank b to firm f in currency c at time t	CBRT	2008M01-2017M09	23,749,593	5.61	1.29	0.00	5.11	5.89	6.55	8.52
Interest Rate of New Domestic Lending	The interest rate of new loans granted by Turkish bank b to firm f in currency c at time t	CBRT	2008M01-2017M09	15,842,361	14.15	4.48	0.00	11.64	14.25	16.70	49.80
Independent Variables											
Relationship	The natural logarithm of the duration (month) between the date of first loan borrowed by firm f from bank b and time t	CBRT	2008M01-2017M09	21,533,573	3.34	1.13	0.00	2.71	3.53	4.17	5.89
Rating	Internal rating of banks on borrower firms	CBRT	2008M01-2017M09	12,050,715	2.42	0.98	1.00	2.00	2.00	3.00	5.00
NPL Dummy	Dummy variable that indicates whether a specific firm defaults within last 3 years	CBRT	2008M01-2017M09	24,765,978	0.02	0.13	0.00	0.00	0.00	0.00	1.00
Turkey (TR) Macro Variables											
Δ Industrial Production	Yearly change in industrial production index (used instead of GDP due to discrepancy of frequencies)	TurkStat	2008M01-2017M09	117	3.26	8.74	-23.98	0.17	4.17	7.52	25.71
Inflation Rate	Yearly change in consumer price index	TurkStat	2008M01-2017M09	117	8.24	1.79	3.99	7.17	8.17	9.38	12.06
Δ AOFM	Monthly change in CBRT weighted average funding rate (effective policy rate)	CBRT	2008M01-2017M09	117	-0.04	0.57	-1.65	-0.26	-0.03	0.15	2.57
Δ REER	Monthly change in real effective exchange rate based on consumer price index	CBRT	2008M01-2017M09	117	-0.31	2.84	-11.80	-1.67	-0.03	1.24	7.64
Bank Variables											
Total Assets	The natural logarithm of banks' total real assets	CBRT	2008M01-2017M09	5,828	9.93	2.31	4.29	8.40	10.11	11.58	14.08
Credit Ratio	Total loans divided by total assets	CBRT	2008M01-2017M09	5,828	48.27	25.53	0.00	31.58	58.78	66.27	95.32
Deposit Ratio	Total deposits divided by total assets	CBRT	2008M01-2017M09	5,828	33.90	29.21	0.00	0.00	46.54	59.98	85.32
Capital Ratio	Capital divided by total assets	CBRT	2008M01-2017M09	5,828	16.69	19.07	1.39	4.36	8.50	19.06	66.09
Liquidity Ratio	Selected FX liquid assets (cash + foreign banks(free) + free Eurobonds) divided by total assets	CBRT	2008M01-2017M09	5,828	22.89	23.38	2.92	6.45	11.95	31.86	84.87
NPL Ratio	Bank non-performing loans divided by bank total loans	CBRT	2008M01-2017M09	5,648	10.07	22.75	0.00	1.66	3.30	5.96	97.77
ROA Ratio	Bank net profit divided by total assets	CBRT	2008M01-2017M09	5,828	1.77	1.73	-1.52	0.78	1.51	2.54	6.06
Other Bank Variable											
CGF Ratio	CGF loans divided by total loans of bank b	CBRT	2017M01-2017M09	26	2.09	1.06	0.16	1.55	1.87	2.87	4.27

Table 2: Relationship Strength/Firm Riskiness and the Amount, Maturity and Interest Rate of New Commercial Lending

Indicator	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	Relationship			Rating			NPL Dummy			
Dependent Variable:	Amount									
Indicator	0.014*** [0.000]	0.012*** [0.000]	0.010*** [0.000]	0.023*** [0.001]	-0.037*** [0.001]	-0.038*** [0.001]	-0.057*** [0.001]	-1.164*** [0.004]	-1.162*** [0.004]	-1.167*** [0.004]
Constant	2.937*** [0.095]	0.460*** [0.106]		5.135*** [0.003]	4.237*** [0.003]	5.135*** [0.075]		2.780*** [0.081]	1.095*** [0.091]	
R2	0.587	0.587	0.583	0.710	0.570	0.571	0.566	0.585	0.585	0.581
Number of Observations	21,517,191	21,517,191	20,908,340	9,560,088	12,043,864	12,043,863	11,444,863	24,747,970	24,747,882	23,716,246
Dependent Variable:	Maturity									
Indicator	-0.010*** [0.000]	-0.014*** [0.000]	-0.009*** [0.000]	-0.010*** [0.001]	-0.052*** [0.001]	-0.051*** [0.001]	-0.042*** [0.001]	-0.213*** [0.003]	-0.210*** [0.003]	-0.200*** [0.003]
Constant	5.879*** [0.072]	1.120*** [0.084]		5.595*** [0.003]	4.519*** [0.080]	4.519*** [0.080]		5.840*** [0.061]	1.267*** [0.073]	
R2	0.437	0.439	0.443	0.528	0.460	0.461	0.448	0.469	0.471	0.462
Number of Observations	20,606,850	20,606,850	20,003,850	8,979,601	11,499,784	11,499,783	10,907,938	23,749,593	23,749,505	22,734,669
Dependent Variable:	Interest Rate									
Indicator	0.004*** [0.001]	0.010*** [0.001]	-0.025*** [0.001]	0.007*** [0.001]	0.020*** [0.002]	0.022*** [0.002]	0.088*** [0.001]	0.463*** [0.011]	0.473*** [0.011]	0.486*** [0.010]
Constant	17.525*** [0.141]	-11.041*** [0.218]		21.990*** [0.018]	2.809*** [0.274]	2.809*** [0.274]		17.499*** [0.126]	-7.784*** [0.200]	
R2	0.690	0.711	0.774	0.815	0.684	0.706	0.762	0.693	0.714	0.772
Number of Observations	13,628,489	13,628,489	13,058,551	5,390,533	7,345,513	7,345,512	6,803,923	15,796,593	15,796,507	14,860,827
TR Macro Variables	No	Yes	-	-	No	Yes	-	No	Yes	-
Bank Variables	No	Yes	-	Yes	No	Yes	-	No	Yes	-
Bank Fixed Effects	Yes	Yes	-	Yes	Yes	Yes	-	Yes	Yes	-
Firm Fixed Effects	Yes	Yes	Yes	-	Yes	Yes	Yes	Yes	Yes	Yes
Time (Year) Fixed Effects	Yes	Yes	-	-	Yes	Yes	-	Yes	Yes	-
(Bank*Month) Fixed Effects	No	No	Yes	No	No	No	Yes	No	No	Yes
(Firm*Month) Fixed Effects	No	No	No	Yes	No	No	No	No	No	No

Note: The dependent variable is the natural logarithm of amount/maturity or the interest rate of Turkish banks' new domestic lending to firms. The bottom panel includes the amount and maturity of loans to control the maturity structure of yield curve. Fixed effects are either included ("Yes"), not included ("No") or spanned by another set of effects ("-"). "-" also indicates dropped variables due to the fixed effects. *** Significant at 1%, ** significant at 5%, * significant at 10%.

Table 3: Risk Factors of Firms with CRE loans above and below the LTV cap (Extensive Margin)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
Relationship	0.003*** [0.001]	0.003*** [0.001]	0.003*** [0.001]							0.002* [0.001]	0.001* [0.001]	0.003*** [0.001]	0.003*** [0.001]
Rating				-0.004** [0.002]	-0.003** [0.002]	-0.004** [0.002]				-0.004** [0.002]	-0.005** [0.002]		
NPL Dummy							-0.055*** [0.006]	-0.055*** [0.006]	-0.055*** [0.006]			-0.057*** [0.006]	-0.057*** [0.006]
Constant	0.115*** [0.005]	-0.018 [0.198]		0.014** [0.006]	-0.181 [0.294]		0.125*** [0.004]	-0.169 [0.187]		-0.097 [0.306]		-0.026 [0.198]	
TR Macro Variables	No	Yes	-	No	Yes	-	No	Yes	-	Yes	-	Yes	-
Bank Variables	No	Yes	-	No	Yes	-	No	Yes	-	Yes	-	Yes	-
Bank Fixed Effects	Yes	Yes	-	Yes	Yes	-	Yes	Yes	-	Yes	-	Yes	-
Time Fixed Effects	Yes	Yes	-	Yes	Yes	-	Yes	Yes	-	Yes	-	Yes	-
(Bank*Month) Fixed Effects	No	No	Yes	No	No	Yes	No	No	Yes	No	Yes	No	Yes
R2	0.007	0.007	0.009	0.005	0.005	0.009	0.006	0.006	0.008	0.005	0.010	0.007	0.010
Number of Observations	162,232	162,232	162,141	78,253	78,253	78,163	181,626	181,623	181,532	72,552	72,468	162,232	162,141

Note: The table reports estimates from ordinary least squares regressions. The dependent variable is the dummy variable that indicates whether borrower firms have LTV ratio higher or lower than 50 percent. Table 1 contains the definition of all variables and the summary statistics for each included variable. TR Macro Variables are yearly change in industrial production index, inflation rate, and monthly change in CBRT policy rate and real effective exchange rate. Bank Variables include the lagged values of Bank Total Assets, Liquidity Ratio, Credit Ratio, Deposit Ratio, ROA and NPL Ratio. Analysis covers the period of 2011:M01 – 2013:M04. Coefficients are listed in the first row, robust standard errors are reported in the row below, and the corresponding significance levels are placed adjacently. Fixed effects are either included ("Yes"), not included ("No"), or spanned by another set of effects ("."). "." also indicates dropped variables due to the fixed effects. *** Significant at 1%, ** significant at 5%, * significant at 10%.

Table 4: Introduction of the LTV Cap and its Interest Rate Effect on CRE Loans with LTV Ratios Above the Cap

Policy	Tightening (2011/M01)								
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	Window:			12-Months			27-Months (Full period)		
After1	0.631*** [0.016]	1.710*** [0.044]	-	2.155*** [0.015]	1.914*** [0.035]	-	-0.165*** [0.024]	1.675*** [0.036]	-
After1*Dummy1	0.047 [0.050]	0.059 [0.048]	0.027 [0.047]	0.092** [0.045]	0.168*** [0.041]	0.135*** [0.037]	0.285*** [0.067]	0.246*** [0.048]	0.189*** [0.033]
Dummy1	-0.051 [0.036]	-0.055 [0.036]	-0.028 [0.035]	-0.180*** [0.032]	-0.199*** [0.033]	-0.147*** [0.029]	-0.374*** [0.064]	-0.309*** [0.045]	-0.236*** [0.030]
Log(Amount)	-0.478*** [0.008]	-0.472*** [0.008]	-0.461*** [0.008]	-0.482*** [0.007]	-0.470*** [0.006]	-0.457*** [0.005]	-0.555*** [0.006]	-0.550*** [0.005]	-0.520*** [0.004]
Log(Maturity)	0.119*** [0.007]	0.135*** [0.006]	0.136*** [0.006]	0.065*** [0.008]	0.088*** [0.006]	0.126*** [0.005]	-0.096*** [0.008]	0.046*** [0.006]	0.104*** [0.004]
Constant	5.294*** [0.205]	4.122** [2.023]		4.712*** [0.421]	-43.837*** [1.325]		9.606*** [0.209]	128.816*** [1.503]	
TR Macro Variables	No	Yes	-	No	Yes	-	No	Yes	-
Bank Variables	No	Yes	-	No	Yes	-	No	Yes	-
Bank Fixed Effects	Yes	Yes	-	Yes	Yes	-	Yes	Yes	-
Firm Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Time (Year) Fixed Effects	Yes	Yes	-	Yes	Yes	-	Yes	Yes	-
(Bank*Month) Fixed Effects	No	No	Yes	No	No	Yes	No	No	Yes
R2	0.674	0.715	0.738	0.613	0.722	0.802	0.429	0.645	0.823
Number of Observations	53,785	53,785	53,765	102,033	102,033	102,001	249,055	249,052	248,979

Note: The table reports estimates from ordinary least squares regressions. The dependent variable is the interest rate of borrower firms having LTV ratio higher than 50 percent. "After1" is a dummy variable that takes the value 1 after 2010:M12 and 0 otherwise. "Dummy1" equals 1 for firms that have CRE LTV levels above 50% for the 27 months between 2010-2013 the LTV cap was in effect, equals 0 for all other firms. Table 1 contains the definition of all variables and the summary statistics for each included variable. TR Macro Variables are yearly change in industrial production index, inflation rate, and monthly change in CBRT policy rate and real effective exchange rate. Bank Variables include the lagged values of Bank Total Assets, Capital Ratio, Liquidity Ratio, Credit Ratio, Deposit Ratio, ROA and NPL Ratio. Analysis covers the period of 2008:M09 – 2013:M04. Coefficients are listed in the first row, robust standard errors are reported in the row below, and the corresponding significance levels are placed adjacently. Fixed effects are either included ("Yes"), not included ("No") or spanned by another set of effects ("."). "-" also indicates dropped variables due to the fixed effects. *** Significant at 1%, ** significant at 5%, * significant at 10%.

Table 5: Conclusion of the LTV Cap and its Interest Rate Effect on CRE Loans with LTV Ratios Above the Cap

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Loosening (2013M04)									
Policy									
Window:	6-Months		12-Months			27-Months (Full period)			
After2	-0.192*** [0.025]	-0.684*** [0.037]	-	-0.119*** [0.026]	-1.428*** [0.043]	-	-0.701*** [0.018]	-1.253*** [0.028]	-
After2*Dummy2	-0.330*** [0.100]	-0.344*** [0.097]	-0.375*** [0.093]	-0.176** [0.089]	-0.175** [0.079]	-0.262*** [0.066]	-0.087 [0.058]	-0.220*** [0.052]	-0.230*** [0.043]
Dummy2	0.404*** [0.078]	0.414*** [0.080]	0.378*** [0.076]	0.279*** [0.066]	0.276*** [0.061]	0.278*** [0.054]	0.131*** [0.050]	0.226*** [0.044]	0.247*** [0.037]
Log(Amount)	-0.491*** [0.012]	-0.493*** [0.012]	-0.501*** [0.011]	-0.551*** [0.011]	-0.533*** [0.010]	-0.499*** [0.008]	-0.491*** [0.007]	-0.491*** [0.006]	-0.466*** [0.005]
Log(Maturity)	0.169*** [0.013]	0.190*** [0.013]	0.212*** [0.012]	0.072*** [0.014]	0.128*** [0.011]	0.179*** [0.009]	0.036*** [0.009]	0.065*** [0.007]	0.118*** [0.006]
Constant	8.237*** [0.192]	-17.898*** [3.841]		9.014*** [0.163]	-85.388*** [3.373]		9.612*** [0.401]	-35.985*** [1.229]	
TR Macro Variables	No	Yes	-	No	Yes	-	No	Yes	-
Bank Variables	No	Yes	-	No	Yes	-	No	Yes	-
Bank Fixed Effects	Yes	Yes	-	Yes	Yes	-	Yes	Yes	-
Firm Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Time (Year) Fixed Effects	Yes	Yes	-	Yes	Yes	-	Yes	Yes	-
(Bank*Month) Fixed Effects	No	No	Yes	No	No	Yes	No	No	Yes
R2	0.677	0.708	0.773	0.566	0.693	0.823	0.621	0.705	0.831
Number of Observations	19,701	19,701	19,691	40,264	40,264	40,248	92,163	92,163	92,123

Note: The table reports estimates from ordinary least squares regressions. The dependent variable is the interest rate of borrower firms having LTV ratio higher than 50 percent. "After2" is a dummy variable that takes the value 1 after 2013:M03 and 0 otherwise. Out of firms that have a CRE loan both in the 27 months before 2013 and after 2013, "Dummy2" equals 1 for firms with CRE LTV ratios above 50% before 2013, and 0 for all other firms in the sample. Table 1 contains the definition of all variables and the summary statistics for each included variable. TR Macro Variables are yearly change in industrial production index, inflation rate, and monthly change in CBRT policy rate and real effective exchange rate. Bank Variables include the lagged values of Bank Total Assets, Capital Ratio, Liquidity Ratio, Credit Ratio, Deposit Ratio, ROA and NPL Ratio. Analysis covers the period of 2011:M01 – 2016:M08. Coefficients are listed in the first row, robust standard errors are reported in the row below, and the corresponding significance levels are placed adjacently. Fixed effects are either included ("Yes"), not included ("No") or spanned by another set of effects ("."). "-" also indicates dropped variables due to the fixed effects. *** Significant at 1%, ** significant at 5%, * significant at 10%.

Table 6: The LTV Cap and Other Commercial Borrowing of Constrained Firms

Policy	Tightening (2011/M01)								
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Window:	6-Months			12-Months			27-Months (Full period)		
After1	0.109*** [0.013]	0.119*** [0.031]	-	0.132*** [0.010]	0.137*** [0.020]	-	0.158*** [0.008]	0.084*** [0.012]	-
After1*LTVconst	0.065*** [0.019]	0.060*** [0.019]	0.052*** [0.020]	0.067*** [0.014]	0.058*** [0.014]	0.055*** [0.015]	0.052*** [0.010]	0.057*** [0.010]	0.057*** [0.011]
LTVconst	-0.049*** [0.014]	-0.047*** [0.015]	-0.042*** [0.015]	-0.037*** [0.011]	-0.031*** [0.011]	-0.029*** [0.012]	-0.017*** [0.009]	-0.021*** [0.009]	-0.024*** [0.009]
Constant	3.858*** [0.010]	1.676 [1.263]		3.820*** [0.008]	3.423*** [0.712]		3.820*** [0.007]	2.226*** [0.355]	
TR Macro Variables	No	Yes	-	No	Yes	-	No	Yes	-
Bank Variables	No	Yes	-	No	Yes	-	No	Yes	-
Bank Fixed Effects	Yes	Yes	-	Yes	Yes	-	Yes	Yes	-
Firm Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Time (Year) Fixed Effects	Yes	Yes	-	Yes	Yes	-	Yes	Yes	-
(Bank-*Month) Fixed Effects	No	No	Yes	No	No	Yes	No	No	Yes
R2	0.039	0.040	0.048	0.044	0.045	0.059	0.048	0.049	0.072
Number of Observations	94,117	94,117	94,096	177,854	177,854	177,818	411,561	411,557	411,480

Note: The table reports estimates from ordinary least squares regressions. The dependent variable is the amount of commercial loans (excluding CRE loans) of borrower firms which become constrained due to LTV regulation and have LTV ratio higher than 45 percent. LTVconst is an indicator for policy constrained firms whose LTV ratios lie between 45 to 50% during the implementation of the policy. "After1" is a dummy variable that takes the value 1 after 2010:M12 and 0 otherwise. Table 1 contains the definition of all variables and the summary statistics for each included variable. TR Macro Variables are yearly change in industrial production index, inflation rate, and monthly change in CBRT policy rate and real effective exchange rate. Bank Variables include the lagged values of Bank Total Assets, Capital Ratio, Liquidity Ratio, Credit Ratio, Deposit Ratio, ROA and NPL Ratio. Analysis covers the period of 2008:M09 – 2013:M04. Coefficients are listed in the first row, robust standard errors are reported in the row below, and the corresponding significance levels are placed adjacently. Fixed effects are either included ("Yes"), not included ("No") or spanned by another set of effects ("_"). "_" also indicates dropped variables due to the fixed effects. *** Significant at 1%, ** significant at 5%, * significant at 10%.

Table 7: The LTV Cap and Post-Policy Other Commercial Borrowing of Constrained Firms

Policy	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	Loosening (2013/M04)								
Window:	6-Months			12-Months			27-Months (Full period)		
After2	0.135*** [0.020]	0.113*** [0.028]	-	0.184*** [0.014]	0.183*** [0.022]	-	0.245*** [0.010]	0.196*** [0.016]	-
After2*LTVconst	-0.073** [0.036]	-0.067* [0.036]	-0.049* [0.037]	-0.094*** [0.026]	-0.089*** [0.026]	-0.068*** [0.026]	-0.059*** [0.018]	-0.066*** [0.018]	-0.069*** [0.018]
LTVconst	0.038 [0.026]	0.035 [0.026]	0.026 [0.026]	0.078*** [0.019]	0.074*** [0.019]	0.061*** [0.019]	0.010 [0.014]	0.015 [0.014]	0.018 [0.014]
Constant	4.192*** [0.014]	2.861 [2.799]		4.137*** [0.010]	6.605*** [1.612]		4.084*** [0.007]	7.024*** [0.625]	
TR Macro Variables	No	Yes	-	No	Yes	-	No	Yes	-
Bank Variables	No	Yes	-	No	Yes	-	No	Yes	-
Bank Fixed Effects	Yes	Yes	-	Yes	Yes	-	Yes	Yes	-
Firm Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Time (Year) Fixed Effects	Yes	Yes	-	Yes	Yes	-	Yes	Yes	-
(Bank*Month) Fixed Effects	No	No	Yes	No	No	Yes	No	No	Yes
R2	0.063	0.064	0.079	0.058	0.059	0.081	0.043	0.046	0.075
Number of Observations	27,064	27,064	27,050	53,601	53,601	53,581	126,906	126,906	126,866

Note: The table reports estimates from ordinary least squares regressions. The dependent variable is the amount of commercial loans (excluding CRE loans) of borrower firms which become constrained due to LTV regulation and have LTV ratio higher than 45 percent. LTVconst is an indicator for policy constrained firms whose LTV ratios lie between 45 to 50% during the implementation of the policy. "After2" is a dummy variable that takes the value 1 after 2013:M03 and 0 otherwise. Table 1 contains the definition of all variables and the summary statistics for each included variable. TR Macro Variables are yearly change in industrial production index, inflation rate, and monthly change in CBRT policy rate and real effective exchange rate. Bank Variables include the lagged values of Bank Total Assets, Capital Ratio, Liquidity Ratio, Credit Ratio, Deposit Ratio, ROA and NPL Ratio. Analysis covers the period of 2011:M01 – 2016:M08. Coefficients are listed in the first row, robust standard errors are reported in the row below, and the corresponding significance levels are placed adjacently. Fixed effects are either included ("Yes"), not included ("No") or spanned by another set of effects ("_"). "_" also indicates dropped variables due to the fixed effects. *** Significant at 1%, ** significant at 5%, * significant at 10%.

Table 8: Risk Factors of CGF and non-CGF Borrowing Firms (Extensive Margin)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
Relationship	0.014*** [0.000]	0.014*** [0.000]	0.014*** [0.000]							0.002*** [0.000]	0.002*** [0.000]	0.016*** [0.000]	0.016*** [0.000]
Rating				-0.019*** [0.000]	-0.018*** [0.000]	-0.016*** [0.000]				-0.019*** [0.000]	-0.017*** [0.000]		
NPL Dummy							-0.353*** [0.002]	-0.351*** [0.002]	-0.348*** [0.002]			-0.369*** [0.002]	-0.367*** [0.002]
Constant		-0.056*** [0.001]	2.168*** [0.286]	0.414*** [0.001]	3.078*** [0.313]			1.591*** [0.264]		0.976*** [0.331]		2.227*** [0.285]	
TR Macro Variables	No	Yes	-	No	Yes	-	No	Yes	-	Yes	-	Yes	-
Bank Variables	No	Yes	-	No	Yes	-	No	Yes	-	Yes	-	Yes	-
Bank Fixed Effects	Yes	Yes	-	Yes	Yes	-	Yes	Yes	-	Yes	-	Yes	-
Firm Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Time Fixed Effects	Yes	Yes	-	Yes	Yes	-	Yes	Yes	-	Yes	-	Yes	-
(Bank*Month) Fixed Effects	No	No	Yes	No	No	Yes	No	No	Yes	No	Yes	No	Yes
R2	0.057	0.058	0.063	0.055	0.058	0.066	0.062	0.065	0.072	0.053	0.059	0.070	0.075
Number of Observations	2,554,193	2,554,193	2,554,185	1,722,871	1,722,871	1,722,868	2,947,027	2,947,027	2,947,019	1,529,283	1,529,280	2,554,193	2,554,185

Note: The table reports estimates from ordinary least squares regressions. The dependent variable is the dummy variable that indicates whether borrower firms use CGF loans. Table 1 contains the definition of all variables and the summary statistics for each included variable. TR Macro Variables are yearly change in industrial production index, inflation rate, and monthly change in CBRT policy rate and real effective exchange rate. Bank Variables include the lagged values of Bank Total Assets, Capital Ratio, Liquidity Ratio, Deposit Ratio, ROA and NPL Ratio. Analysis covers the period of 2017:M01 – 2017:M09. Coefficients are listed in the first row, robust standard errors are reported in the row below, and the corresponding significance levels are placed adjacently. Fixed effects are either included ("Yes"), not included ("No") or spanned by another set of effects ("*, **") also indicates dropped variables due to the fixed effects. *** Significant at 1%, ** significant at 5%, * significant at 10%.

Table 9: Amount, Maturity and Interest Rate of New Commercial Lending in and out of the CGF Scheme

	(1)	(2)	(3)	(4)	(5)	(6)
Window	5-Months			9-Months		
Dependent Variable	Amount					
After	-0.110*** [0.003]	-0.258*** [0.007]	-	-0.075*** [0.002]	-0.260*** [0.004]	-
After*Dummy	0.382*** [0.004]	0.374*** [0.004]	0.364*** [0.003]	0.329*** [0.002]	0.323*** [0.002]	0.318*** [0.002]
Dummy	-	-	-	-	-	-
Constant	3.499*** [0.214]	1.737** [0.748]		3.488*** [0.130]	1.883*** [0.306]	
R2	0.700	0.700	0.665	0.672	0.672	0.650
Number of Observations	3,444,878	3,444,878	2,780,846	5,807,013	5,807,013	5,066,449
Dependent Variable	Maturity					
After	0.002 [0.002]	-0.208*** [0.006]	-	-0.029*** [0.002]	-0.234*** [0.003]	-
After*Dummy	0.308*** [0.003]	0.301*** [0.003]	0.295*** [0.003]	0.245*** [0.002]	0.242*** [0.002]	0.241*** [0.002]
Dummy	-	-	-	-	-	-
Constant	6.224*** [0.133]	-5.832*** [0.673]		6.117*** [0.083]	1.438*** [0.251]	
R2	0.617	0.620	0.555	0.582	0.585	0.539
Number of Observations	3,341,145	3,341,145	2,682,614	5,612,640	5,612,640	4,881,083
Dependent Variable	Interest Rate					
After	0.428*** [0.006]	0.421*** [0.016]	-	0.534*** [0.004]	1.179*** [0.009]	-
After*Dummy	0.262*** [0.008]	0.164*** [0.008]	0.040*** [0.007]	0.306*** [0.006]	0.206*** [0.006]	0.109*** [0.005]
Dummy	-	-	-	-	-	-
Log(Amount)	-0.452*** [0.003]	-0.460*** [0.002]	-0.454*** [0.002]	-0.495*** [0.002]	-0.487*** [0.002]	-0.470*** [0.002]
Log(Maturity)	0.279*** [0.003]	0.276*** [0.003]	0.241*** [0.003]	0.343*** [0.002]	0.312*** [0.002]	0.243*** [0.002]
Constant	12.535*** [0.284]	55.701*** [1.746]		12.643*** [0.186]	72.710*** [0.815]	
TR Macro Variables	No	Yes	-	No	Yes	-
Bank Variables	No	Yes	-	No	Yes	-
Bank Fixed Effects	Yes	Yes	-	Yes	Yes	-
Firm Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Time (Year) Fixed Effects	Yes	Yes	-	Yes	Yes	-
(Bank*Month) Fixed Effects	No	No	Yes	No	No	Yes
R2	0.797	0.808	0.741	0.768	0.785	0.748
Number of Observations	2,520,950	2,520,950	1,937,266	4,233,656	4,233,656	3,564,854

Note: The table reports estimates from ordinary least squares regressions. The dependent variable is the amount/maturity/interest rate of loans of CGF and nonCGF borrower firms. "Dummy" takes on the value 1 for a firm with a CGF loan, and 0 otherwise. "After" is a dummy variable that takes the value 1 after 2016:M12 and 0 otherwise. Table 1 contains the definition of all variables and the summary statistics for each included variable. TR Macro Variables are yearly change in industrial production index, inflation rate, and monthly change in CBRT policy rate and reel effective exchange rate. Bank Variables include the lagged values of Bank Total Assets, Capital Ratio, Liquidity Ratio, Credit Ratio, Deposit Ratio, ROA and NPL Ratio. Analysis covers the period of 2016:M04 – 2017:M09. Coefficients are listed in the first row, robust standard errors are reported in the row below, and the corresponding significance levels are placed adjacently. Fixed effects are either included ("Yes"), not included ("No") or spanned by another set of effects ("-"). "-" also indicates dropped variables due to the fixed effects. *** Significant at 1%, ** significant at 5%, * significant at 10%.

Table 10: Risk Factors of CGF and non-CGF Borrowing Firms (Intensive Margin)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
The Amount of CGF Loans of CGF Borrower Firms													
Relationship	0.211*** [0.002]	0.208*** [0.002]	0.201*** [0.002]							0.163*** [0.003]	0.163*** [0.002]	0.208*** [0.002]	0.201*** [0.002]
Rating		0.078*** [0.003]	0.066*** [0.003]	0.061*** [0.003]						0.088*** [0.004]	0.078*** [0.004]		
NPL Dummy		4.448*** [0.009]	-40.053*** [4.307]				0.460*** [0.039]	0.402*** [0.038]	0.393*** [0.038]			0.314*** [0.040]	0.323*** [0.040]
Constant	3.955*** [0.008]	-94.345*** [3.554]					4.653*** [0.004]	-89.447*** [2.966]		-54.943*** [5.046]		-94.352*** [3.558]	
R2	0.15	0.21	0.27	0.19	0.24	0.31	0.15	0.21	0.28	0.27	0.33	0.21	0.27
Number of Observations	294,055	294,055	294,050	224,855	224,855	224,850	395,892	395,892	395,887	172,469	172,463	294,055	294,050
The Amount of nonCGF Loans of CGF Borrower Firms													
Relationship	0.182*** [0.006]	0.179*** [0.006]	0.170*** [0.006]							0.166*** [0.008]	0.159*** [0.008]	0.179*** [0.006]	0.170*** [0.006]
Rating		0.083*** [0.010]	0.078*** [0.010]	0.086*** [0.010]						0.086*** [0.011]	0.093*** [0.011]		
NPL Dummy		3.703*** [0.030]	151.149*** [10.127]				0.322*** [0.101]	0.308*** [0.101]	0.308*** [0.098]			0.253*** [0.103]	0.272*** [0.101]
Constant	3.322*** [0.024]	77.525*** [7.768]					3.930*** [0.012]	63.389*** [6.832]		157.476*** [12.148]		77.546*** [7.764]	
R2	0.15	0.16	0.23	0.17	0.18	0.26	0.15	0.16	0.23	0.19	0.27	0.16	0.23
Number of Observations	57,399	57,399	57,389	42,766	42,766	42,761	66,019	66,019	66,012	38,050	38,043	57,399	57,389
TR Macro Variables	No	Yes	-	No	Yes	-	No	Yes	-	Yes	-	Yes	-
Bank Variables	No	Yes	-	No	Yes	-	No	Yes	-	Yes	-	Yes	-
Bank Fixed Effects	Yes	Yes	-	Yes	Yes	-	Yes	Yes	-	Yes	-	Yes	-
Firm Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Time Fixed Effects	Yes	Yes	-	Yes	Yes	-	Yes	Yes	-	Yes	-	Yes	-
(Bank*Month) Fixed Effects	No	No	Yes	No	No	Yes	No	No	Yes	No	Yes	No	Yes

Note: The table reports estimates from ordinary least squares regressions. The dependent variable is the amount of CGF and nonCGF loans of CGF borrower firms. Table 1 contains the definition of all variables and the summary statistics for each included variable. TR Macro Variables are yearly change in industrial production index, inflation rate, and monthly change in CBRT policy rate and real effective exchange rate. Bank Variables include the lagged values of Bank Total Assets, Capital Ratio, Liquidity Ratio, Credit Ratio, Deposit Ratio, ROA and NPL Ratio. Analysis covers the period of 2017:M01 – 2017:M09. Coefficients are listed in the first row, robust standard errors are reported in the row below, and the corresponding significance levels are placed adjacently. Fixed effects are either included ("Yes"), not included ("No") or spanned by another set of effects ("-"). "-" also indicates dropped variables due to the fixed effects. *** Significant at 1%, ** significant at 5%, * significant at 10%.

Table 11: Amount, Maturity and Interest Rate of CGF Loans

	(1)	(2)	(3)	(8)	(9)	(10)
Window	5-Months			9-Months		
Dependent Variable	Amount					
After	-0.103*** [0.007]	-0.447*** [0.011]	-	-0.066*** [0.006]	-0.444*** [0.007]	-
After*Dummy	0.057*** [0.001]	0.061*** [0.001]	0.067*** [0.001]	0.049*** [0.001]	0.051*** [0.001]	0.058*** [0.001]
Dummy	-	-	-	-	-	-
Constant	4.634*** [0.004]	3.519*** [0.814]		4.598*** [0.003]	4.361*** [0.352]	
Number of Observations	0.59	0.59	0.58	0.57	0.57	0.57
R2	1,520,214	1,520,214	1,419,729	2,517,932	2,517,932	2,427,762
Dependent Variable	Maturity					
After	0.286*** [0.007]	-0.111*** [0.011]	-	0.164*** [0.005]	-0.221*** [0.007]	-
After*Dummy	0.003*** [0.001]	0.012*** [0.001]	0.018*** [0.001]	0.008*** [0.001]	0.016*** [0.001]	0.023*** [0.001]
Dummy	-	-	-	-	-	-
Constant	5.940*** [0.003]	-4.362*** [0.775]		5.890*** [0.002]	4.939*** [0.304]	
R2	0.48	0.49	0.47	0.44	0.45	0.44
Number of Observations	1,493,094	1,493,094	1,391,848	2,466,459	2,466,459	2,375,357
Dependent Variable	Interest rate					
After	-0.650*** [0.020]	-0.688*** [0.028]	-	-0.537*** [0.015]	0.141*** [0.019]	-
After*Dummy	0.191*** [0.003]	0.171*** [0.003]	0.156*** [0.003]	0.200*** [0.002]	0.187*** [0.002]	0.161*** [0.002]
Dummy	-	-	-	-	-	-
Log(Amount)	-0.369*** [0.003]	-0.387*** [0.003]	-0.381*** [0.003]	-0.418*** [0.003]	-0.410*** [0.002]	-0.387*** [0.002]
Log(Maturity)	0.191*** [0.004]	0.207*** [0.004]	0.178*** [0.004]	0.264*** [0.003]	0.235*** [0.003]	0.164*** [0.003]
Constant	15.366*** [0.024]	54.686*** [2.303]		16.633*** [0.018]	70.926*** [1.158]	
TR Macro Variables	No	Yes	-	No	Yes	-
Bank Variables	No	Yes	-	No	Yes	-
Bank Fixed Effects	Yes	Yes	-	Yes	Yes	-
Firm Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Time (Year) Fixed Effects	Yes	Yes	-	Yes	Yes	-
(Bank*Month) Fixed Effects	No	No	Yes	No	No	Yes
R2	0.66	0.67	0.66	0.63	0.66	0.67
Number of Observations	1,204,090	1,204,090	1,112,002	2,002,965	2,002,965	1,917,354

Note: The table reports estimates from ordinary least squares regressions. The dependent variable is the amount/maturity/interest rate of loans of CGF borrower firms. "Dummy" is in fact a continuous indicator taking on the natural logarithmic value of the firm's CGF loan. We call this indicator dummy for continuity in the tables. "After" is a dummy variable that takes the value 1 after 2016:M12 and 0 otherwise. Table 1 contains the definition of all variables and the summary statistics for each included variable. TR Macro Variables are yearly change in industrial production index, inflation rate, and monthly change in CBRT policy rate and real effective exchange rate. Bank Variables include the lagged values of Bank Total Assets, Capital Ratio, Liquidity Ratio, Credit Ratio, Deposit Ratio, ROA and NPL Ratio. Analysis covers the period of 2016:M04 – 2017:M09. Coefficients are listed in the first row, robust standard errors are reported in the row below, and the corresponding significance levels are placed adjacently. Fixed effects are either included ("Yes"), not included ("No") or spanned by another set of effects ("-"). "-" also indicates dropped variables due to the fixed effects. *** Significant at 1%, ** significant at 5%, * significant at 10%.

Table 12: The Effects of CGF Scheme on the Other Commercial Lending of Banks

	(1)	(2)	(4)	(5)	(6)	(8)
Window	5-Months			9-Months		
Panel A						
After	-0.069*** [0.005]	-0.036*** [0.009]	-	-0.015*** [0.004]	-0.014** [0.006]	-
After*CGF Ratio	-0.015*** [0.003]	-0.011*** [0.003]	-0.013** [0.005]	-0.027*** [0.002]	-0.025*** [0.002]	-0.030*** [0.004]
CGF Ratio	0.086 [0.061]	0.506 [0.337]	-0.184** [0.088]	0.157*** [0.039]	2.044*** [0.146]	-0.173*** [0.056]
Constant	4.208*** [0.059]	1.322 [1.051]		4.121*** [0.038]	-2.734*** [0.430]	
TR Macro Variables	No	Yes	-	No	Yes	-
Bank Variables	No	Yes	Yes	No	Yes	Yes
Bank Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Firm Fixed Effects	Yes	Yes	-	Yes	Yes	-
Time (Year) Fixed Effects	Yes	Yes	-	Yes	Yes	-
(Firm*Month) Fixed Effects	No	No	Yes	No	No	Yes
R2	0.71	0.71	0.72	0.68	0.68	0.72
Number of Observations	3,168,018	3,168,018	1,037,246	5,461,352	5,461,352	1,811,744
Panel B						
After	-0.008 [0.026]	-0.058 [0.042]	-	-0.005 [0.019]	-0.043 [0.027]	-
After*CGF Ratio	-0.030** [0.012]	-0.026** [0.013]	-0.027** [0.014]	-0.016* [0.009]	-0.009 [0.010]	-0.021** [0.010]
CGF Ratio	1.498*** [0.103]	-3.170** [1.272]	-0.022 [0.171]	1.505*** [0.078]	0.730 [0.530]	-0.227*** [0.080]
Constant	3.950*** [0.256]	16.552*** [4.021]		3.880*** [0.202]	5.547*** [1.663]	
TR Macro Variables	No	Yes	-	No	Yes	-
Bank Variables	No	Yes	Yes	No	Yes	Yes
Bank Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
City Fixed Effects	Yes	Yes	-	Yes	Yes	-
Sector Fixed Effects	Yes	Yes	-	Yes	Yes	-
Time (Year) Fixed Effects	Yes	Yes	-	Yes	Yes	-
(City*Sector*Month) Fixed Effects	No	No	Yes	No	No	Yes
R2	0.34	0.34	0.35	0.34	0.34	0.35
Number of Observations	82,225	82,225	82,225	150,386	150,386	150,386

Note: The table reports estimates from ordinary least squares regressions. The dependent variable is the amount of commercial loans (excluding CGF loans) of banks. "After" is a dummy variable that takes the value 1 after 2016:M12 and 0 otherwise. Table 1 contains the definition of all variables and the summary statistics for each included variable. TR Macro Variables are yearly change in industrial production index, inflation rate, and monthly change in CBRT policy rate and reel effective exchange rate. Bank Variables include the lagged values of Bank Total Assets, Capital Ratio, Liquidity Ratio, Credit Ratio, Deposit Ratio, ROA and NPL Ratio. Analysis covers the period of 2016:M04 – 2017:M09. Coefficients are listed in the first row, robust standard errors are reported in the row below, and the corresponding significance levels are placed adjacently. Fixed effects are either included ("Yes"), not included ("No") or spanned by another set of effects ("-"). "-" also indicates dropped variables due to the fixed effects. *** Significant at 1%, ** significant at 5%, * significant at 10%.

Table 13: The Effects of the CGF Scheme on Consumer Lending of Banks

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Window	5-Months				9-Months			
	After	0.220*** [0.053]	0.343*** [0.088]	-	-	0.338*** [0.040]	0.114* [0.059]	-
After*CGF Ratio	-0.068*** [0.025]	-0.051* [0.029]	-0.061** [0.025]	-0.038* [0.030]	-0.047*** [0.019]	-0.120*** [0.022]	-0.034* [0.019]	-0.100*** [0.023]
CGF Ratio	3.906*** [0.600]	10.114*** [2.595]	0.742*** [0.095]	0.842*** [0.397]	1.108 [0.791]	8.112*** [1.575]	0.321** [0.136]	1.034*** [0.235]
Constant	-1.813** [0.828]	-16.489** [8.037]			2.175* [1.140]	-25.891*** [4.162]		
TR Macro Variables	No	Yes	-	-	No	Yes	-	-
Bank Variables	No	Yes	No	Yes	No	Yes	No	Yes
Bank Fixed Effects	Yes	Yes	-	-	Yes	Yes	-	-
Firm Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Time (Year) Fixed Effects	Yes	Yes	-	-	Yes	Yes	-	-
(City*Month) Fixed Effects	No	No	Yes	Yes	No	No	Yes	Yes
R2	0.80	0.81	0.82	0.82	0.79	0.80	0.81	0.81
Number of Observations	10,646	10,646	10,646	10,646	18,938	18,938	18,938	18,938

Note: The table reports estimates from ordinary least squares regressions. The dependent variable is the amount of general-purpose loans of banks. "After" is a dummy variable that takes the value 1 after 2016:M12 and 0 otherwise. Table 1 contains the definition of all variables and the summary statistics for each included variable. TR Macro Variables are yearly change in industrial production index, inflation rate, and monthly change in CBRT policy rate and real effective exchange rate. Bank Variables include the lagged values of Bank Total Assets, Capital Ratio, Liquidity Ratio, Credit Ratio, Deposit Ratio, ROA and NPL Ratio. Analysis covers the period of 2016:M04 – 2017:M09. Coefficients are listed in the first row, robust standard errors are reported in the row below, and the corresponding significance levels are placed adjacently. Fixed effects are either included ("Yes"), not included ("No") or spanned by another set of effects ("."). "-" also indicates dropped variables due to the fixed effects. *** Significant at 1%, ** significant at 5%, * significant at 10%.

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