

Credit growth and macro prudential policies: Preliminary evidence on the firm-level

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Abstract: Using data on 1.3 million firms from 2002 to 2011 operating in 59 countries with changes in macro-prudential regulations over this period we find some evidence that macro-prudential policies are associated with lower credit growth, especially for small firms with limited non-bank financing. We also find an impact of macro-prudential policies on young firms in emerging markets. Our results point to un-intended consequences of macro-prudential tools for small firms' financing and an important trade-off in financial stability and financial deepening.

Keywords: Financial development; macro-prudential policies; firm financing

JEL codes: E44, E58, G18, G28

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1. Introduction

The trade-off between financial development and stability has dominated academic and policy debates alike, especially in the wake of the Global Financial Crisis. On the one hand, an extensive literature has documented that small firms are especially financially constrained with negative repercussions for overall economic development (e.g. Fazzari et al., 2000; Beck et al., 2005, 2006). Easing these financing constraints and thus improving resource allocation and ultimately economic growth in an economy requires more efficient financial intermediation and financial deepening. On the other hand, the Global Financial Crisis has reinforced the need to reign in credit cycles, which can turn credit booms into credit busts and banking and economic crises (Claesens, Kose and Terrones, 2011). Macro-prudential tools, utilized for many decades and having received an increased focus in the post-crisis regulatory reform debate, have the objective of reducing growth in credit intermediation, with possible negative repercussions for firm financing.

This paper provides a first attempt at assessing the effectiveness of macroprudential policies and their impact on firms, thus assessing a potential trade-off between stability and development objectives. Specifically, we document cross-country variation in credit growth over the past decade and examine the relationship between macroprudential policies and the growth in short-term versus long-term debt of firms, controlling for the monetary policy stance, other macroeconomic factors and time-variant firm characteristics. We also explore if there is heterogeneity in this relationship across different types of firms according to their age and size and macroprudential instruments (borrower targeted versus financial institution targeted). In exploring the relationship between firm financing and macroprudential tools, we combine firm-level data on over 1.3 million firms between 2002 and 2011 in 59 countries with detailed data on the use of 12 different macro-prudential policies in these countries.

We find substantial variation in financial development and credit growth across countries. Specifically, we document a sustained increase in *Private Credit to GDP* across countries of all income levels in Asia over the past decades. When assessing the relationship between macro-prudential regulatory tools and firm financing, we find some evidence that macro-prudential policy matters, especially for smaller firms with limited non-bank financing sources. In the overall sample, we find only the index of borrower targeted macro-prudential policies to be negatively associated with growth in long-term debt. When we focus on small firms with fewer than 10 employees, we see that both borrower and financial institution targeted macro-prudential regulations are negatively associated with growth in short-term debt and overall debt, whereas only borrower targeted macro-prudential policies are negatively associated with growth in long-term debt. While in advanced countries, it is mostly the smaller firms that are affected by macro-prudential policies, in emerging markets it is both small and young firms that are affected. In addition, in emerging markets, it is mainly borrower-related macro-prudential tools that seem to work, while in advanced markets, both borrower- and bank-related macro-prudential tools seem to be effective in reducing firm credit growth. Overall, we find that macro-prudential policies targeting borrower leverage are more effective than policies targeted at financial institutions, especially in emerging markets.

Our paper relates to several strands of literature. First, we relate to a literature on firm financing that has documented the importance of financing constraints for firm growth but also the differential effect that such financing constraints have across firms of different sizes and age. Using either Tobin's q-model or the Euler equation of investment, an extensive literature has documented financing constraints, especially among smaller and younger firms by showing a higher investment-cash flow sensitivity of these firms (Fazzari et al., 2000; Abel, 1980). While most of this earlier literature has used information on larger, listed firms, a more recent literature using firm-level surveys has shown that smaller firms are more likely to report

financing obstacles and are more constrained in their growth by such obstacles (Beck et al., 2005, 2006). In our analysis, we use both firm-level survey data as well as balance sheet data from a broad cross-section of both listed and private firms, ranging across different size and age groups using the growth of debt as an indicator of access to financing.

Second, our paper builds on and contributes to a small but rapidly expanding literature on the effects of macro-prudential policies. The micro-level evidence is rather limited and ours is one of the first papers to document the impact of a wide range of macro-prudential policies on firm-level credit growth across a number of countries. The most comprehensive of these studies and the one most closely related to our paper is Cerutti, Claessens, and Laeven (2015) who document the use of various macro-prudential policies in 119 countries over the period 2000-13. In a cross-country setting, they show that usage of borrower-based policies and financial institutions-based policies is associated with lower growth in credit. Claessens, Ghosh, and Mihet (2013) use balance sheet data of individual banks in 48 countries over 2000-2010 to show that borrower-based measures, such as LTV and DTI caps, and credit growth and foreign currency lending limits are effective in reducing the growth in bank's leverage, asset and noncore to core liabilities growth. Akinci and Olmstead-Rumsey (2015) record the tightening and easing of macro-prudential policies every quarter from 2000 onwards in 57 countries and show that these policies are used in tandem with bank reserve requirements, capital flow management measures, and monetary policy. Lim et. al. (2011) study a smaller subset of 49 countries and find that macro-prudential policies are associated with reductions in the procyclicality of credit and leverage.

Empirical studies have also focused on specific regions. Zhang and Zoli (2014) study Asian banks to show that macro-prudential policies limited the supply of credit from Asian banks. Bruno, Shim and Shin (2014) study Asia-Pacific economies and Tovar et al. (2012) focus on Latin America and both papers show that macro-prudential instruments play a

complementary role to monetary policy, and Vandebussche et. al. (2015) study the impact of macro-prudential policies on housing prices in Central, Eastern, and Southeastern Europe. Country-specific studies include Igan and Kang (2011), Bruno and Shin (2013) on Korea; Vargas et al. (2010) on Colombia; and Glockr and Towbin (2012) on Brazil; Saurina (2009) and Jimenez, Ongena, Peydro, Saurina (2013) on Spain.¹

The remainder of the paper is structured as follows. Section 2 presents cross-country indicators of credit growth and macro-prudential policy tools, both in global comparison and focusing on Asia. Section 3 presents initial findings on the relationship between macro-prudential regulation and firm financing. Section 4 concludes.

2. Credit growth and macro-prudential policies

We use aggregate *Private Credit to GDP*, which is the total outstanding claims of financial institutions on domestic non-financial enterprises and households, relative to economic activity, from the World Bank's Global Financial Development Database to document trends in financial development and cross-country and over time. An extensive literature has documented the positive relationship between *Private Credit to GDP* and economic growth (e.g., Beck, Levine and Loayza, 2000), though the relationship is non-linear (e.g., Arcand, Berkes and Panizza, 2015) and high credit growth has also been shown to be a good crisis predictor (e.g., Demirguc-Kunt and Detragiache, 2001).

Figure 1 shows the median value of *Private Credit to GDP* across the four groups of (i) high-income, (ii) upper-middle income, (iii) lower-middle income and (iv) low-income countries between 1980 and 2014. We see a rapid increase in *Private Credit to GDP* in high-

¹ See reviews by Galati and Moessner (2011), Claessens (2014)

income countries, especially in the 2000s, followed by a retrenchment after the Global Financial Crisis. Similarly, both upper- and lower-middle income countries have seen a sustained increase in *Private Credit to GDP* since the early 2000s, while there have been little changes in the median low-income country.

Figure 2 shows the development of *Private Credit to GDP* across the four income groups in Asia. Compared to global medians, all four income groups in Asia have seen a sustained increase in *Private Credit to GDP*, most impressively the high-income group. High-income countries in Asia did not suffer from a retrenchment after the Global Financial Crisis. The median low-income country has by now a higher *Private Credit to GDP* ratio than the median lower-middle country.

While macro-prudential tools have been used for many years across the globe, they have received renewed attention after the Global Financial Crisis. Many Asian countries, on the other hand, have been using macro-prudential regulatory tools for many years. Partly, this can be explained with a history of financial repression, as some of these tools (e.g., reserve requirements, lending caps) can be used both for allocative purposes and for stability objectives. For example, both Hong Kong and Korea have been using loan-to-value ratios to mitigate excessive housing price cycles.

The case for macro-prudential policies rests on (i) the notion that a high correlation in performance across financial institutions results in contagion effects which can cause idiosyncratic distress to become systemic and (ii) the potential that strong credit cycles might not only exacerbate business cycles, but also lead to systemic banking distress. In the broadest sense, one can distinguish between a cross-sectional dimension of macro-prudential tools (i.e., higher capital requirements or regulatory restrictions on institutions whose failure would have a stronger negative impact on the overall financial system) and the time-series dimension,

which aims at smoothing credit cycles and reducing the impact of such credit cycles on bank solvency.

As the literature analyzing the transmission and impact of monetary policy, assessing the impact of macro-prudential policy presents several problems. First, macro-prudential policies are endogenous to credit cycles. Tightening macro-prudential policies should be observed during credit booms, and hence, the resulting reverse causation will bias downward any effect we find for macro-prudential policies mitigating credit cycles. In other words, there might be a timing issue confounding the relationship between macro-prudential policies and credit flows making any causal statement difficult. Second, we have to disentangle demand from supply of credit, as changes in macro-prudential policies might affect both demand and supply of credit. Third, changes in macro-prudential policies might come about at the same time as changes in other policies, most prominently monetary policy. Using micro-level data allows us to control to some extent for these different challenges.

To document the use of macro-prudential regulatory tools and relate them to firm-level financing growth, we make use of the Global Macroprudential Policy Instruments (GMPI), a recent IMF survey exercise, as described in Cerutti, Claessens and Laeven (2015). The GMPI survey is very detailed and covers 12 different instruments. We can distinguish between (i) tools targeted at borrowers' leverage and financial positions (BOR) and (ii) tools targeted at financial institutions (FIN). The former includes loan-to-value and debt-to-income ratios, while the latter includes dynamic loan-loss provisioning, counter-cyclical capital buffers, leverage ratio, capital surcharge for systemically important financial institutions, limits on interbank exposures, concentration limits, limits on foreign or domestic currency loans, reserve requirement ratios, and taxes or levies on financial institutions. Each instrument is coded as 1 or 0 for each country-year depending on whether it was in use or not. Thus, the BOR index could range from 0 (no borrower targeted instrument in place) to 2 (both borrower targeted

instruments in place) and FIN index could range from 0 (no financial institution targeted instrument in place) to 10 (all the ten financial institution targeted instruments in place). Our third index (MPI) is the sum of BOR and FIN. Instruments are each coded for the period they were actually in place, i.e., from the date that they were introduced until the day that they were discontinued. While the survey captures the breadth of macro-prudential policy across an array of tools and for a large cross-section of countries, it does not capture the intensity of the tools or the extent to which they were binding.

Figure 3 shows a continuous increase in the use of macro-prudential tools between 2000 and 2013 across the globe, with some, rather limited variation across income groups. Interestingly, it is the upper middle income countries, where the use of such instruments is the most prominent, while high-income countries use, on average, as many macro-prudential tools as lower-middle income countries. Low-income countries use, on average, the fewest macro-prudential tools. Figure 4 shows the variation within Asia. On average, Asian countries across all income groups used more macro-prudential tools than non-Asian countries, led again by upper-middle income countries and followed by low and lower-middle income countries and high-income countries. The differences across the four income groups, however, are even smaller than across the global sample.

3. Firm financing and macro-prudential tools

This section provides some preliminary evidence on the relationship between the implementation of macro-prudential regulatory tools and firm financing trends. In the

following we first describe our data, then discuss the methodology before presenting some initial results.

3.1. Data

We combine a firm-level database with a dataset on macro-prudential policies, complementing both with other macro-economic data. Appendix Table A1 lists the countries in our sample with the respective number of firms entering the sample.

We use data from Orbis, a commercial database distributed by Bureau van Dijk containing basic firm-level information including on external financing for over 1.3 million companies across 59 countries over the period 2002 to 2011. Compared to other databases, the unique advantage of using Orbis is that it includes data on large and small, listed and unlisted firms. We “clean” the data in a number of ways: First, we restrict our analysis to non-financial firms and drop all duplicate observations or double reports for the same firm. Second, we only include in our sample countries that have at least 25 firms over the entire period. Third, we drop all firms that were acquirers in an acquisition deal post acquisition or that merged with others following the merger since such transactions can result in sharp changes in firms’ balance sheets. Fourth, we drop observations with negative or zero values for total assets and employees.

As seen in Appendix Table A1, we have a wide variation in the number of firms across countries, ranging from 356, 000 firms in France and over 180,000 firms in Italy and Spain to fewer than 100 firms in Austria, Costa Rica, Ghana, Jordan, Morocco, New Zealand and Peru.² To address the unbalanced nature of our data, we weight all our estimations with the inverse of the number of firms in each country.

² Some of these countries end up with fewer than 25 firms in our regressions, as not all firms have observations for the three dependent variables.

We construct the following financing variables: *Growth in short-term debt* (with residual maturity less than one year), *Growth in long-term debt* (with residual maturity of one year or more) and *Growth in total financing* (defined as the sum of short- and long-term debt), where growth is the annual growth rate, defined as log-difference of the variable. To reduce the impact of outliers, we winsorize each dependent variable at the 5th and 95th percentiles. We then drop observations for which we do not have all three variables available to make results comparable across the three dependent variables. We then create a consistent sample across all three variables. We control for the log of total assets to account for changes in external financing due to firm growth.

The summary statistics in Table 1 Panel A show a high variation in external financing growth among firms in our sample, ranging from -165% to 169% for short-term and -137% to 136% for long-term financing. The median firm experienced a positive short-term financing growth, but a decline in long-term financing growth. Overall financing growth was negative, on average, with the effect being stronger for the smallest and youngest firms.

We combine the firm-level data with country panel data on the use of different macro-prudential tools from the Global Macroprudential Policy Instruments (GMPI) as described above. Following Cerutti et al. (2015) we aggregate the information on the specific instruments into two indicators covering two broad areas of macro-prudential policy: tools targeted at borrowers' leverage and financial positions (BOR) and tools targeted at financial institutions (FIN).³

We control for several country-level time-variant factors to ensure that we do not confound the effect of macro-prudential tools with other policies or macro factors. We

³ As the use of different macro-prudential tools varies quite significantly across countries, we prefer to use aggregate indicators.

control for the log of GDP, thus effectively controlling for economic growth, and the real monetary policy rate, defined as the discount rate minus the inflation rate. Finally, we control for the effect of the Global Financial Crisis by including a dummy for the years 2008 and 2009.

The descriptive statistics in Table 1 show a high variation in the use of macro-prudential tools across countries and over the sample period, ranging from zero to two instruments targeted at borrowers (out of two possible tools) and zero to six tools targeted at financial institutions (out of a possible maximum of ten possible tools). The use is more widespread in emerging than in advanced countries.

3.2. Methodology

To assess the relationship between changes in macro-prudential policies and growth in firms' loans, long-term debt and overall external financing, we run the following regression:

$$y_{ijt} = \alpha_1 + \beta_1 \text{Macro-pru}_{jt-1} + \beta_2 \text{Firm Size}_{it} + \beta_3 \text{Macro}_{jt-1} + \beta_4 \text{GFC}_t + \eta_i + \varepsilon_{ijt}, \quad (1)$$

where i denotes firm, j country and t year. The dependent variable is one of the following three variables - *Log change in short-term debt*, *Log change in long-term debt* and *Log change in total financing* (defined as the sum of short- and long-term debt). *Macro-pru* is an indicator of macro-prudential policies; *Firm Size* is proxied by Log of total assets; *Macro* is a vector of macroeconomic variables including the real monetary policy rate and the log of GDP. *GFC* is the Global Financial Crisis (dummy variable for 2008 and 2009) to control for the generally lower growth during this period. We lag the macro-prudential and macroeconomic variables to reduce any bias that might come from reverse causation and allow for the time lag it takes for policy to affect firms' financing growth. η_i is a vector of firm-fixed effects, to allow us to assess the effect of macro-prudential policies on firms' financing growth controlling for

any time-invariant firm characteristics. We weight observations by the inverse of the number of firms per country and year so that each country has the same weight in our estimations. Finally, we cluster standard errors at the country-level, thus allowing error terms to be correlated across firms within a country

To investigate whether the impact of macro-prudential policies varies with firm size and age, we run the above regression also for several sub-samples of firms. Specifically, we run regressions for a sample of firms of one to nine employees, 10 to 49 employees and 50 to 249 of fewer employees⁴, as well as for a sample of firms that are three years or younger (since incorporation).⁵ As banks are more bank dependent, we expect the effect of macro-prudential policies to be stronger for smaller firms. We would therefore expect any impact of macro-prudential policies to be stronger for smaller and younger firms.

3.3. Results

The results in Table 2 show a significant and negative relationship between macro-prudential instruments and small firms' financing growth, while we find a less significant result for larger firms. The results in Panel A show a negative and significant (at the 10% level) relationship between firms' overall debt growth and changes in the overall index of macro-prudential policies (MPI). A closer look at the components of MPI shows that this is driven mainly by the changes in in borrower-related macro-prudential policies (BOR). We find no significant relationship between short-term and long-term debt growth and changes in macro-prudential policies.

⁴ The employee ranges we consider coincide with the European Commission definition of micro (less than 10), small (from 10 to 49), and medium (from 50 to 249) firms.

⁵ We only include firms until three years after their incorporation. We classify firms according to the median employees across all observations available during the sample period.

In Panel B, we limit our sample to firms with a median number of employees of nine or fewer over the sample period and find stronger results. There is a negative and significant relationship between changes in all three macro-prudential indices' and small firms' short-term, long-term and total debt growth, with the notable exception of FIN in the regression of long-term funding growth. Specifically, macro-prudential tightening by applying one additional instrument that is borrower-related (loan-to-value or income-to-debt ratio) results in 7.3 percentage points lower short-term external debt growth, while one additional instrument that is bank-related results in 12.3 percentage points lower short-term external debt growth. The relationship between changes in macro-prudential instruments and firms' long-term financing growth also enters negatively and significantly, though in this case it is driven by macro-prudential tools aimed at borrowers; the coefficient on macro-prudential tools aimed at banks enters negatively but insignificantly. We also find a negative and significant relationship between changes in macro-prudential tools and firms' overall financing growth, in this case driven by both borrower-targeted and bank-targeted tools, though the latter enters significantly only at the 10% level. In unreported regressions, we find that in the case of the sample of firms with 10 to 49 employees, there is only a negative and significant relationship between firms' long-term financing growth and changes in borrower-related macro-prudential tools. None of the other coefficients enters significantly. When we consider the sample of firms with 50 to 249 employees, none of the macro-prudential policies enters significantly. Finally, the results in Panel C do not show any significant relationship between firms' short-term, long-term or overall financing growth and macro-prudential policies for a set of firms that are 3 years or younger. Here we limit our sample to firms that have been incorporated for three years or less. However, none of the coefficients on macro-prudential policies enters significantly.

Turning to the control variables, we find a positive relationship between economic growth and firms' financing growth and a negative relationship with firm size as measured by

the log of total assets. Financing growth during the Global Financial Crisis is significantly lower. The real policy rate enters negatively and significantly in the regressions of long-term and overall financing growth in Panel A, but not in the case of short-term financing growth. This variable is not significant in any of the regressions across the different sub-samples.

In summary, we find strong evidence that firms' financing growth changes with changes in macro-prudential policies, especially for smaller firms with fewer options for outside financing. There is somewhat stronger evidence that borrower-related macro-prudential tools are more effective, most likely because they are harder to circumvent and also because often smaller firms are able to borrow based on the owners' personal collateral. The ability to borrow for individuals is likely to be affected by loan-to value and leverage ratios.

The results in Table 3 and 4 consider two sub-samples, that of advanced and that of emerging countries. One can consider several reasons why the relationship between firms' financing growth and macro-prudential tools might vary across these two groups of countries. On the one hand, financial systems in most advanced countries offer more non-bank financing options so that we would expect a less strong and significant impact of macro-prudential tools on firms in these countries. On the other hand, not only might it be harder to enforce prudential policies in emerging markets, but as these tools have been used for a longer time, firms might have found alternative financing sources over the years to counter the effect of macro-prudential policies.

The results in Table 3 show no significant relationship between firms' short-term, long-term and overall financing growth and macro-prudential tools in the overall sample of firms in advanced countries (Panel A), while we again find strong evidence that different types of macro-prudential policies affect short-term, long-term and overall financing growth in the case of smaller firms with fewer than 10 employees in advanced economies (Panel B). In unreported

regressions, we also find some evidence that borrower-related macro-prudential policies affect the long-term financing growth of firms with 10 to 49 employees, while there is no evidence of a significant impact of macro-prudential policies in the sample of firms with 50 to 249 employees in advanced countries. Similarly, we do not find any evidence of an effect of macro-prudential policies on financing growth of firms with three or fewer years since incorporation in advanced countries (Panel C). Turning to the control variables, we find similar results as in Table 3, with the exception of the real monetary policy rate, which enters negatively and significantly across all regressions in Panel A and across several sub-sample regressions.

The results in Table 4 for the sample of firms in emerging countries show a somewhat stronger impact of macro-prudential policies in these countries. First, we find some evidence of an effect of borrower-related macro-prudential policies on firms' long-term and overall financing growth (Panel A), though there is no significant relationship with short-term financing growth of firms in emerging markets. We find rather strong evidence that borrower-related macro-prudential tools have an impact on small firms' long-term and overall financing growth (Panel B), while there is significant (at the 10% level) evidence of a negative relationship between macro-prudential tools and small firms' short-term financing growth in emerging markets. In unreported regressions, we also find a negative relationship between borrower-targeted macro-prudential policies and long-term funding growth for the sample of firms with 10 to 49 employees and no evidence for a significant relationship between macro-prudential tools and firms' financing growth in emerging markets in a sample of firms with 10 to 249 employees. Finally, we find some evidence that young firms' short-term and overall financing growth is affected by changes in borrower-related macro-prudential tools (Panel C). The fact that we find some negative effects for young firms in emerging markets, while we do not find any evidence for young firms in advanced economies could be due to the fact that angel or venture capital financing is more likely to be available for firms in advanced economies relative

to those in emerging markets. Turning to the control variables, we again find a negative and significant relationship of financing growth with firm size and a more tenuous positive relationship between GDP growth and financing growth. The real monetary policy rate rarely enters significantly and we have a less strong relationship between financing growth and the Global Financial Crisis than in the sample of advanced countries.

In summary, we confirm many of our main findings in the sub-samples of advanced and emerging markets, but also find some critical differences. First, in advanced countries, it is mostly the smaller firms that are affected by macro-prudential policies, while in emerging markets it is both small and young firms that are affected. Second, in emerging markets, it is mainly borrower-related macro-prudential tools that seem to work, while in advanced markets it is both borrower- and bank-related macro-prudential tools that work.

4. Conclusions

This paper shows that there has been financial deepening and credit growth across countries of all income levels in Asia. We also assess the effect of macro-prudential policies on firms' funding growth across a broad cross-section of firms and countries, differentiating between firms of different sizes and ages, emerging and advanced countries and different types of macro-prudential policies. We find evidence that the smallest firms (those with fewer than 10 employees) are more likely to be affected by macro-prudential policies. We find some evidence that younger firms are more affected in emerging markets. We also find that borrower-targeted policies are more effective than policies targeted at financial institutions. Overall these findings are consistent with the broader literature on financing constraints, which shows that smaller firms are more affected by financing constraints and by monetary policies. The findings that borrower-targeted policies are more effective than policies targeted at banks

are consistent with previous findings that macro-prudential policies targeted at banks are subject to leakage (Aiyar et al., 2014).

The efficiency of borrower-targeted policies raises additional questions. In many cases, such restrictions apply only to residential real estate lending, which is consistent with the fact that only the smallest firms are significantly affected by such restrictions, as in these cases owners might guarantee funding with their personal real estate. This might also explain why younger firms in emerging markets are affected by borrower-targeted policies, while younger firms in advanced countries are not affected by any of the macro-prudential policies, most likely relying on non-bank funding.

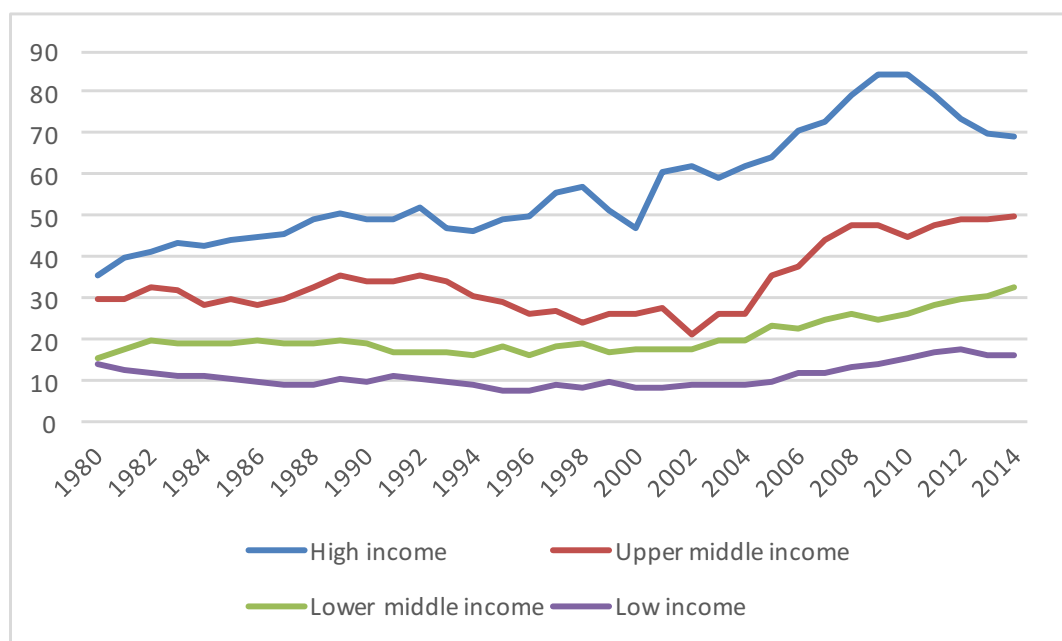
Returning to the theme we started with, our findings point to a clear trade-off between financial stability and financial deepening. As in the case of capital account restrictions (Forbes, 2007), smaller firms are the ones most affected by macro-prudential tools, which points to a trade-off in the implementation of these policies.

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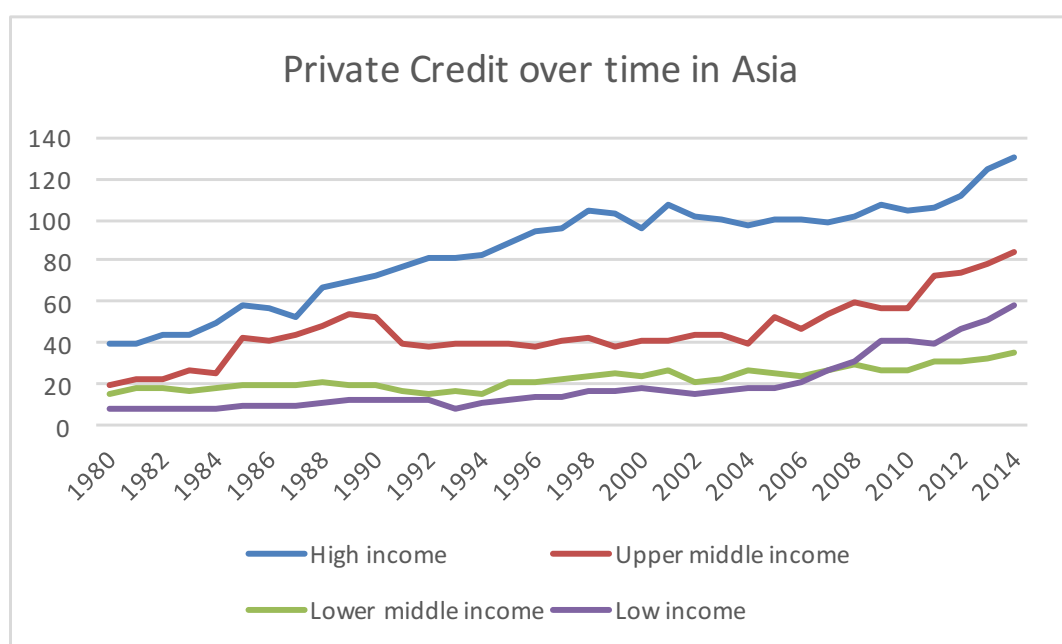
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Figure 1: Private Credit to GDP over time, across income groups



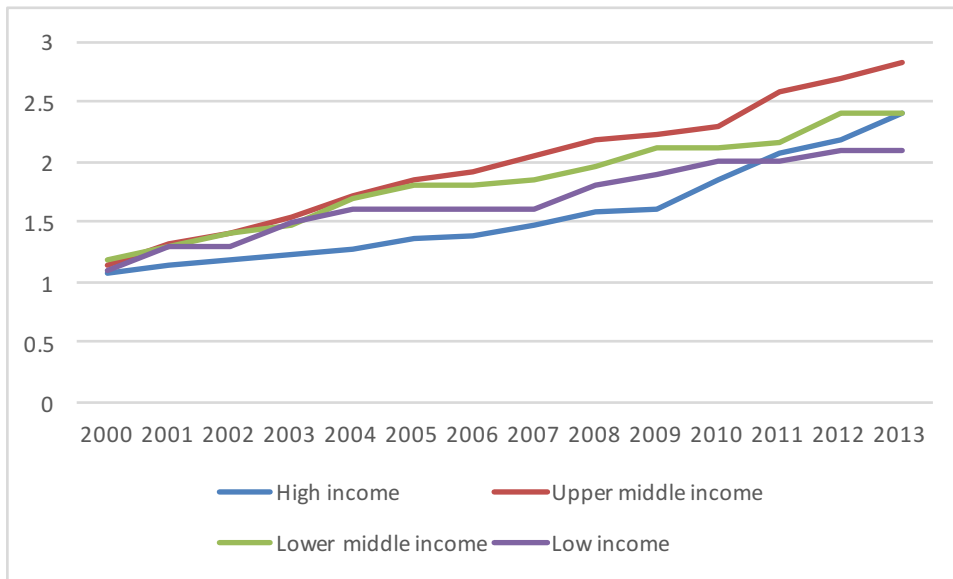
Source: Authors' calculations, based on Global Financial Development Database

Figure 2: Private Credit to GDP in Asia over time, across income groups



Source: Authors' calculations, based on Global Financial Development Database

Figure 3: Use of Macro-puridential tools across income groups



Source: Authors' calculations, based on Cerutti et al. (2015)

Figure 4: Use of Macro-puridential tool in Asia



Table 1: Descriptive Statistics

Panel A: Firm variables						
	Mean	Median	Standard deviation	Minimum	Maximum	Observations
Short-term financing growth	0.0319	0.0258	0.5354	-1.6546	1.6877	3,143,321
Long-term financing growth	-0.0656	-0.0773	0.4399	-1.3659	1.3607	3,143,321
Overall financing growth	-0.0155	-0.0335	0.2960	-0.7135	0.8944	3,143,321
Log (Total assets)	14.3372	14.2395	1.6434	11.4746	17.3467	3,143,321
Panel B: Firms with fewer than 10 employees (n<10)						
	Mean	Median	Standard deviation	Minimum	Maximum	Observations
Short-term financing growth	0.0127	0.0117	0.5434	-1.6546	1.6877	1,328,198
Long-term financing growth	-0.0807	-0.0921	0.4406	-1.3658	1.3607	1,328,198
Overall financing growth	-0.0380	-0.0595	0.2985	-0.7135	0.8944	1,328,198
Log (Total assets)	13.3390	13.2398	1.2072	11.4746	17.3467	1,328,198
Panel C: Firms with employees between 10 and 50						
	Mean	Median	Standard deviation	Minimum	Maximum	Observations
Short-term financing growth	0.0485	0.0374	0.5320	-1.6546	1.6877	971,782
Long-term financing growth	-0.0427	-0.0620	0.4417	-1.3659	1.3607	971,782
Overall financing growth	0.0108	-0.0058	0.2935	-0.7135	0.8944	971,782
Log (Total assets)	14.9490	14.9641	1.1396	11.4746	17.3467	971,782
Panel D: Firms with employees 50 and 250						
	Mean	Median	Standard deviation	Minimum	Maximum	Observations
Short-term financing growth	0.0557	0.0443	0.5136	-1.6546	1.6877	398,302
Long-term financing growth	-0.0324	-0.0517	0.4366	-1.3658	1.3607	398,302
Overall financing growth	0.0219	0.0056	0.2863	-0.7135	0.8944	398,302
Log (Total assets)	16.2771	16.4036	0.9445	11.4746	17.3467	398,302
Panel E: Firms with three or fewer years since incorporation						
	Mean	Median	Standard deviation	Minimum	Maximum	Observations
Short-term financing growth	0.0333	0.0131	0.5351	-1.6546	1.6877	224,245
Long-term financing growth	-0.0624	-0.0740	0.4214	-1.3655	1.3607	224,245
Overall financing growth	-0.0435	-0.0804	0.2962	-0.7135	0.8944	224,245
Log (Total assets)	13.1035	12.8177	1.4273	11.4746	17.3467	224,245
Panel F: Country variables						
	Mean	Median	Standard deviation	Minimum	Maximum	Observations
GDP growth	3.5350	3.7689	4.0179	-14.8142	15.2404	411
Real policy rate	0.2087	0.3433	4.6918	-16.9571	25.6001	411
MPI	1.7348	1	1.7711	0	8	411
BOR	0.3723	0	0.6553	0	2	411
FIN	1.3625	1	1.4081	0	6	411
Panel G: Advanced countries						
	Mean	Median	Standard deviation	Minimum	Maximum	Observations
GDP growth	2.2782	2.6807	3.7712	-14.7244	11.9022	206
Real policy rate	0.2097	0.0433	2.9654	-14.1279	13.6856	206
MPI	1.1408	1	1.1580	0	5	206
BOR	0.2379	0	0.5289	0	2	206
FIN	0.9029	1	1.0266	0	3	206
Panel H: Emerging markets						
	Mean	Median	Standard deviation	Minimum	Maximum	Observations
GDP growth	4.8177	5.1500	3.8247	-14.8142	14.1950	189
Real policy rate	0.1328	0.7542	6.1398	-16.9571	25.6001	189
MPI	2.4444	2	2.0868	0	8	189
BOR	0.5079	0	0.7553	0	2	189
FIN	1.9365	2	1.5899	0	6	189

Table 2: Firms' financing growth and macro-prudential policies – unweighted regressions

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	Short-term financing	Short-term financing	Short-term financing	Long-term financing	Long-term financing	Long-term financing	Overall financing growth	Overall financing growth	Overall financing growth
GDP growth	0.007** (2.65)	0.007** (2.64)	0.007** (2.63)	0.007** (2.33)	0.007** (2.30)	0.007** (2.30)	0.006** (2.47)	0.006** (2.44)	0.006** (2.46)
Log (Total assets)	-0.187*** (-12.05)	-0.188*** (-12.33)	-0.188*** (-12.39)	-0.162*** (-21.48)	-0.165*** (-20.66)	-0.163*** (-22.14)	-0.188*** (-17.18)	-0.190*** (-17.52)	-0.189*** (-17.58)
Real policy rate	0.000 (0.13)	0.000 (0.19)	0.000 (0.12)	0.000 (0.01)	0.000 (0.10)	0.000 (-0.02)	0.000 (0.12)	0.000 (0.19)	0.000 (0.09)
GFC	-0.021* (-1.71)	-0.021* (-1.70)	-0.021* (-1.70)	0.009 (0.51)	0.010 (0.54)	0.010 (0.55)	-0.005 (-0.34)	-0.004 (-0.31)	-0.005 (-0.32)
MPI	-0.022*** (-4.54)			-0.045*** (-4.68)			-0.026*** (-3.70)		
BOR		-0.022** (-2.09)			-0.036*** (-2.81)			-0.014 (-1.19)	
FIN			-0.029** (-2.44)			-0.065*** (-3.37)			-0.044*** (-3.24)
N	3143321	3143321	3143321	3143321	3143321	3143321	3143321	3143321	3143321
adj. R-sq	-0.024	-0.024	-0.024	0.070	0.070	0.070	0.105	0.105	0.106

Table 2: Firms' financing growth and macro-prudential policies

Panel A: Overall sample

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	Short-term financing	Short-term financing	Short-term financing	Long-term financing	Long-term financing	Long-term financing	Overall financing growth	Overall financing growth	Overall financing growth
GDP growth	0.005** (2.15)	0.005* (1.95)	0.005** (2.23)	0.007*** (3.71)	0.007*** (3.73)	0.008*** (3.81)	0.007*** (3.43)	0.007*** (3.45)	0.007*** (3.57)
Log (Total assets)	-0.001 (-0.77)	-0.001 (-0.79)	-0.001 (-0.75)	0.011*** (4.92)	0.011*** (4.92)	0.012*** (4.93)	0.004*** (2.86)	0.004*** (2.86)	0.004*** (2.89)
Real policy rate	-0.003 (-1.41)	-0.003 (-1.42)	-0.002 (-1.29)	0.001 (0.40)	0.001 (0.42)	0.001 (0.50)	-0.001 (-0.62)	-0.001 (-0.56)	-0.001 (-0.47)
GFC	-0.052*** (-4.52)	-0.052*** (-4.09)	-0.053*** (-4.71)	-0.050*** (-4.63)	-0.051*** (-4.67)	-0.051*** (-4.66)	-0.057*** (-6.79)	-0.058*** (-6.93)	-0.058*** (-6.83)
MPI	-0.005 (-0.28)			-0.011 (-0.87)			-0.016* (-1.88)		
BOR		-0.028 (-1.15)			-0.023 (-1.09)			-0.031* (-1.84)	
FIN			0.007 (0.23)			-0.008 (-0.47)			-0.013 (-1.05)
N	3658784	3658784	3658784	3658784	3658784	3658784	3658784	3658784	3658784
adj. R-sq	0.014	0.014	0.014	0.024	0.024	0.024	0.035	0.035	0.035

Panel B: Firms with one to nine employees

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	Short-term financing	Short-term financing	Short-term financing	Long-term financing	Long-term financing	Long-term financing	Overall financing growth	Overall financing growth	Overall financing growth
GDP growth	0.007** (2.34)	0.007** (2.35)	0.007** (2.32)	0.003 (0.91)	0.003 (0.94)	0.003 (0.95)	0.006** (2.69)	0.006*** (2.72)	0.006*** (2.71)
Log (Total assets)	-0.100*** (-3.03)	-0.107*** (-3.05)	-0.103*** (-3.10)	-0.073*** (-3.00)	-0.076*** (-3.14)	-0.076*** (-3.08)	-0.109*** (-5.89)	-0.111*** (-5.78)	-0.111*** (-5.99)
Real policy rate	0.006 (0.84)	0.007 (0.97)	0.006 (0.86)	-0.010 (-1.66)	-0.009 (-1.63)	-0.009 (-1.63)	-0.002 (-0.75)	-0.001 (-0.52)	-0.002 (-0.69)
GFC	-0.053 (-1.32)	-0.057 (-1.48)	-0.049 (-1.19)	-0.079*** (-2.91)	-0.083*** (-3.02)	-0.077*** (-2.89)	-0.058*** (-2.70)	-0.062*** (-2.93)	-0.057** (-2.58)
MPI	-0.097*** (-3.60)			-0.069** (-2.34)			-0.060*** (-2.89)		
BOR		-0.073** (-2.40)			-0.101*** (-5.03)			-0.081*** (-3.37)	
FIN			-0.123*** (-3.88)			-0.067 (-1.53)			-0.061* (-1.97)
N	1328198	1328198	1328198	1328198	1328198	1328198	1328198	1328198	1328198
adj. R-sq	0.022	0.018	0.023	0.142	0.140	0.140	0.168	0.164	0.166
t statistics in parentheses									
=** p<0.10		** p<0.05	*** p<0.01"						

Panel C: Firms with three or fewer years since incorporation

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	Short-term financing growth	Short-term financing growth	Short-term financing growth	Long-term financing growth	Long-term financing growth	Long-term financing growth	Overall financing growth	Overall financing growth	Overall financing growth
GDP growth	0.014***	0.014***	0.014***	0.002	0.001	0.001	0.007***	0.007***	0.007***
	(3.13)	(3.20)	(3.06)	(0.59)	(0.51)	(0.54)	(3.51)	(3.61)	(3.42)
Log (Total assets)	-0.388***	-0.383***	-0.389***	-0.228***	-0.230***	-0.232***	-0.281***	-0.281***	-0.281***
	(-6.94)	(-6.83)	(-6.95)	(-7.36)	(-7.64)	(-7.46)	(-9.18)	(-9.21)	(-9.00)
Real policy rate	-0.001	-0.001	-0.001	-0.004	-0.003	-0.003	-0.003	-0.003	-0.003
	(-0.21)	(-0.24)	(-0.21)	(-0.69)	(-0.68)	(-0.65)	(-0.79)	(-0.78)	(-0.79)
GFC	-0.052	-0.053	-0.052	-0.035	-0.034	-0.034	-0.042	-0.041	-0.041
	(-1.18)	(-1.20)	(-1.18)	(-1.21)	(-1.19)	(-1.18)	(-1.63)	(-1.64)	(-1.63)
MPI	0.016			-0.045			-0.007		
	(0.33)			(-1.47)			(-0.21)		
BOR		-0.027			-0.044			-0.009	
		(-0.56)			(-0.86)			(-0.23)	
FIN			0.059			-0.056			-0.006
			(0.63)			(-1.23)			(-0.11)
N	224245	224245	224245	224245	224245	224245	224245	224245	224245
adj. R-sq	0.031	0.031	0.032	0.211	0.210	0.211	0.256	0.256	0.256

Table 3: Firms' financing growth and macro-prudential policies in advanced countries

Panel A: Overall sample

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	Short-term financing	Short-term financing	Short-term financing	Long-term financing	Long-term financing	Long-term financing	Overall financing growth	Overall financing growth	Overall financing growth
GDP growth	0.006*** (3.48)	0.006*** (3.42)	0.006*** (3.47)	0.008*** (7.12)	0.008*** (7.07)	0.008*** (7.16)	0.007*** (5.94)	0.007*** (5.90)	0.007*** (5.96)
Log (Total assets)	-0.133*** (-7.75)	-0.132*** (-8.06)	-0.133*** (-7.83)	-0.125*** (-10.02)	-0.125*** (-9.90)	-0.128*** (-10.11)	-0.139*** (-9.46)	-0.139*** (-9.54)	-0.140*** (-9.58)
Real policy rate	-0.005*** (-3.56)	-0.005*** (-3.50)	-0.005*** (-3.65)	-0.005* (-2.03)	-0.005* (-1.95)	-0.005** (-2.08)	-0.004** (-2.38)	-0.004** (-2.32)	-0.004** (-2.43)
GFC	-0.039*** (-3.64)	-0.039*** (-3.57)	-0.039*** (-3.75)	-0.034*** (-2.89)	-0.035*** (-2.94)	-0.034*** (-2.91)	-0.037*** (-3.46)	-0.038*** (-3.48)	-0.037*** (-3.47)
MPI	0.002 (0.15)			-0.016 (-0.86)			-0.007 (-0.63)		
BOR		-0.004 (-0.22)			-0.029 (-1.52)			-0.011 (-0.74)	
FIN			0.006 (0.38)			-0.007 (-0.29)			-0.006 (-0.32)
N	2922400	2922400	2922400	2922400	2922400	2922400	2922400	2922400	2922400
adj. R-sq	-0.023	-0.023	-0.023	0.093	0.093	0.093	0.105	0.105	0.105
t statistics in parentheses									
="* p<0.10 ** p<0.05 *** p<0.01"									

Panel B: Firms with one to nine employees

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	Short-term financing	Short-term financing	Short-term financing	Long-term financing	Long-term financing	Long-term financing	Overall financing growth	Overall financing growth	Overall financing growth
GDP growth	0.006** (2.23)	0.007** (2.38)	0.007** (2.29)	0.006*** (4.08)	0.006*** (4.27)	0.006*** (4.11)	0.006*** (4.76)	0.006*** (5.14)	0.006*** (4.66)
Log (Total assets)	-0.092*** (-3.09)	-0.102*** (-2.99)	-0.096*** (-3.18)	-0.097*** (-3.82)	-0.098*** (-3.80)	-0.100*** (-3.84)	-0.119*** (-6.49)	-0.121*** (-6.27)	-0.122*** (-6.68)
Real policy rate	-0.006 (-1.56)	-0.005 (-1.29)	-0.005 (-1.49)	-0.006* (-1.90)	-0.006* (-1.75)	-0.006* (-1.99)	-0.005* (-1.88)	-0.005* (-1.74)	-0.004* (-1.90)
GFC	-0.056*** (-3.14)	-0.063*** (-4.41)	-0.052*** (-2.85)	-0.034** (-2.24)	-0.038** (-2.37)	-0.034** (-2.22)	-0.043*** (-3.42)	-0.046*** (-3.53)	-0.042*** (-3.35)
MPI	-0.106*** (-4.20)			-0.043** (-2.23)			-0.041*** (-2.91)		
BOR		-0.050*** (-3.07)			-0.088*** (-3.04)			-0.067** (-2.14)	
FIN			-0.130*** (-7.35)			-0.029* (-1.88)			-0.034*** (-2.94)
N	1293633	1293633	1293633	1293633	1293633	1293633	1293633	1293633	1293633
adj. R-sq	-0.017	-0.023	-0.017	0.115	0.115	0.113	0.132	0.131	0.130
t statistics in parentheses									
="* p<0.10 ** p<0.05 *** p<0.01"									

Panel C: Firms with three or fewer years since incorporation

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	Short-term financing	Short-term financing	Short-term financing	Long-term financing	Long-term financing	Long-term financing	Overall financing growth	Overall financing growth	Overall financing growth
GDP growth	0.008** (2.21)	0.008** (2.19)	0.008** (2.20)	0.002 (1.04)	0.002 (1.02)	0.002 (0.99)	0.004** (2.39)	0.004** (2.37)	0.004** (2.36)
Log (Total assets)	-0.297*** (-5.09)	-0.296*** (-5.03)	-0.297*** (-5.22)	-0.239*** (-7.56)	-0.240*** (-7.75)	-0.240*** (-7.07)	-0.265*** (-8.37)	-0.265*** (-8.41)	-0.264*** (-7.92)
Real policy rate	-0.001 (-0.19)	-0.002 (-0.20)	-0.001 (-0.21)	-0.007** (-2.27)	-0.007** (-2.11)	-0.007** (-2.36)	-0.006 (-1.52)	-0.006 (-1.42)	-0.006 (-1.70)
GFC	-0.057 (-1.50)	-0.057 (-1.51)	-0.057 (-1.51)	-0.035 (-1.37)	-0.034 (-1.35)	-0.034 (-1.35)	-0.042** (-2.67)	-0.042** (-2.68)	-0.042** (-2.70)
MPI	-0.000 (-0.01)			-0.015 (-0.38)			0.010 (0.28)		
BOR		-0.007 (-0.12)			-0.007 (-0.10)			0.008 (0.14)	
FIN			0.008 (0.21)			-0.023 (-0.67)			0.011 (0.27)
N	215270	215270	215270	215270	215270	215270	215270	215270	215270
adj. R-sq	-0.006	-0.006	-0.006	0.227	0.227	0.227	0.265	0.265	0.265
t statistics in parentheses									
=** p<0.10	** p<0.05	*** p<0.01"							

Table 4: Firms' financing growth and macro-prudential policies in emerging countries

Panel A: Overall sample

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	Short-term financing	Short-term financing	Short-term financing	Long-term financing	Long-term financing	Long-term financing	Overall financing growth	Overall financing growth	Overall financing growth
GDP growth	0.008** (2.12)	0.008** (2.09)	0.008** (2.13)	0.006** (2.25)	0.007** (2.26)	0.007** (2.35)	0.006** (2.15)	0.006** (2.14)	0.006** (2.22)
Log (Total assets)	-0.090* (-1.87)	-0.086 (-1.57)	-0.094* (-2.02)	-0.152*** (-8.42)	-0.155*** (-8.48)	-0.156*** (-8.63)	-0.149*** (-8.30)	-0.150*** (-8.86)	-0.151*** (-8.16)
Real policy rate	0.000 (0.04)	-0.000 (-0.06)	0.000 (0.11)	0.002 (0.94)	0.002 (1.06)	0.002 (1.08)	0.001 (0.53)	0.001 (0.58)	0.001 (0.63)
GFC	-0.058*** (-3.34)	-0.058*** (-3.38)	-0.059*** (-3.34)	-0.037** (-2.16)	-0.037** (-2.19)	-0.037** (-2.14)	-0.053*** (-4.61)	-0.053*** (-4.71)	-0.053*** (-4.55)
MPI	0.002 (0.08)			-0.034** (-2.28)			-0.020 (-1.54)		
BOR		-0.046 (-1.46)			-0.073*** (-6.22)			-0.045** (-2.13)	
FIN			0.023 (0.41)			-0.031 (-1.32)			-0.016 (-0.85)
N	220484	220484	220484	220484	220484	220484	220484	220484	220484
adj. R-sq	0.025	0.026	0.026	0.143	0.143	0.142	0.161	0.162	0.161
t statistics in parentheses									
=** p<0.10	** p<0.05	*** p<0.01"							

Panel B: Firms with one to nine employees

	Short-term financing	Short-term financing	Short-term financing	Long-term financing	Long-term financing	Long-term financing	Overall financing growth	Overall financing growth	Overall financing growth
GDP growth	0.011 (1.66)	0.011 (1.63)	0.011 (1.65)	-0.005 (-0.56)	-0.004 (-0.56)	-0.005 (-0.58)	0.005 (0.86)	0.005 (0.86)	0.005 (0.84)
Log (Total assets)	-0.118 (-1.41)	-0.122 (-1.43)	-0.120 (-1.44)	-0.061 (-1.10)	-0.069 (-1.22)	-0.062 (-1.10)	-0.108** (-2.46)	-0.114** (-2.50)	-0.109** (-2.46)
Real policy rate	0.023 (1.64)	0.024 (1.70)	0.023 (1.65)	-0.019 (-1.41)	-0.017 (-1.40)	-0.020 (-1.39)	0.000 (0.01)	0.002 (0.42)	-0.000 (-0.09)
GFC	-0.052 (-0.40)	-0.055 (-0.42)	-0.049 (-0.38)	-0.192** (-2.39)	-0.193** (-2.41)	-0.187** (-2.32)	-0.100 (-1.48)	-0.102 (-1.53)	-0.097 (-1.39)
MPI	-0.074 (-1.54)			-0.116* (-1.91)			-0.090** (-2.19)		
BOR		-0.117* (-1.97)			-0.117*** (-4.66)			-0.105*** (-3.15)	
FIN			-0.083 (-0.98)			-0.165 (-1.64)			-0.121* (-1.79)
N	34542	34542	34542	34542	34542	34542	34542	34542	34542
adj. R-sq	0.106	0.105	0.105	0.180	0.172	0.181	0.213	0.203	0.212
t statistics in parentheses									
=** p<0.10	** p<0.05	*** p<0.01"							

Panel C: Firms with three or fewer years since incorporation

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	Short-term financing	Short-term financing	Short-term financing	Long-term financing	Long-term financing	Long-term financing	Overall financing growth	Overall financing growth	Overall financing growth
GDP growth	0.018*	0.019**	0.017*	0.004	0.003	0.003	0.011**	0.011***	0.011**
	(2.03)	(2.32)	(1.90)	(0.54)	(0.49)	(0.45)	(2.74)	(2.93)	(2.61)
Log (Total assets)	-0.552***	-0.543***	-0.560***	-0.213***	-0.218***	-0.217***	-0.302***	-0.303***	-0.305***
	(-4.84)	(-4.65)	(-4.93)	(-3.29)	(-3.38)	(-3.33)	(-4.81)	(-4.74)	(-4.88)
Real policy rate	0.003	0.004	0.003	-0.001	-0.001	-0.002	0.003	0.003	0.002
	(0.37)	(0.46)	(0.38)	(-0.17)	(-0.14)	(-0.22)	(0.52)	(0.55)	(0.49)
GFC	-0.032	-0.037	-0.028	-0.046	-0.044	-0.044	-0.042	-0.042	-0.041
	(-0.32)	(-0.37)	(-0.28)	(-0.66)	(-0.65)	(-0.62)	(-0.64)	(-0.64)	(-0.61)
MPI	0.025			-0.082			-0.032		
	(0.27)			(-1.67)			(-0.60)		
BOR		-0.098***			-0.123			-0.066**	
		(-3.35)			(-1.70)			(-2.29)	
FIN			0.124			-0.093			-0.023
			(0.71)			(-1.17)			(-0.22)
N	8971	8971	8971	8971	8971	8971	8971	8971	8971
adj. R-sq	0.087	0.088	0.089	0.158	0.157	0.157	0.234	0.234	0.233
t statistics in parentheses									
=* p<0.10	** p<0.05	*** p<0.01"							

Appendix Table A1: Country and firm coverage

Country	Number of firms	Country	Number of firms
Argentina	451	Lithuania	1,606
Australia	612	Malaysia	1,273
Belgium	63,560	Malta	842
Brazil	88	Mexico	165
Bulgaria	6,760	Montenegro	110
Canada	606	Netherlands	126
Chile	105	New Zealand	33
China	694	Norway	12,115
Colombia	1,012	Pakistan	275
Croatia	15,387	Peru	75
Cyprus	260	Philippines	262
Czech Republic	11,681	Poland	15,333
Ecuador	61	Portugal	44,544
Estonia	13,392	Republic of Korea	40,966
Finland	29,158	Romania	914
France	355,851	Russian Federation	30,986
Germany	38,123	Singapore	229
Hungary	6,035	Slovakia	2,479
Iceland	2,967	Slovenia	12,097
India	377	South Africa	159
Indonesia	219	Spain	182,826
Ireland	5,078	Sweden	44,816
Israel	291	Switzerland	115
Italy	188,487	Thailand	10,992
Japan	142,120	Turkey	3,153
Jordan	62	United Kingdom	54,645
Kazakhstan	158	United States of Ame	12,165
Latvia	10,028	Total	1,366,924