

Was it credit supply? Cross-border bank lending to emerging market economies during the financial crisis¹

Cross-border bank lending dropped sharply during the financial crisis. This feature uses a panel regression framework to analyse the key drivers of cross-border bank lending to 21 emerging market economies between 1995 and 2009. The analysis suggests that both demand and supply factors contributed to the fall, but the impact of supply was stronger. The two factors seem to have had more balanced effects before the crisis.

JEL classification: F34, G15, G21.

The global financial crisis shook the foundations of international banking and finance. Many markets became dysfunctional, and many international banks needed to be rescued from bankruptcy. Economic growth halted and reversed in most countries. Cross-border bank lending to emerging markets also dropped sharply, raising serious policy questions: did declines in cross-border bank lending transmit advanced country financial shocks to emerging markets? Or did they simply reflect the lower need for financing? In other words, did supply or demand drive cross-border bank lending during the financial crisis?

Understanding the drivers of cross-border bank lending to emerging markets is the key to thinking about financial vulnerabilities. Cross-border bank lending in the BIS banking statistics measures foreign bank lending relevant for balance of payment financing. This is a fundamental variable for emerging markets, which have experienced balance of payment crises in recent decades. Policymakers are concerned about possible balance of payments stress, as perhaps evidenced by soaring foreign exchange reserves.

This feature finds that supply factors drove the fall in cross-border bank lending to emerging markets during the crisis. The demand for cross-border bank lending also declined, but it played a much smaller role. This contrasts with a much more balanced impact before the crisis.

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To put these results in the proper context, one needs to examine a larger lending picture. There are other channels through which international banks provide loans to emerging market economies. The Committee on the Global Financial System (CGFS (2009)) documents the steady increase in local currency lending of subsidiaries; as McCauley et al (2010) show, this local currency lending held up much better than international lending during the financial crisis. Furthermore, as Takáts (2010) documents, there is substantial heterogeneity across emerging market experiences. Hence, policy conclusions on the role of internationally active banks are likely to be nuanced.

Empirical strategy

The analysis uses a panel regression framework that incorporates a global supply factor and country-specific demand factors. The dataset covers quarterly data from 21 emerging market economies² between early 1995 and the third quarter of 2009. Currency-adjusted locational claims are used as the dependent variable. This section explains the choice between the two available sets of BIS statistics – locational and consolidated data – and the identification strategy.

The BIS locational statistics have the advantage of measuring cross-border lending exactly, ie consistently with the principles underlying national accounts and balance of payment statistics. By contrast, the consolidated statistics measure international claims, which also include local claims in foreign currency besides cross-border lending. These local claims in foreign currency are not directly relevant for balance of payment financing, and might bias the results. They are also substantial in many emerging economies, so any bias might be non-trivial. Furthermore, changes in locational claims are also available in currency-adjusted form, which is not the case for the consolidated statistics.

Locational data:
advantages ...

However, using locational data also involves trade-offs. Most importantly, it only allows us to identify global supply factors. In contrast to consolidated data, the locational statistics do not permit researchers to exploit information on the variation across lender countries due to the presence of financial centres (eg London), which intermediate bank lending. These intermediated claims show up twice in the locational data: first, between the original lender's country and the financial centre, and second, between the financial centre and the end destination. Since it is not possible to track flows from their origin to their destination, bilateral flows cannot be explained by demand and supply factors of the two countries involved.³

... and
disadvantages

This analysis uses the normalised quarterly volatility of the S&P 500 financial index as the global supply factor. Volatility tends to be high in periods

Supply factor:
volatility

² Argentina, Brazil, Chile, China, the Czech Republic, Hong Kong SAR, Hungary, India, Indonesia, Israel, Korea, Malaysia, Mexico, Peru, the Philippines, Poland, Russia, Singapore, South Africa, Thailand and Turkey.

³ By contrast, McGuire and Tarashev (2008) show that it is possible to use country pair analysis with consolidated data.

of stress, which is in turn negatively related to credit supply. Higher volatility also implies that it is more difficult for banks to raise additional capital, which also limits credit supply. A further advantage is that volatility is computed from stock prices, which are based on large trading volumes and have a long track record. That said, the results are robust to alternative measures of supply, as discussed in the section on robustness below.

Demand factor:
output

The most important demand factor in the analysis is GDP. This follows straightforwardly from the standard credit equation: higher levels of output require more credit, including more cross-border lending. Further demand factors are also considered below.

Analysis

The impact of country-specific demand factors and a global supply factor on cross-border lending is estimated in a panel regression (Table 1). The benchmark model estimates demand and supply factors jointly. All coefficients have the right sign and are statistically significant. The size of coefficients also seems plausible: a 1% increase in output is associated with around 0.2% higher cross-border bank lending. However, the demand and supply factors are correlated, which calls for standalone “demand only” and “supply only” estimates. By omitting the other variable, these models force their respective coefficients to assume the full effect of correlation between the two variables. They therefore provide upper bounds for the demand and supply effects, respectively. The relative proximity of the standalone and the respective benchmark coefficients suggests that the correlation does not substantially affect the magnitude of the estimates.

Supply was
dominant during the
crisis ...

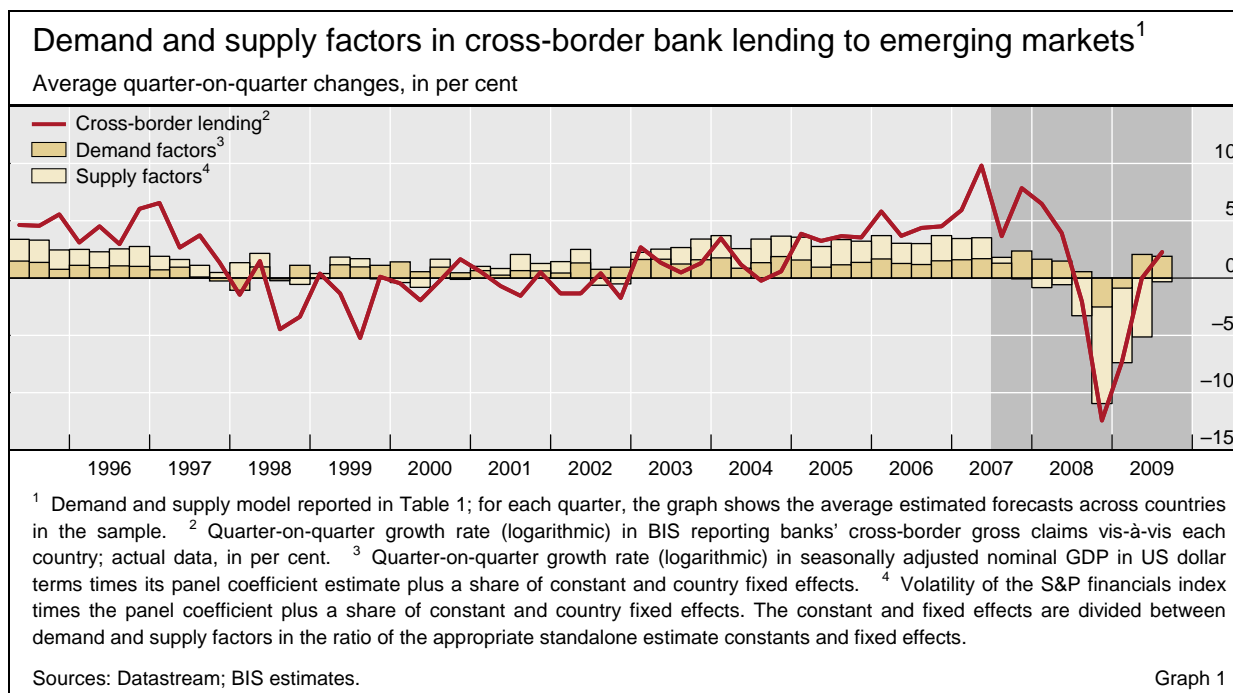
Supply dominated during the financial crisis, though demand factors also contributed to the decline in cross-border lending (Graph 1). At the height of the crisis in Q4 2008, cross-border lending to an average emerging market dropped 12.4%; supply factors contributed 8.4% and demand factors 2.5% to the decrease (leaving the remainder unexplained).

Demand and supply factors in cross-border lending ¹					
Q1 1995–Q3 2009					
Model	Observations	R-squared	Constant	Supply ²	Demand ³
Benchmark	1,197	0.18	0.0370***	−0.1009***	0.2032***
Demand only	1,197	0.12	0.0097**	...	0.2886***
Supply only	1,218	0.15	0.0463***	−0.1221***	...

*, ** and *** denote coefficients significantly different from zero at the 10%, 5% and 1% level, respectively.

¹ The dependent variable is the quarter-on-quarter growth rate (logarithmic) in BIS reporting banks' currency-adjusted cross-border gross claims vis-à-vis each country in the sample. The series is built by taking end-1994 cross-border claims and adding consecutive currency-adjusted changes. The model is estimated through panel regression allowing for heteroscedasticity across countries and using country-specific fixed effects. ² Volatility of US S&P 500 financial index, average for the period, normalised. ³ GDP of each country and at current prices, expressed in US dollars at average exchange rates, in logarithms, seasonally adjusted.

Sources: Datastream; national data; BIS locational banking statistics; BIS estimates. Table 1



However, demand and supply factors tend to be more balanced during non-crisis periods. For example, between 2003 and 2007, demand and supply factors each contributed to around one third of cross-border lending (leaving the remaining third unexplained), suggesting that the credit boom of advanced countries also spilled over to emerging markets.

... but demand and supply were more balanced beforehand

Of course, all these results apply only to an “average emerging market economy”, and there is substantial heterogeneity among them. It is possible that the 1997–98 and 2002 crises meant very strong supply constraints for some economies. In the current crisis, international banks seem to have supported operations in some countries – even though they retrenched their activities in general. Takáts (2010) provides more details on these heterogeneous experiences.

It is important to emphasise that identifying demand and supply factors amid such heterogeneity is difficult. Hence, some caution is warranted, and there is ample room for further research. The next section aims to answer questions regarding the robustness of the results obtained from this analysis.

Robustness

The model is fairly robust to straightforward modifications (Table 2). First, the model performs well out of sample (Model 1). Using observations up until end-2006, the model produces statistically significant coefficients of the right sign and approximately the right magnitude. Interestingly, this result is similar to McGuire and Tarashev’s (2008) finding that out-of-sample estimates are somewhat lower than actual lending during the crisis. Cross-border lending held up better than one would have expected based on pre-crisis data. Second, the results are very robust to the exclusion of financial centres (Model 2).

The model is robust for out-of-sample estimation ...

... exclusion of financial centres ...

Robustness of estimates ¹				
Model	Observations	R-squared	Supply	Demand
Benchmark	1,197	0.18	-0.1009***	0.2032***
1 (out-of-sample) ²	966	0.14	-0.1879***	0.1307***
2 (no financial centre) ³	1,081	0.18	-0.1067***	0.1954***
3 (extended time frame) ⁴	1,755	0.06	-0.1219***	0.0227**

*, ** and *** denote coefficients significantly different from zero at the 10%, 5% and 1% level, respectively.
¹ As defined in Table 1. ² Using data up until end-2006. ³ Excluding Hong Kong SAR and Singapore. ⁴ Extended time frame from Q2 1978 to Q3 2009. Supply effect is Datastream US financial sector volatility.
Sources: Datastream; national data; BIS locational banking statistics; BIS estimates. Table 2

... and extending the time horizon

Financial centres might especially affect the demand factor estimate, as parts of cross-border lending to financial centres are not used locally. However, the exclusion of Hong Kong SAR and Singapore does not substantially change the demand or supply coefficients. Finally, extending the model to include the 1978–2009 period also shows the setup to be robust (Model 3). Data availability is an issue for some countries; hence the results might be less representative than the benchmark model. Nevertheless, the estimated supply impact is almost the same as in the main model.⁴ The demand effect, however, seems to be substantially weaker.

The model is robust to various other supply ...

The model's supply specification also seems to be robust to alternative measures of supply (Table 3). Replacing the volatility of the S&P 500 financial index with the implied volatility of a broader stock index paints a very similar picture. Lending surveys provide an alternative and very direct measure for

Robustness of supply estimates ¹								
Model	Observations	R-squared	Demand	Index volatility	Survey	TED (US)	TED (DE)	Index level
Benchmark	1,197	0.18	0.2032***	-0.1009***				
4	1,197	0.16	0.2340***		-0.0006***			
5	1,197	0.18	0.2019***	-0.0836***	-0.0002			
6	1,197	0.13	0.2639***			-0.0176		
7	1,197	0.13	0.2670***				-0.0227	
8	1,197	0.13	0.2548***					0.0703
9	1,197	0.18	0.1992***	-0.0967***				0.0156

*, ** and *** denote coefficients significantly different from zero at the 10%, 5% and 1% level, respectively. In parenthesis, t-statistics.
¹ As defined in Table 1. The definition of the independent variables is as follows: (i) demand: GDP, at current prices expressed in US dollars at average exchange rates, in logarithms, seasonally adjusted; (ii) index volatility: S&P 500 financial sub-index volatility is the quarterly average, normalised to 1995–2005 = 1; (iii) survey: US lending survey on credit tightening for medium and large firms; (iv) TED (US): US TED spreads; (v) Ted (DE): German TED spreads; (vi) index level: S&P 500 financial sub-index end-of-quarter levels, logarithmic change.
Sources: Datastream; national data; BIS locational banking statistics by residence; BIS estimates. Table 3

⁴ The extended setup uses the volatility of the Datastream US financial sector index due to data availability. However, this should not affect results as the volatility measures are very similar.

supply effects. Using credit tightening measures from the US lending survey yields similar results to the benchmark model (Model 4). However, this survey coefficient is not significant after controlling for volatility (Model 5). The TED spread, the difference between the interest rates on interbank loans and short-term government debt, is also a natural measure of bank stress. The larger the spread, the riskier banks are perceived as being – and the less likely they are to be able to provide credit. However, the coefficient is not significant, though it has the right sign (Models 6 and 7). The inclusion of banks' stock market valuations as a measure of supply effects also does not change the results (Models 8 and 9). Valuation could be a proxy for the cost of capital, and thus for credit supply, as McCauley and Zimmer (1991) discuss. The higher the stock valuation, the lower the cost of capital, and the stronger credit supply is. Here the value of the S&P 500 financial index is considered as a supply measure: the coefficient has the right sign and its size seems to be economically significant. The economic message is similar to the benchmark model: before the crisis the two impacts are balanced, and during the crisis supply is somewhat stronger (though not to the same degree as in the benchmark model). Unfortunately, this supply coefficient is insignificant (Model 8). Furthermore, the impact disappears after controlling for stock market volatility (Model 9).

The model is also robust to various changes to the demand specification (Table 4). The need to finance current account deficits could create additional demand for cross-border lending. Similarly, large interest rate differentials might induce foreign currency borrowing – perhaps through cross-border lending. Though coefficients for current account deficits and interest rate differentials are statistically significant and have the right sign, they are not economically relevant in explaining cross-border lending (Models 10, 11 and 12). Furthermore, in many emerging markets cross-border lending is connected to specific economic activities, such as export financing, certain

... and demand factors

Robustness of demand estimates ¹									
Model	Observations	R-squared	Supply	Demand	Current account	Interest rate diff	Exports	Investment	Consumption
Benchmark	1,197	0.18	-0.1009***	0.2032***					
10	1,117	0.18	-0.1007***	0.2028***	-0.4395***				
11	1,160	0.19	-0.1026***	0.1776***		-0.0006***			
12	1,080	0.19	-0.1017***	0.1810***	-0.3790**	-0.0005***			
13	1,197	0.18	-0.0992***	0.1982***			0.0123		
14	1,189	0.18	-0.0975***	0.1869***				-0.0593*	
15	1,073	0.18	-0.0620***	0.1852***					0.0319

*, ** and *** denote coefficients significantly different from zero at the 10%, 5% and 1% level, respectively. In parenthesis, t-statistics.

¹ As defined in Table 1. The definition of the independent variables is as follows: (i) supply: S&P 500 financial sub-index quarterly average volatility, normalised to 1995–2005 = 1; (ii) demand: GDP, at current prices expressed in US dollars at average exchange rates, in logarithms, seasonally adjusted; (iii) current account: quarterly current account deficit as a percentage of previous four-quarter average GDP; (iv) interest rate differential: vis-à-vis the USD interest rate; (v) exports: in US dollars, in logarithms; (vi) investments: gross fixed capital formation at current prices expressed in US dollars at average exchange rates, in logarithms; (vii) consumption: at current prices expressed in US dollars at average exchange rates, in logarithms.

Sources: Datastream; national data; BIS locational banking statistics by residence; BIS estimates.

Table 4

investments or even consumer lending. Developments in some of these fields might better correspond to actual credit demand. However, measures of exports, investment and consumption are not only economically, but also mostly statistically insignificant after controlling for output (Models 13, 14 and 15). In sum, output seems to explain credit demand well on average.

Conclusion

The financial crisis posed many questions for policymakers. This feature aims to answer one such question: did supply or demand drive cross-border bank lending to emerging markets during the financial crisis?

The feature finds that supply mainly drove cross-border bank lending during the financial crisis. In other words, the stress experienced by major, internationally active banks appears to have limited the supply of cross-border lending. This finding is consistent with the general understanding that this time the financial crisis originated outside emerging markets. Cross-border bank lending was one of the channels through which the crisis propagated to emerging markets.

The paper also finds that demand and supply factors were much more balanced before the crisis. It seems that during tranquil times international banks allocate capital according to its most efficient use. Furthermore, it seems that this more balanced pattern is returning as the crisis subsides.

Hence, a trade-off arises for economic policy. On the one hand, cross-border lending seems to be a two-way street for contagion. Crises can be transmitted from advanced countries to emerging markets, not just the other way around. In addition, cross-border lending can transmit advanced country credit booms. Policymakers might want to reduce the resulting vulnerabilities. On the other hand, cross-border lending is normally a channel for efficient international capital allocation. Emerging markets might wish to continue to benefit from this access to international lending. Given the heterogeneity of emerging markets, the policy responses might differ substantially across countries.

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