

Box 5.2

Global Liquidity Conditions, Domestic Credit Supply and Firms' Access to Credit

Global liquidity is a major source of funding for domestic banks. Thus, a larger-than-expected global liquidity squeeze might cause banks to reduce their credit supply. This box analyzes the effects of a stronger-than-expected tightening in global liquidity on banks' credit supply and what type of firms were affected more severely by this squeeze during the period from September 2008 to September 2009. For an accurate and complete identification of these effects, data is matched across bank, firm and type of credit level.

Our first main hypothesis is that relatively more optimistic banks about external financial conditions and banks with a higher non-core FX liability to total assets ratio, shorter-term external debt and paying a higher premium for external financing, therefore, with higher exposure to global liquidity and possibly facing more severe constraints on external debt in the pre-crunch period would be affected more negatively and shrink their credit supply more strongly in the post-crunch period.

To test this hypothesis, the following equation is estimated:

$$\Delta C_{bfi,after} = \beta_1 FXliabilities_{b,before} + \beta_2 FXliabilities_{b,before} * Maturity_{b,before} + \beta_3 FXliabilities_{b,before} * Premium_{b,before} + \beta_4 FXliabilities_{b,before} * Expectations_{b,before} + \beta_5 FXliabilities_{b,before} * X_{b,before} + \xi_{bf} + \mu_b + \nu_f + \vartheta_i + \varepsilon_{bfi,after} \quad (1)$$

Here, $\Delta C_{bfi,after}$ represents the logarithmic difference of credits lent by bank b to firm f from pre- to post-crunch. $FXliabilities_{b,before}$ is the pre-crunch FX liability to total assets ratio of bank b ; $Maturity_{b,before}$ denotes the average maturity of the pre-crunch non-core FX liability of bank b ; $Premium_{b,before}$ is the pre-crunch premium paid by bank b for the non-core FX liability (the weighted average of the external debt interest rate relative to the same currency and the LIBOR rate with the closest time to maturity); $Expectations_{b,before}$ represents the logarithmic difference between the expected and actual year-end (December 2008) USD/TL parity in the pre-crunch period. September 2008 is defined as the pre-crunch period (before) while September 2009 is the post-crunch period (after).

$X_{b,before}$ stands for the capital adequacy, liquidity, total assets (in logarithm), profitability (net profits/total assets), and the non-performing loans ratio (non-performing loans/total loans) of bank b . Given that external borrowing conditions (amount, maturity or premium) would vary across different types of banks, $FXliabilities_{b,before}$ is also interacted with bank-specific variables $X_{b,before}$ in order to control/avoid this variation. Moreover, the change in credit supply also depends on how strong the credit relationship between the bank and the firm is, which is controlled with ξ_{bf} showing the bank-firm credit relationship. ξ_{bf} indicates the share of pre-crunch credits that firm f borrowed from bank b in total credits borrowed by the firm. Lastly, the type of bank (state, private, foreign, investment), μ_b , the unobserved characteristics of the firm, ν_f , and the type of loan (local/foreign currency, cash/non-cash), ϑ_i , are controlled.

The results are summarized in Table 1.

Table 1: Change in Credit Supply After Global Liquidity Crunch*

	Pre-crunch			
	Banks with high external debt (relative to banks with low debt; 25-75 percentiles)	Banks with an external debt due one year earlier (relative to banks with longer-term debt)	Banks with an external borrowing premium higher by 1 percentage point (relative to banks with lower premium)	Banks optimistic about external financing conditions (relative to banks less optimistic; 25-75 percentiles)
Post-crunch % change in credit supply	- %9.1 ***	- %10.5 ***	- %9.0 ***	- 9.2% ***

* The results are obtained by ordinary least squares estimation to equation (1). *** denotes statistical significance at 1 percent.

According to the results regarding the pre-crunch period, the credit balance of a firm borrowing from a bank that borrows high amount of short-term and high-premium loans or is relatively more optimistic about external financing conditions decreases at a stronger pace than the firm’s credit balance at a bank that borrowed small amount of long-term and low-premium loans or is less optimistic about external financing conditions. The coefficients are both statistically significant at the 1 percent level and notable in size. For example, a bank with a one-year shorter external debt shrinks its credit supply by an additional 10.5 percent or a bank relatively optimistic about external financing conditions reduces its credit supply by an additional 9.2 percent in the post-crunch period.

Our second main hypothesis is that banks tend to reduce their credit supply to small, young, indebted or non-exporting firms that are likely to be more vulnerable to economic contraction and have a higher asymmetrical information problem.

To test this hypothesis, the following econometric equation is estimated:

$$\Delta C_{bfi,after} = \beta_1 FXliabilities_{b,before} I(Bigfirm_{f,before}) + \beta_2 FXliabilities_{b,before} * I(Smallfirm_{f,before}) + \beta_3 FXliabilities_{b,before} * X_{b,before} + X_{b,before} + \xi_{bf} + \mu_b + \nu_f + \vartheta_i + \varepsilon_{bfi,after} \tag{2}$$

Here, $I(Bigfirm_{f,before})$ is the dummy variable that equals 1 for firms with a larger total asset size relative to the median and 0 for the remaining firms, while $I(Smallfirm_{f,before})$ is the dummy variable that equals 1 for firms with a smaller total asset size relative to the median and 0 for the remaining firms. Since these dummy variables are interacted with bank’s external borrowing, equation (2) will show how banks with larger pre-crunch external debt change their credit supply to firms of different sizes (relative to banks with smaller debt). Based on equation (2), we also examined the firm’s total number of employees, age, total debt to total equity ratio, short-term debt to total debt ratio and exports to total sales ratio. In addition, the interaction of bank’s external debt maturity with premium and expectations for external financing conditions are also included in equation (2).

The results are summarized in Table 2.

Table 2: The Impact of the Global Liquidity Crunch on Firms' Access to Credit*

	Bank Characteristics→			Banks with an external borrowing premium higher by 1 percentage point	Banks optimistic about external financing conditions
	Firm Characteristics↓	Banks with high external debt	Banks with an external debt due one year earlier		
Percentage change in post-crunch credit supply	Small	-%7.5**	-%5.4**	-%4.1**	-%10.0**
	Large	-%1.6	-%4.3**	+%1.1	-%9.0**
	Few employees	-%3.9**	-%5.5**	-%1.2	-11.1**
	Many employees	-%2.6**	-%4.4**	-%0.5	-9.0**
	Young	-%3.5**	-%4.9**	-%2.5	-9.4**
	Old	-%3.0**	-%4.6**	-%0.2	-9.4**
	High total debt to equity ratio	-%3.9**	-%4.9**	-%1.1	-10.5**
	Low total debt to equity ratio	-%2.6**	-%4.5**	-%0.9	-%8.9**
	High short-term debt to total debt ratio	-%5.0**	-%4.2**	-%2.2	-%10.6**
	Low short-term debt to total debt ratio	-%2.6**	-%5.0**	-%0.1	-%8.3**
	Low exports/total sales	-%3.6**	-%4.8**	-%2.3	-%9.7**
	High exports/total sales	-%3.1**	-%4.7**	+%0.1	-%9.6**

* The results are obtained by ordinary least squares estimation to equation (2). ** denotes statistical significance at 5 percent.

Table 2 shows that small, young, indebted and non-exporting firms that have a shorter-term debt find it particularly difficult to access credit in the post-crunch period. More specifically, banks with larger pre-crunch external debt put more credit constraints on similar firms. This impact is much stronger for banks that have a shorter-term external debt or are relatively more optimistic about external financing conditions and fail to see their expectations realized. In other words, having worked with banks that had a shorter-term external debt or were more optimistic in the pre-crunch period puts additional credit constraints on such firms.

In sum, measures designed to lower the bank demand for external debt, lengthen the maturity of banks' external borrowing or reduce the premium for their external borrowing are likely to cushion the economy against global financial turbulences. Moreover, our analysis concludes that a global liquidity crunch would have a larger impact on small, young, indebted or non-exporting firms. Thus, economic resilience can be strengthened by measures that will reduce the asymmetric information between banks and firms, enhance firms' debt management and boost their export potential.