The shifting drivers of international capital flows

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Abstract

Alternative forms of international capital flows have historically reacted differentially to global and local factors. This paper provides empirical evidence on the importance of such factors for cross-border loans and international debt securities. Using the BIS international banking and international debt securities statistics for a large panel of countries over fourteen years, we show that the aftermath of the global financial crisis has been characterized by a shift in the composition of international capital flows from bank lending toward direct market financing. We also demonstrate that the sensitivity of all major types of international financial flows to US monetary policy has increased dramatically since the Global Financial Crisis. The impact of global risk conditions has increased significantly for international bonds flows and has declined for cross-border loan flows, but remains qualitatively important. We find evidence that some of the latter shifts in the estimated sensitivities may be related to prudential policy actions and compositional shifts across and within lending sectors.

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1. Introduction

Alternative forms of international capital flows have historically reacted differentially to global and local factors. Cross-border bank-to-bank lending has been particularly sensitive to global liquidity conditions, as captured by monetary policy factors and proxies for risk conditions; market-based financing has historically been less flighty. Volumes of cross-border flows through banks dominated overall credit-based financing. The patterns of drivers and their strength for various types of international capital flows and domestic versus foreign investors has been carefully documented (Forbes and Warnock (2012), Cerutti, Claessens, and Ratnovski (2014), Miranda-Agrippino and Rey (2015); Bruno and Shin (2015a)).

An international capital flow retrenchment occurred in the immediate aftermath of the global financial crisis, with some subsequent recovery (Milesi-Ferretti and Tille (2011)). The policy community proceeded with a range of policy reforms aimed at making banks safer and reducing systemic vulnerabilities, including changed required capital and liquidity ratios for banks, newly developed prudential policy frameworks, and enhanced regimes for bank holding company recovery and resolution in the event of a solvency event. Some globally-active banks reduced balance sheet leverage and evolved their business models. The decline in bank-based cross-border lending, particularly by eurozone banks, has been described as financial deglobalization, as cross-border bank financing flows declined substantially (Rose and Wieladek (2011), Forbes et al (2015), Bussiere et al (2016)). A shift also occurred in the composition of international capital flows, as the first phase of global liquidity through banks was replaced to some degree by a second phase of global liquidity through corporate bond financing, particularly to emerging market borrowers (Shin 2013).[2]

Has this type of evolution generated global capital flows that are safer and less flighty than prior to the global financial crisis? The paper documents changes in the strength of drivers of global capital flows, and further explores whether these changes are at least partially explained by changes in prudential measures in the borrower countries. Bremus and Fratzcher (2015) have conducted a pre- versus post- period assessment of the role of monetary policy versus regulatory strength in cross-border bank flows, concluding that cross-border bank lending has decreased in the post-crisis period and that expansionary monetary policy in source countries has encouraged cross-border lending. Our approach instead provides time-series panel evidence on the importance of global liquidity and local factors for cross-border loans and for international debt securities, vis-à-vis both bank and nonbank borrowers. We carefully relate changes in the strength of global liquidity and domestic drivers to changes in prudential instruments, using a detailed new prudential instrument database. We document a set of intriguing changes in the pattern of sensitivities to global liquidity conditions.

We start by confirming the major previously documented patterns for the impact of global and local factors on international capital flows. We then show that the impact of US monetary policy on all types of international financial flows that we study has increased considerably since the Global Financial Crisis. We further demonstrate that the sensitivity of

[2] These observations pertain to volumes of cross-border flows, not to co-movements of asset prices. During this same broad period, co-movements in international asset prices continue to be at least as strong and sensitive to global risk sentiment and liquidity conditions as pre-crisis state. This type of evidence does not support de-globalization.

market-based lending through debt securities to global risk conditions has also increased significantly. By contrast, the respective sensitivity for international bank flows has declined. A significant part of these changes in sensitivities directly correlate with the pattern of prudential policy changes implemented across countries and over time. Risk-taking may have shifted from bank-to-bank transactions over to the historically less risk-sensitive market-based debt instrument financing. Across types of instruments and institutions, capital flow responses to risk may have evolved to make business models of banks and nonbanks more similar, so that diversification across types of investors may be less of a market-based stabilizer to international flows than had previously been the case. During the post-crisis period, *total* capital flow responsiveness to global liquidity conditions has increased substantially, while sensitivity to global risk has declined, but remains qualitatively important.

Our analysis uses detailed quarterly data for a panel of sixty-four countries for the period between 2000Q1 and 2013Q4. We combine the BIS International Banking Statistics (IBS) and the BIS International Debt Securities (IDS) Statistics to create a panel of international capital flows from the perspective of the recipient countries. Unlike the body of prior research using the BIS International Banking Statistics for analysis of international claims of global banks,[3] we explicitly separate bank loan financing flows from bank bond financing flows. Using the IDS database we have complementary data on cross-border bond issuance by banks and nonbanks.

Our first set of empirical findings pertains to the sensitivities of global financial flows to global liquidity factors such as US monetary policy and global risk conditions, while controlling for country-specific and other global drivers. We establish the empirical importance of global risk and liquidity factors over the full sample period of the data, reaching conclusions that are qualitatively similar to the results of prior studies (e.g. Rey 2013). We then test for the presence of structural breaks in the sensitivity of cross-border credit flows to global factors. The evidence points to structural breaks around Lehman's default for both cross-border bank loans and international debt securities. Structural breaks are detected for all main drivers, but are particularly strong for global factors such as the VIX and the federal funds rate. Post-crisis, all types of global flows we examine became substantially more flighty with respect to US monetary policy. Furthermore, the sensitivity of IDS flows to global risk conditions also heightened considerably.

Our second set of results is related to the role of prudential policies in "explaining" the altered sensitivities to global shocks. The pattern of policy instrument changes across countries and over time explains some, though not all, of the time variation in the sensitivities of cross-border flows to global drivers. In particular, we find that including certain prudential controls (most notably, LTV caps) brings the sensitivities to the VIX closer (but not all the way) to the pre-crisis levels.

Our third set of findings is based on utilizing the lending bank nationality dimension in the BIS Consolidated Banking Statistics (CBS). More concretely, we demonstrate that our main results about the global drivers of international capital flows are robust to controlling for variation across lenders as well as borrowers. We also show that using the CBS data to control for heterogeneity among lending banking systems goes a long way towards explaining some

[3] International claims data are sometimes referred to as cross-border loans, but in fact reflect the summation of cross-border claims and local claims denominated in foreign currencies.

of the post-crisis shifts in the sensitivities of capital flows to global drivers. Most importantly, the post-break coefficient on the VIX in the CBS estimates is virtually equal to its pre-break counterpart. A likely explanation for that set of results is that different national baking systems have business models which differ with respect to their sensitivity to undiversifiable global risk.

The remainder of the paper is organised as follows. The next section reviews the literature on international capital flows, global factors and links with prudential policies. Section 3 discusses the data. Section 4 goes over the most important stylized facts concerning international capital flows. Section 5 discusses the econometric methodology that we employ in our empirical investigation. Section 6 presents our main empirical results and robustness checks. The final section summarizes the main conclusions of our empirical analysis.

2. Prior evidence on drivers of international flows

The distinction between push and pull factors for capital flows has been the dominant intellectual framework for classifying drivers since the focus of academic inquiry shifted to the role of external factors in the early 1990s. In the existing literature, domestic economic performance, asset return indicators, and country risk indicators stand out as important pull variables. Similarly, mature economy interest rates and global risk aversion are unambiguously important push factors and have significant explanatory power for capital flows movements.

There is ample evidence that monetary policy shocks in advanced economies are transmitted internationally. Forbes and Warnock (2012) show that capital flows are highly correlated with one another and strongly negatively correlated with the VIX. Virtually all papers in the existing empirical literature conclude that banking flows respond negatively to an increase in global risk aversion (Jeanneau and Micu (2002), Ferucci, et al (2004), Takats (2010), Milesi-Ferretti and Tille (2011), Herrmann and Mihaljek (2013), Bruno and Shin (2015b)). Rey (2013) demonstrates the existence of a global financial cycle in capital flows, asset prices and in credit growth, which is primarily driven by US monetary policy. There is a common component in risky asset prices around the world (Miranda-Agrippino and Rey (2012)). In a comprehensive analysis by the IMF, global liquidity conditions are shown to mainly reflect US monetary policy and the VIX (Cerutti, Claessens and Ratnovski (2014)).

The empirical evidence for the impact of US monetary policy on international capital flows is more nuanced. There is evidence which suggests that the impact of US interest rates on banking flows is negative. However, this effect may at times be more than offset by the stronger economic and financial environment in which higher interest rates tend to prevail (Koepke (2015)).

Using BIS locational banking statistics, Bruno and Shin (2015a) find a negative relationship. They argue that banks' financing costs are closely tied to central bank policy rates, and hence affect banks' willingness to lend internationally, including to local banks in emerging economies. This effect is amplified by a risk-taking channel, in which measured risks decline during periods of low interest rates as borrowers' creditworthiness improves. Cetorelli and Goldberg (2012) show that transmission occurs through internal capital market flows between US banks and their foreign affiliates, with this channel potentially as large as the interbank funding channel. Ghosh et al. (2014) find a negative impact of U.S. real interest rates on cross-

border banking flows to a sample of 76 countries, both emerging and mature (also based on BIS locational banking statistics).

However, Jeanneau and Micu (2002) find a positive relationship between higher global interest rates and BIS international banking flows to emerging markets over 1985 to 2000. The explanation offered by the authors is that higher interest rates in mature economies reflect stronger economic conditions that result in improved confidence of international lenders, which may encourage cross-border bank lending. Goldberg (2002) uses micro-level U.S. banking data from banks' regulatory filings for the 1984-2000 period. She obtains mixed results on this relationship, with the sign of the coefficient depending on the model specification and with different results for U.S. lending to Latin America compared to EM Asia (for which there is more consistent evidence that higher interest rates lead to higher bank lending). Cerutti et al. (2014) provide mixed evidence for a sample of 77 countries (mature and emerging), finding that U.S. real interest rates are positively associated with cross-border bank flows, while the term premium shows the expected negative relationship.

One of the most important channels through which monetary policy in advanced economies impacts global financial conditions is related to cross-border bank lending. Rey (2013) documents the international risk-taking channel of monetary policy, which operates through the unique role that the US dollar plays in international financial markets and international banking. Bruno and Shin (2015b) find evidence of monetary policy spillovers on cross-border bank capital flows and the US dollar exchange rate through the banking sector. Bruno and Shin (2015a) demonstrate that episodes of appreciation of the U.S. dollar are associated with deleveraging of global banks and an overall tightening of global financial conditions.

When it comes to portfolio equity and debt flows, there is very strong evidence that both types of portfolio flows are strongly affected by global risk aversion. Empirical studies almost universally find a strong and statistically significant impact of increases in global risk aversion on portfolio flows (e.g., Milesi-Ferretti and Tille 2011; Broner et al. 2013).

Numerous studies published during the last 25 years have analyzed the relation of portfolio flows with world interest rates (often proxied by U.S. rates) and have overwhelmingly concluded that an increase in the external interest rate environment tends to exert a negative impact on portfolio flows and vice versa. Most studies find that bond flows are more sensitive to mature economy interest rates than equity flows (including Taylor and Sarno 1997; Koepke 2014, and Dahlhaus and Vasishtha 2014; an exception is Chuhan et al. 1998). Furthermore, McCauley et al (2015) have recently demonstrated the existence of a negative and statistically significant relationship between the term premium on 10-year Treasury bonds international bond issuance during the post-crisis period.

This paper also analyses the interactions between global drivers of cross-border flows and country-specific prudential measures. Buch and Goldberg (2015) use the dataset on prudential policy measures developed by Cerutti et al. (2015) to analyse cross-border prudential policy spillovers. They find that capital requirements, loan-to-value ratios and reserve requirements are most frequently spilled over across borders through bank lending. Previous papers have explored the role of prudential policies using alternative databases. Houston, Lin and Ma (2012) relate changes in lending by all banks of a country to other countries to a set of control variables and regulatory policies. The study finds that banks transfer funds to markets with fewer regulations when there is an effort by domestic regulators to limit bank risk-taking.

These effects were particularly significant when the recipient country is a developed country with strong property rights and creditor rights. In a similar vein, Bremus and Fratzscher (2015) use the BIS international banking data to disentangle the role of monetary policies versus more stringent regulatory policies in explaining patterns of international flows around the global financial crisis period. Cross-border bank outflows were driven by expansionary monetary policies, while some flows were mitigated by tighter regulation. Both studies utilized the database by Barth, Caprio and Levine (2013), which provides a cross-country perspective on the stance of regulation, supervision, and monitoring at three-year intervals. Unfortunately, the frequency and specific construction of the data makes it difficult to map directly to effects of particular policy instruments.

Other studies rely on alternative prudential instrument databases and provide cross-country lessons usually using data on economic aggregates. Cerutti et al. (2015) use the 2013 IMF survey to create a database of prudential policy in 119 countries, and then sum across all policies – finding that EM credit growth is lower with tighter policies. Claessens, Ghosh and Mihet (2014) use annual data collected through an internal IMF survey of country desk economists and a sample of banks in 35 countries over 2000-2010. They conclude that caps on borrower and financial institutions' assets- and liabilities–based measures may be effective, while buffer-based policies seems to have little impact on asset growth. Overall, there is little evidence that the effectiveness of these tools varied by the intensity of the cycle, although the main impact of policies is in reducing vulnerabilities by reducing risks during upswings.

3. Data

International capital flows

We construct our cross-border credit flows series by combining two Bank for International Settlements (BIS) datasets – the BIS Locational International Banking Statistics (LIBS) and the BIS International Debt Securities Statistics (IDSS).

We obtain data on external bank lending from the BIS LIBS, which capture the outstanding claims and liabilities of internationally active banks located in 44 BIS LIBS reporting countries[4] against counterparties residing in more than 200 countries. Banks record their positions on an unconsolidated basis, including intragroup positions between offices of the same banking group. The data are compiled following principles that are consistent with balance of payments statistics. The LIBS statistics capture around 95% of all cross-border interbank business (BIS, 2015).

In addition to providing a geographical breakdown of reporting banks' cross-border claims and liabilities, the BIS LIBS also provide information about the currency composition and the counterparty sector of banks' cross-border positions. The availability of a currency breakdown in the LIBS, coupled with the reporting of breaks in series arising from changes in methodology, reporting practices or reporting population, enables us to calculate break- and

[4] More information is provided at http://www.bis.org/statistics/rep_countries.htm.

exchange rate- adjusted changes in amounts outstanding. Such adjusted changes approximate underlying flows during a quarter.[5] At the same time, the counterparty sector breakdown available in the BIS LIBS enables us also to distinguish between cross-border bank lending to bank and non-bank borrowers.

The BIS IDSS data capture borrowing in money and bond markets. International debt securities (IDS) are defined as those issued in a market other than the local market of the country where the borrower resides (Gruić and Wooldridge (2012)). They encompass what market participants have traditionally referred to as foreign bonds and eurobonds.

Our sample consists of quarterly data from Q1 2000 to Q4 2013. On the borrowing side, we focus on a set of 64 countries, which includes both, Advanced Economies (AEs) and Emerging Market Economies (EMEs). On the bank lending side, we use data on the positions of all 44 BIS LIBS reporting countries, including many offshore financial centres.

Global drivers

We focus on three global factors in our analysis. The first one is a measure of global risk aversion. We measure that with the VIX index of the implied volatility in S&P500 stock index option prices from Chicago Board Options Exchange (CBOE). The second global factor that we use in our analysis is related to the global monetary policy stance. We proxy that with the US Federal Funds target rate. More precisely, we use the effective US Federal Funds target rate prior to Q4 2008 and the Wu-Xia (2015) estimates of the shadow Federal Funds rate from Q1 2009 onwards. The third, and final global factor that we include in our analysis is global real GDP growth.

Other potential drivers and additional controls

In line with the literature on drivers of international capital flows, we examine three borrowing country variables (i.e. pull factors) - local real GDP growth, sovereign ratings and the degree of financial openness. For each destination country, the sovereign ratings variable is defined as the average ratings across the three major credit ratings agencies (S&P, Moody's and Fitch). The degree of financial openness is captured by the Chinn-Ito index (2008), normalized between 0 and 1.

Prudential measures

We employ a new dataset constructed by Cerutti et al. (2015). The dataset covers widely-used prudential instruments, keeping track of the intensity of their usage in 64 countries between 2000 and 2014 (at a quarterly frequency). Information has been gathered both from regulatory

[5] Adjusted changes may over- or underestimate underlying flows because adjusted changes may also be affected by changes in valuations, write-downs, the underreporting of breaks, and differences between the exchange rate on the transaction date and the quarterly average exchange rate used by the BIS to convert non-dollar amounts into US dollars.

sources in the individual countries, as well as extending and utilizing the Global Macro Prudential Instruments (GMPI) survey which the IMF conducted in 2013.

The instruments that are covered in the above prudential database are: general capital requirements, sector-specific capital requirements (split into real estate credit, consumer credit, and other), interbank exposure limits, concentration limits, loan-to-value (LTV) ratio limits, and (local currency and foreign currency) reserve requirements.

Each of the above variables comes in two versions. The first is an impulse version, which records the prudential measure undertaken in a given quarter. It can take positive and negative values, indicating a tightening or loosening of the policy, respectively, and it also takes into account the intensity of the prudential measure. The second version is a cumulative one. For every quarter and every country, it is constructed by summing up all the impulse measures undertaken by that country up to that quarter.

Following Avdjiev et al (2016), we focus on three of these instruments: loan-to-value ratio caps, capital requirements and local currency reserve requirements. Table 1 contains summary statistics for those three variables. Each of the above three prudential policy tools has been used in more than half of the countries in our sample. Local currency reserve requirements have been used most often (on 297 occasions). Capital requirements and LTV caps have been employed in roughly 100 episodes each.

The split between loosening and tightening episodes varies quite a bit across the three prudential tools. For local currency reserve requirements, the number of loosening episodes (166) slightly exceeds the number of tightening episodes (131). By contrast, roughly three quarters of all LTV policy actions have been in the tightening direction. Finally, capital requirements have been tightened in each of the 100 instances in which they have been changed.

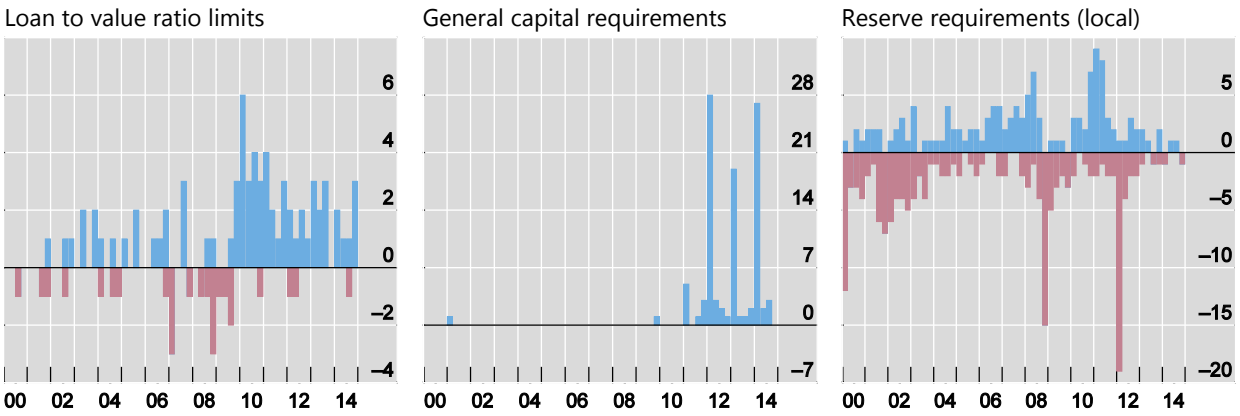
Table 1. Incidence of prudential changes

	Distinct countries	Episodes	Tightening episodes	Loosening episodes
General capital requirements	55	100	100	0
Loan to value ratio limits	36	97	72	25
Reserve requirements (local)	46	297	131	166

Source: Cerutti et al (2015).

Graph 1 shows the changes in these instruments over time. Virtually all policy actions involving general capital requirements have taken place during the post-crisis period. By contrast, prudential policy actions involving loan-to-value ratios and local currency reserve requirements have been much more evenly spread over time.

Changes in prudential policies Graph 1



Source: Cerutti et al (2015).

Summary statistics for all of the explanatory variables used in our empirical analysis are presented in Table 2.

Table 2. Descriptive statistics of the explanatory variables used in the estimation

Variables	Obs.	Mean	Std. Dev.	Min	Max
Global factors					
ΔFed fund rates (1)	3,840	-0.13	0.50	-1.73	1.00
Log (VIX)	3,776	2.97	0.35	2.40	4.07
ΔGlobal GDP	3,840	3.68	1.73	-2.49	5.75
Country-specific variables					
ΔGDP	3,430	3.19	3.90	-19.30	27.15
ΔSovereign ratings (2)	3,660	0.01	0.27	-4.67	2.43
Chinn-Ito index (3)	3,416	0.74	0.32	0.00	1.00
Prudential tools (4)					
PruC (5)	3,840	0.05	0.39	-1.00	1.00
LTV (6)	1,298	0.04	0.27	-1.00	1.00
ResReq (7)	3,840	-0.01	0.32	-3.00	5.00
CapReq (8)	3,420	0.03	0.17	0.00	1.00
CumPruC (9)	3,584	0.58	3.42	-9.00	25.00
CumLTV (10)	1,149	0.47	1.73	-3.00	8.00
CumCapReq (11)	3,192	0.16	0.41	0.00	2.00
CumResReq (12)	3,584	-0.49	1.98	-7.00	13.00

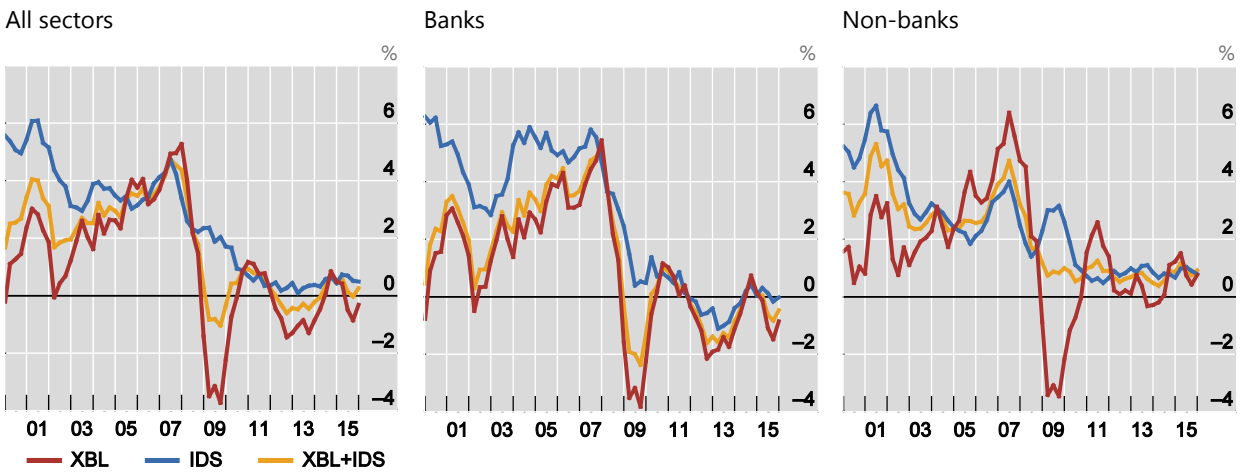
Notes: The sample includes quarterly data for 64 recipient countries over the period 2000:Q1 - 2013:Q4. (1) Effective federal funds rate for the period 2001:Q1 – 2008:Q4, Wu-Xia Shadow rate for the period 2009:Q1 – 2013:Q4. (2) LT foreign currency, average across 3 agencies. (3) Chinn and Ito (2006) measure of financial openness. (4) A higher prudential index indicates a tightening. (5) Composite prudential index. (6) Caps on loan to value ratio. (7) Reserve requirements in local currency. (8) Capital requirements. (9) Cumulative composite prudential index. (10) Cumulative caps on loan to value ratio. (11) Cumulative reserve requirements in local currency. (12) Cumulative capital requirements. Each cumulative prudential index is obtained in each quarter by adding the non-cumulative prudential index up to that quarter.

4. Broad patterns and trends in international capital flows

The behaviour of international capital flows over the past several decades has been well-documented in the existing literature. Nevertheless, focusing on the aggregate series conceals considerable heterogeneity among the main components. At a global level, IDS have exhibited higher growth rates than cross-border bank loans for virtually the entire sample period that we focus on (Graph 2).

External debt flows, all borrowers

Four-quarter moving average of quarterly growth rates — Graph 2



XBL = Cross-border loans: Quarterly Growth Rate$_t$ = Adjusted Flows$_t$ / Outstanding Stock$_{t-1}$; IDS = International Debt Securities: Quarterly Growth Rate$_t$ = Net Issuance$_t$ / Outstanding Stock$_{t-1}$.

Sources: BIS Locational Banking Statistics by residence; BIS International Debt Securities Statistics.

As Table 3 reveals, the average quarterly growth rate of IDS (2.7%) has been a more than a full percentage point higher than that of cross-border bank loans (1.3%). This relative ranking of growth rates holds true not only for aggregate global flows, but also across borrowing countries (advanced economies and emerging market economies) and sectors (banks and non-banks).

Nevertheless, a deeper look into the data reveals several important differences between international capital flows to advanced economies and emerging markets. In the former case, the growth rate of IDS exceeded that of cross-border loans before, during and after the Global Financial Crisis (Graph 3). By contrast, cross-border loans to EMEs grew at a much higher rate during the pre-crisis period than international debt securities issued by EME residents (Graph 4). This trend was primarily driven by lending to non-banks. During the crisis, the contraction in loan flows to EMEs was much larger than the contraction in bond flows. In this case, the main driver of the divergence was credit to banks in EMEs.

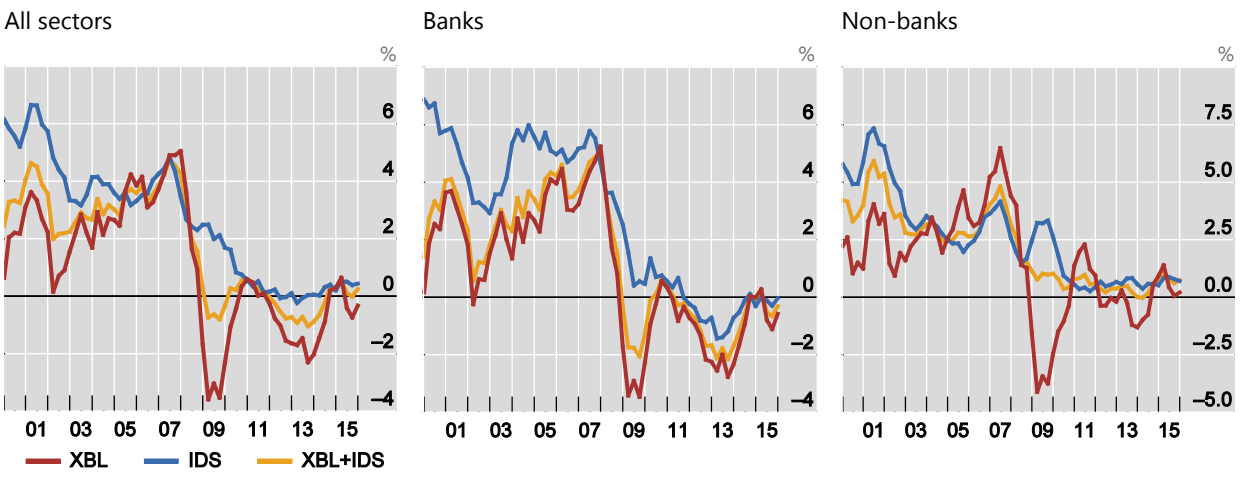
Table 3. Summary statistics, whole sample

		Mean			Standard deviation		
Sector	*Region*	XBL	IDS	XBL+IDS	XBL	IDS	XBL+IDS
All	All	1.28	2.69	1.86	3.17	1.96	2.22
	AE	1.18	2.77	1.86	3.42	2.20	2.43
	EME	1.68	2.15	1.83	4.01	1.82	2.92
Banks	All	1.13	2.88	1.58	3.37	2.73	2.90
	AE	1.04	2.89	1.55	3.60	2.87	3.08
	EME	1.53	2.91	1.69	5.02	3.52	4.60
Non-banks	All	1.63	2.59	2.20	3.51	1.86	1.76
	AE	1.55	2.70	2.26	3.91	2.15	2.01
	EME	1.94	1.97	1.95	3.43	1.85	1.86

Notes: XBL = Cross-border loans: Quarterly Growth Rate$_t$ = Adjusted Flows$_t$ / Outstanding Stock$_{t-1}$; IDS = International Debt Securities: Quarterly Growth Rate$_t$ = Net Issuance$_t$ / Outstanding Stock$_{t-1}$. Sources: BIS Locational Banking Statistics by residence; BIS International Debt Securities Statistics.

External debt flows, AE borrowers

Four-quarter moving average of quarterly growth rates — Graph 3

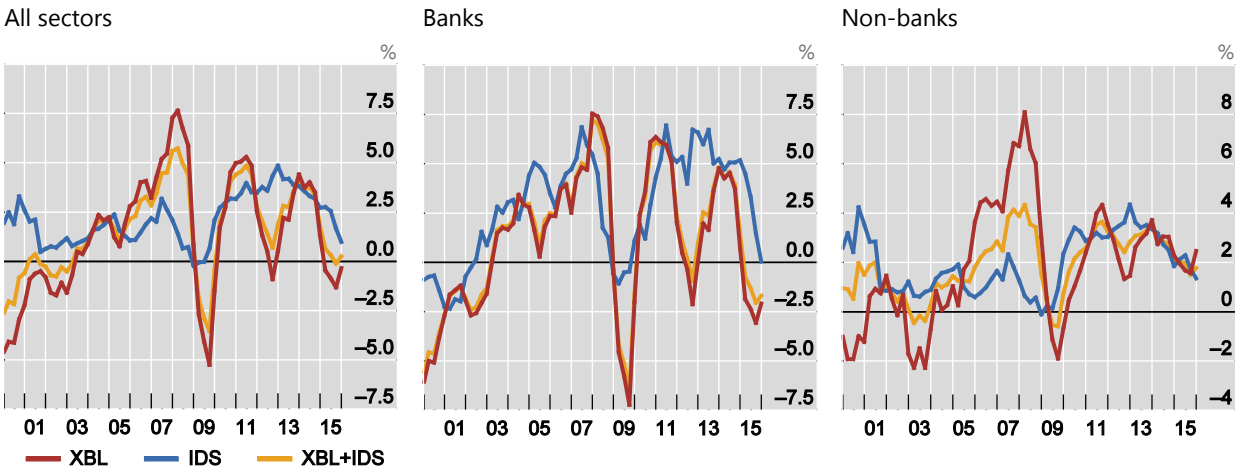


XBL = Cross-border loans: Quarterly Growth Rate$_t$ = Adjusted Flows$_t$ / Outstanding Stock$_{t-1}$; IDS = International Debt Securities: Quarterly Growth Rate$_t$ = Net Issuance$_t$ / Outstanding Stock$_{t-1}$.

Sources: BIS Locational Banking Statistics by residence; BIS International Debt Securities Statistics.

External debt flows, EME borrowers

Four-quarter moving average of quarterly growth rates — Graph 4



XBL = Cross-border loans: Quarterly Growth Rate$_t$ = Adjusted Flows$_t$ / Outstanding Stock$_{t-1}$; IDS = International Debt Securities: Quarterly Growth Rate$_t$ = Net Issuance$_t$ / Outstanding Stock$_{t-1}$.

Sources: BIS Locational Banking Statistics by residence; BIS International Debt Securities Statistics.

Table 4. Correlations, whole sample

Sector	*Region*	XBL, IDS	XBL, VIX	XBL, FF	IDS, VIX	IDS, FF
All	All	0.44***	–0.41***	0.30**	–0.11	–0.01
	AE	0.50***	–0.33**	0.29**	–0.06	–0.03
	EME	0.24*	–0.52***	0.14	–0.45***	0.29**
Banks	All	0.63***	–0.35***	0.30**	–0.34**	0.22
	AE	0.67***	–0.28**	0.28**	–0.30**	0.21
	EME	0.43***	–0.47***	0.15	–0.57***	0.31**
Non-banks	All	0.13	–0.45***	0.21	0.14	–0.19
	AE	0.18	–0.39***	0.21	0.17	–0.22
	EME	0.02	–0.47***	0.05	–0.29**	0.23*

Notes: *** p<0.01, ** p<0.05, * p<0.1. XBL = Cross-border loans: Quarterly Growth Rate$_t$ = Adjusted Flows$_t$ / Outstanding Stock$_{t-1}$; IDS = International Debt Securities: Quarterly Growth Rate$_t$ = Net Issuance$_t$ / Outstanding Stock$_{t-1}$; VIX = log of VIX; FF = ΔEffective federal funds rate for the period 2001:Q1–2008:Q4, ΔWu-Xia Shadow rate for the period 2009:Q1–2013:Q4. Sources: Wu and Xia (2015); Bloomberg; BIS Locational Banking Statistics by residence; BIS International Debt Securities Statistics.

Table 4 reveals that the two main types of international capital flows that we examine tend to be highly correlated not only with each other, but also with the two major global factors (the federal funds rate and the VIX). The correlation between cross-border loans and international debt securities is positive and strongly statistically significant. This is especially true for international credit to bank borrowers. In line with the findings of the empirical literature, international capital flows tend to be highly negative correlated with the VIX. Interestingly, the correlation between international capital flows and the federal funds rate tends to be positive and, in several cases, statistically significant. As we demonstrate in our formal econometric analysis below, this positive relationship disappears once all the relevant control variables are included. Intuitively, both international capital flows and the federal funds

rate tend to be high when global economic growth is high. Once the latter variable is accounted for, the relationship between the former two variables becomes negative.

5. Empirical strategy

Our formal empirical investigation is divided in two parts. In the first part of the analysis, we explore the sensitivities of international flows to global and country-specific drivers. In particular, we look for the presence of a structural break in these sensitivities in the last part of our sample and we elicit pre and post-break differences.

In the second part of the analysis, we include prudential policies into the model. First, we see whether controlling for the policies alters the sensitivities of international flows to global factors. Then we determine whether global factors have a stronger or weaker impact on flows to countries that have applied specific prudential policies.

In the first part of the analysis our baseline model is the following:

$$GrRateY_t^j = \beta_1 \Delta FFR_t + \beta_2 logVIX_t + \beta_3 \Delta logGDP_t^j + \beta_4 \Delta SovRating_t^j + \beta_5 ChinnIto_t^j + \beta_6 \Delta logGlobalGDP_t + \mu^j + \varepsilon_t^j \quad (1)$$

where $j = 1, \dots, 64$ denotes one of 64 advanced and emerging economies and t is a quarter between 2000:Q1 and 2013:Q4. As detailed in the data section, we have broken down cross-border flows by instrument and by type of borrower. Therefore, Y can be cross-border loans - to all sectors, to banks, to non-banks - or international debt securities - issued by all sectors, by banks or by non-banks. As standard in the literature, the model is expressed in stationary variables to avoid problems of spurious correlations. The cross-border flows on the left-hand side of the equation are expressed in growth rates that filter out FX movements and breaks in the series from one quarter to the next.[6] The right-hand-side of the equation contains two global drivers, the Fed funds rate (capturing global funding conditions) and the VIX (representing global volatility), and a set of country-specific and global controls (sovereign rating, Chinn-Ito index and local and global GDP). The Fed funds rate and the sovereign ratings are in first differences, while the local and global GDP are in growth rates. The Chinn-Ito index is in levels and the VIX enters the equation in logs as both series are stationary.[7]

We estimate the model under the plausible assumption that the two global drivers of interest, the Fed funds rate and the VIX, are exogenous when controlling for local and global GDP, government ratings and degree of financial openness. In particular, the inclusion of these variables allows us to control for the risk of the destination country: the destination country GDP growth is a proxy for overall economic performance, while sovereign ratings indicate the healthiness of the country system. The Chinn-Ito index measures a country's degree of capital account openness.

The presence of a possible structural break is typically associated with Lehman's default and the global financial crisis. However, we do not impose a particular date for the break. We

[6] $GrRateY_t^j = AdjFlowY_t^j / Y_{t-1}^j$

[7] The Chinn-Ito index has a yearly frequency and therefore proceeds in steps. We have tested the robustness the results by using a quarterly linear interpolation of Chinn-Ito index and by eliminating the index from the regressions. In both cases the main results of the study are qualitatively similar.

search for an endogenous structural break in the parameters of the model by using the tools developed in Bai (1994, 1997), Kurozumi (2022) and Carrion-i-Silvestre and Sansó (2006). For each quarter T starting in 2007:Q1, we estimate the following equation

$$GrRateY_t^j = \beta' X_t^j + \mu^j + I(t \geq T)(\kappa + \gamma' X_t^j) + \varepsilon_t^j \quad (2)$$

where

$$X_t^j = (\Delta FFR_t, logVIX_t, \Delta logGDP_t^j, \Delta SovRating_t^j, ChinnIto_t^j, \Delta logGlobalGDP_t)'$$

and $I(t \geq T)$ is an indicator function that takes the value 1 when $t \geq T$ and 0 otherwise. Notice that for each candidate break date T, all the parameters of equation (2) are different. For each type of cross border flow Y and each quarter T we can compute the sum of squared residuals of the regression in order to get a sequence $\{SSR_T^Y\}_{T \geq 2007:Q1}$. The most likely candidate for the break is the date that minimizes the sequence, hence maximizing the fit of the model: $T_{break}^Y = argmin_{T \geq 2007:Q1}\{SSR_T^Y\}$.

Once we have detected the endogenous date for the break (T_{break}^Y), we then re-estimate the baseline model with the appropriate break dummy

$$GrRateY_t^j = \beta' X_t^j + \mu^j + I\left(t \geq T_{break}^Y\right)\left(\kappa + \gamma' X_t^j\right) + \varepsilon_t^j \quad (3)$$

and we use a Wald test on κ and γ' to determine whether the break is statistically significant.

β' contains the sensitivities of cross-border flows to the drivers in X_t^j before the break. The sum $\beta' + \gamma'$ contains the post-break sensitivities. To corroborate the results on the presence of a structural shock, we also analyze the time variation of the sensitivities to global drivers using rolling-window regressions of model (1) with a window size of 20 quarters (see Graphs C1 and C2 in the appendix).

In the second part of the analysis, we include prudential policies applied by the destination country into the model. In particular we estimate the following model:

$$GrRateY_t^j = \beta' X_t^j + \mu^j + I\left(t \geq T_{break}^Y\right)\left(\kappa + \gamma' X_t^j\right) + \varphi Pru_t^j + \varepsilon_t^j \quad (4)$$

where Pru_t^j can be one of three prudential policies: loan-to-value ratio caps, capital requirements or reserve requirements. An increase in Pru_t^j indicates a tightening of the policy. Comparing the estimates of model (3) and those of models (4), we can see whether the sensitivities to global factors change in the presence of specific policies, both pre and post-break.

The next step of the analysis is to investigate whether the sensitivities to global factors are stronger in those destination countries that applied prudential policies in the past and whether this interaction effect is different pre and post-break. To do so, we include interactions between the prudential policy Pru_t^j and the global drivers: the Fed funds rate and the VIX. The resulting model is the following:

$$GrRateY_t^j = \beta' X_t^j + \delta' Int_t^j + \mu^j + + I\left(t \geq T_{break}^Y\right)\left(\kappa + \gamma' X_t^j + \eta' Int_t^j\right) + \varphi Pru_t^j + \varepsilon_t^j \quad (5)$$

where $Int_t^j = (\Delta FFR_t * Pru_t^j, logVIX_t * Pru_t^j)'$.

The vector of coefficients δ' contains the effect of the global factors, ΔFFR and $logVIX$, on the growth rate of the global flows Y when a specific prudential policy Pru is applied *before the break*. The sum of the coefficients in the vectors $\delta' + \eta'$ indicates the different effects *after*

the break. The test on the diversity of the effects pre and post break can be derived directly from the statistical significance on the coefficients in the vector η'.

So far, we have indexed observations by time *t* and destination country *j*. The consolidated banking statistics database of the BIS includes data on cross-border loans – to all sectors, to banks, to the public sector and to non-banks (private) – from banks headquartered in country i to recipients in country *j*. Therefore, this dataset allows us to add the lending country dimension to the analysis, while limiting the instrument breakdown to cross-border loans only. We exploit this additional dimension in two ways. First, we include both lending-country and borrowing-country fixed effects into the model. Second, we include prudential variables both on the lender side and on the borrower side. Since the data are now very granular, we control for the effects of outliers on the results by winsorizing the cross-border loans at the 10% level.

The baseline model is the same as model (1), with the inclusion of lending-country fixed effects θ^i:

$$GrRateY_t^{ij} = \beta_1 \Delta FFR_t + \beta_2 logVIX_t + \beta_3 \Delta logGDP_t^j + \beta_4 \Delta SovRating_t^j + \beta_5 ChinnIto_t^j + \beta_6 \Delta logGlobalGDP_t + \theta^i + \mu^j + \varepsilon_t^{ij} \quad (6)$$

$GrRateY_t^{ij}$ no longer filters out FX movements and breaks in the series as these refinements are not available in the BIS consolidated dataset.

We look for an endogenous break date using the SSR procedure. Once we find the break date T_{break}^Y we estimate the following equation:

$$GrRateY_t^{ij} = \beta' X_t^j + \theta^i + \mu^j + I\left(t \geq T_{break}^Y\right)\left(\kappa + \gamma' X_t^j\right) + \varepsilon_t^{ij} \quad (7)$$

where $X_t^j = \left(\Delta FFR_t, logVIX_t, \Delta logGDP_t^j, \Delta SovRating_t^j, ChinnIto_t^j, \Delta logGlobalGDP_t\right)'$. We use a Wald test on κ and γ' to determine whether the break is statistically significant. β contains the pre-break sensitivities, while $\beta + \gamma$ contains the post-break ones.

We repeat the analysis on the relevance of prudential measures by exploiting the lender as well as the borrower dimensions of the data. For each different tool Pru_t, we control for Pru_t in both the lender and the borrower dimensions:

$$GrRateY_t^{ij} = \beta' X_t^j + \theta^i + \mu^j + I\left(t \geq T_{break}^Y\right)\left(\kappa + \gamma' X_t^j\right) + \varphi^i Pru_t^i + \varphi^j Pru_t^j + \varepsilon_t^{ij} \quad (8)$$

Finally, we include interactions between the global factors and the Pru_t , applied to both the lender and the borrower:

$$GrRateY_t^{ij} = \beta' X_t^j + \delta^{i\prime} Int_t^i + \delta^{j\prime} Int_t^j + \theta^i + \mu^j + I\left(t \geq T_{break}^Y\right)\left(\kappa + \gamma' X_t^j + \eta^{i\prime} Int_t^i + \eta^{j\prime} Int_t^j\right) + \varphi^i Pru_t^i + \varphi^j Pru_t^j + \varepsilon_t^{ij} \quad (9)$$

where $Int_t^i = \left(\Delta FFR_t * Pru_t^i, logVIX_t * Pru_t^i\right)'$ and $Int_t^j = (\Delta FFR_t * Pru_t^j, logVIX_t * Pru_t^j)'$.

The sum of the vectors of coefficients δ^i and η^i contains the post-break sensitivity of the cross-border flow Y_t^{ij} to global factors when the prudential policy Pru_t is tightened in the lending country. Similarly, the sum of the coefficients in δ^j and η^j contain the same post-break sensitivities when Pru_t is tightened in the borrowing country.

6. Results

We start our formal empirical investigation by estimating the baseline specification given in equation (1). Table 5 shows the estimated coefficients for the entire sample 2000:Q1 – 2013:Q4. The results are largely in line with those obtained in the existing literature. An increase in global volatility (measured by the VIX) has a negative and strongly statistically significant effect on all types of international capital flows, regardless of the instrument and the sector of the borrower. The US federal funds rate has a sharply negative impact on loans. Its estimated impact on international debt securities is also negative, albeit only marginally statistically significant. Local drivers are also significant drivers. Destination countries with higher GDP growth rates (i.e. with more attractive real rates of return) and with better sovereign credit ratings (i.e. with healthier public finances) attract more cross-border loans. Meanwhile, the degree of financial openness has a positive (and statistically significant) effect on the international debt securities, especially those issued by banks.

Detecting structural breaks

In the next step of our empirical analysis, we formally test whether the above estimated coefficients from equation (1) are stable over time. More concretely, rather than exogenously imposing an ad-hoc break date, we test for its presence and exact timing endogenously. In particular, as explained in Section 5, for each type of cross-border flow *Y*, Graph 5 shows the sequences of sums of square residuals (SSRs) from the estimation of equation (2). The minimum of each SSR series identifies the most likely quarter in which a structural break may have occurred.

Table 5 – Baseline Model

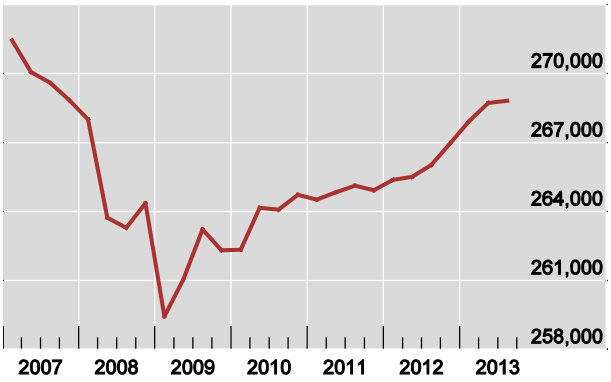
	Dependent variable: ΔCross-border loans †			Dependent variable: ΔInternational debt securities ‡		
Explanatory variables	All	to banks	to non-banks	All	by banks	by non-banks
ΔFed funds rate (1)	-1.876***	-2.074***	-2.108***	-1.348*	-1.336	-1.051
	(0.412)	(0.646)	(0.431)	(0.776)	(1.116)	(0.817)
Log(VIX)	-4.455***	-4.294***	-4.895***	-3.275***	-7.260***	-2.488***
	(0.640)	(1.058)	(0.684)	(0.829)	(2.118)	(0.930)
ΔReal GDP	0.565***	0.597***	0.524***	0.187*	0.246	0.182
	(0.0762)	(0.119)	(0.0757)	(0.102)	(0.285)	(0.136)
ΔSovereign rating (2)	2.491**	4.207***	-0.567	1.459*	-1.830	1.146
	(1.055)	(1.411)	(0.775)	(0.788)	(3.102)	(1.002)
Chinn-Ito index (3)	-0.118	-1.079	1.337	8.705***	13.45***	5.191
	(1.876)	(2.991)	(1.876)	(3.133)	(5.108)	(3.275)
ΔReal global GDP	0.215	0.465*	0.100	-0.317	-0.618	-0.477
	(0.156)	(0.239)	(0.153)	(0.276)	(0.837)	(0.323)
Observations	2,903	2,903	2,903	2,903	2,572	2,902
R-squared	0.124	0.082	0.080	0.060	0.031	0.038

Notes: The sample includes quarterly data on cross-border flows (loans and debt securities) for 64 recipient countries over the period 2000:Q1 - 2013:Q4. The regressions include a full set of country fixed effects. Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1. † to borrowers in country j. ‡ issued by borrowers in country j. (1) Effective federal funds rate for the period 2001:Q1 – 2008:Q4, Wu-Xia Shadow rate for the period 2009:Q1 – 2013:Q4. (2) LT foreign currency, average across 3 agencies. (3) Chinn and Ito (2006) measure of financial openness.

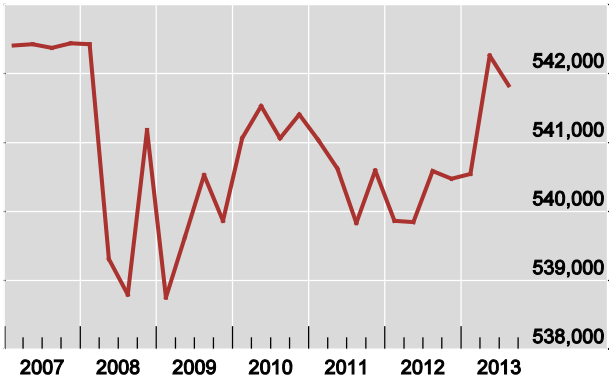
Sum of square residual (SSR) test on structural breaks for all parameters

Baseline model Graph 5

Cross-border loans



International debt securities



Notes: The tests have been performed in the following way. For every date t in the x-axis, we have created a time dummy that takes value 1 if the date is greater than t and 0 elsewhere. Then we have run the regression of cross-border loans and international debt securities on ΔFed fund rates, log(VIX), ΔReal GDP, ΔSovereign Ratings, Chinn-Ito Index, ΔReal Global GDP, the time dummy and the interaction of each explanatory variables with the time dummy. Each panel reports the sequence of sum of squared residuals (SSR) of each of these regressions, obtained by varying the time dummy. When the sequence of SSR's attains its minimum, then the fit of the model is the greatest and this is due to the presence of a specific time dummy. Therefore, the date when the SSR is at its minimum is the most likely candidate for a structural break. For cross-border loans, the break date is 2009:Q1, with F(7,2834) = 21.29 and p-value = 0.0000. For international debt securities, the break date is 2009:Q1, with F(7,2834) = 3.63 and p-value = 0.0007.

The SSR series plotted in Graph 5 suggest the most likely break date for both cross-border loans and international debt securities is 2009:Q1. Nevertheless, as already stressed, this econometric exercise only identifies the most likely dates on which a structural break may have occurred, but does not formally test for the existence of such a break. In order to do that, we conduct Wald (or Chow) tests on the coefficients κ and γ' in equation (3). The F-statistic of the Wald tests, along with the respective p-values are displayed in Graph 5. The break is significant for both types of international capital flows (cross-border loans and international debt securities) that we examine.

Table 6 displays the estimated parameters from the model with structural breaks (3). A large number of the interaction terms between the explanatory variables and the dummy break are statistically significant, indicating a considerable shifts in the estimated sensitivities of international capital flows to global factors. In particular, it appears that the impact of US monetary policy (proxied by the federal funds rate) strengthens during the post-crisis period. By contrast, the sensitivities of international capital flows to global GDP growth and the destination country's degree of openness decline. The estimated impacts of the VIX and of the destination country's sovereign credit ratings weaken for cross-border loans, but strengthen for IDS. Finally, the sensitivity of most types of international financial flows to the borrowing country's GDP growth remains virtually unchanged during the post-crisis period.

In order to formally test whether the post-crisis impact of the respective drivers are statistically significant, we construct a post-crisis impact estimate for each explanatory variable defined as the sum of the coefficient on the respective stand-alone (i.e. pre-crisis) variable and the interaction term of that variables with the crisis dummy. We then test whether the resulting sum is statistically significant.

Table 7 summarizes the estimated sensitivities to the main global drivers (the VIX and the federal funds rate) during the pre-break and the post-break periods, respectively. The results confirm that the relationship between the main global factors and international capital flows has changed profoundly since the Global Financial Crisis.

More concretely, the sensitivity of international capital flows to the federal funds rate has increased sharply during the post-crisis period. This is true across the board – for all instruments and for all borrowing sectors that we examine. For example, the estimated coefficient for cross-border loans to all sectors, which was already negative and highly significant before the crisis, doubles in the post-crisis period (from -3.15 to -6.35). The estimated sensitivity for cross-border lending to non-banks follows a similar pattern, falling sharply from -3.39 in the per-crisis period to -5.19 after the crisis. The increase in sensitivity of cross-border interbank loans is even greater: from -3.36 pre-crisis to -8.36 post-crisis.

The rise in the sensitivity of IDS to the federal funds rate is even more remarkable than that for cross-border loans. The estimated coefficient on IDS (issued by all sectors), which was negative but insignificant before the crisis, becomes negative and highly statistically significant after the crisis. Furthermore, its magnitude rises more than four times (from -1.45 to -6.42). The overall increase in the sensitivity of IDS to the federal funds rate is driven primarily by IDS issued by non-banks, whose estimated coefficient switches from being insignificant during the pre-crisis period to being negative and highly statistically significant after the crisis. Its magnitude increases by more than a factor of six (from -0.94 to -6.37). The absolute value of the estimated coefficient for IDS issued by banks also increases dramatically: from -1.19 before the crisis to -14.67 after the crisis. Nevertheless, it remains insignificant due to the considerable post-crisis rise in the volatility of the series for IDS issued by banks, which increases the standard errors of the estimated coefficients.

What could explain the remarkable post-crisis rise in the impact of US monetary policy on global capital flows? One possible explanation for the negative and highly statistically significant coefficient on the federal fuds rate is related to the fact that a decline in the federal funds rate lowers banks' funding costs. In turn, this makes them more willing to expand their balance sheets through higher lending to both domestic and foreign borrowers (Bruno and Shin, 2015a). Nevertheless, this "funding costs" channel cannot explain the (statistically significant) difference between the estimated pre- and post-crisis coefficients on the federal funds rate.

A more plausible explanation for the increased post-crisis impact of the federal funds rate on international capital flows is related to the risk-taking channel of currency appreciation (Bruno and Shin, 2015b). In the post-crisis period, increased USD borrowing by non-US borrowers caused a sustained rise in the stock of their USD-denominated liabilities, which in turn exacerbated the currency mismatches on their balance sheets (Shin (2013) and Turner (2014)). As a consequence, the net worth of those borrowers has become more sensitive to fluctuations in the value of the US dollar, thus strengthening the impact of the risk-taking channel of FX appreciation. Since a contractionary US monetary policy shock tends to result in an appreciation in the US dollar (see Eichenbaum and Evans (1995) among others), an increase in the federal funds rate would result in an appreciation of the US dollar, which would in turn have a larger impact on the net worth of borrowers with currency mismatches on their balance sheets during the post-crisis period than before the crisis.

The results presented in Table 7 further suggest that the sensitivities of international capital flows to the VIX have also changed considerably since the Global Financial Crisis. Most notably, the negative impact of the VIX on IDS (issued by all sectors), which was insignificant before the crisis, has become statistically significant during the post-crisis period. The evolution of the estimated sensitivity of IDS issued by non-banks to the VIX has followed the same pattern – it is insignificant before the crisis, but negative and significant after the crisis. By contrast, the impact of the VIX on IDS issued by banks goes from negative and significant before the crisis to being insignificant after the crisis.

Table 7 also reveals that the estimated impact of the VIX on cross-border loans has declined during the post-crisis period. The fall appears to be driven primarily by interbank loans, whose sensitivity to the VIX goes from negative and highly statistically significant during the pre-crisis period to being insignificant after the crisis. The estimated magnitude of the negative impact of the VIX on cross-border loans to non-banks also drops after the crisis (from -4.32 to -2.52), but still remains highly statistically significant.

Table 8 provides a slightly different angle. It contains the estimated sensitivities of aggregate international flows, defined as the sum of cross-border loans and international debt securities. The main takeaways are fully consistent with the ones from Table 7. Namely, the sensitivity of aggregate international flows to the federal funds rate has increased sharply during the post-crisis period. By contrast, the post-crisis sensitivity the VIX has declined a bit, but remains highly statistically significant. The fall is driven entirely by international flows to banks, while the impact of the VIX on aggregate flows to non-banks remains relatively stable over time.

In order to further investigate the main drivers of the above changes in sensitivities, we split our main sample in two sub-samples - borrowers from Advanced Economies (AEs) and borrowers Emerging Market Economies (EMEs). The results presented in Table 9 reveal that the sharp increases in the post-crisis sensitivities of international capital flows to the federal funds rate are for both, AE and EME borrowers. That said, the increases in the impact of the federal funds rate are more dramatic in the case of AEs. This is especially true for IDS issued by AE borrowers – their sensitivity to the federal funds rate increases by a factor of four and has switched from being insignificant to being highly significant. The increase in the estimated impact of the VIX on IDS appears to be driven primarily by borrowers in EMEs.

Table 6 - Baseline model with structural breaks

	Dependent variable: ΔCross-border loans †			Dependent variable: ΔInternational debt securities ‡		
Explanatory variables	All	to banks	to non-banks	All	by banks	by non-banks
ΔFed funds rate (1)	-3.151***	-3.360***	-3.392***	-1.451	-1.188	-0.937
	(0.491)	(0.805)	(0.559)	(1.030)	(1.366)	(1.194)
Log(VIX)	-3.906***	-4.362***	-4.322***	-1.090	-5.576**	-0.230
	(0.937)	(1.631)	(1.072)	(1.288)	(2.671)	(1.567)
ΔReal GDP	0.396***	0.423**	0.434***	-0.0684	0.431	0.00359
	(0.102)	(0.175)	(0.109)	(0.132)	(0.354)	(0.191)
ΔSovereign rating (2)	4.029**	6.916***	0.0890	0.880	-1.950	-0.255
	(1.765)	(2.529)	(1.081)	(1.092)	(2.137)	(1.642)
Chinn-Ito index (3)	1.142	0.644	2.082	8.707***	16.63**	5.609
	(1.890)	(3.108)	(1.897)	(3.305)	(6.904)	(3.509)
ΔReal global GDP	1.672***	1.820***	1.438***	0.980	0.338	0.643
	(0.273)	(0.472)	(0.286)	(0.601)	(0.739)	(0.803)
Break dummy (4)	1.916	-3.556	2.678	10.41	3.250	11.54
	(4.847)	(8.180)	(5.098)	(7.724)	(17.44)	(8.530)
ΔFed funds rate*Break	-3.195***	-5.003**	-1.792	-4.969**	-13.48	-5.437**
	(1.237)	(1.956)	(1.179)	(2.420)	(10.82)	(2.536)
Log(VIX)*Break	2.347*	4.143*	1.805	-1.877	2.183	-2.078
	(1.327)	(2.197)	(1.404)	(1.912)	(5.428)	(2.112)
ΔReal GDP*Break	0.179	0.136	0.0549	0.535***	-0.402	0.372*
	(0.134)	(0.219)	(0.142)	(0.171)	(0.717)	(0.211)
ΔSovereign rating*Break	-3.927**	-6.288**	-2.068	0.342	-0.838	1.938
	(1.987)	(2.911)	(1.463)	(1.489)	(6.080)	(1.733)
Chinn-Ito Index*Break	-5.278***	-6.743***	-4.080***	0.299	-8.409	-1.188
	(1.338)	(2.248)	(1.372)	(1.650)	(6.748)	(1.969)
ΔReal global GDP*Break	-2.021***	-1.861***	-1.814***	-1.970***	-1.030	-1.659**
	(0.323)	(0.510)	(0.339)	(0.635)	(1.065)	(0.819)
Observations	2,903	2,903	2,903	2,903	2,572	2,902
R-squared	0.165	0.105	0.105	0.070	0.035	0.044

Notes: The sample includes quarterly data on cross-border flows (loans and debt securities) for 64 recipient countries over the period 2000:Q1 - 2013:Q4. The regressions include a full set of country fixed effects. Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1. † to borrowers in country j. ‡ issued by borrowers in country j. (1) Effective federal funds rate for the period 2001:Q1 – 2008:Q4, Wu-Xia Shadow rate for the period 2009:Q1 – 2013:Q4. (2) LT foreign currency, average across 3 agencies. (3) Chinn and Ito (2006) measure of financial openness. (4) The break dummy equals 1 for every period after (and including) the break date (2009:Q1).

Table 7 - Baseline model with structural breaks

	Dependent variable: ΔCross-border loans †			Dependent variable: ΔInternational debt securities ‡		
Explanatory variables	All	to banks	to non-banks	All	by banks	by non-banks
Pre-break						
Log(VIX)	-3.906***	-4.362***	-4.322***	-1.090	-5.576**	-0.230
	(0.937)	(1.631)	(1.072)	(1.288)	(2.671)	(1.567)
ΔFed funds rate (1)	-3.151***	-3.360***	-3.392***	-1.451	-1.188	-0.937
	(0.491)	(0.805)	(0.559)	(1.030)	(1.366)	(1.194)
Post-break						
Log(VIX)	-1.559*	-0.219	-2.518***	-2.967**	-3.393	-2.307*
	(0.933)	(1.473)	(0.896)	(1.356)	(4.662)	(1.359)
ΔFed funds rate (1)	-6.346***	-8.363***	-5.185***	-6.420***	-14.67	-6.373***
	(1.135)	(1.778)	(1.038)	(2.171)	(10.70)	(2.213)
Observations	2,903	2,903	2,903	2,903	2,572	2,902
R-squared	0.165	0.105	0.105	0.070	0.035	0.044

Notes: The sample includes quarterly data on cross-border flows (loans and debt securities) for 64 recipient countries over the period 2000:Q1 - 2013:Q4. Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1. † to borrowers in country j. ‡ issued by borrowers in country j. (1) Effective federal funds rate for the period 2001:Q1 – 2008:Q4, Wu-Xia Shadow rate for the period 2009:Q1 – 2013:Q4. The regressions include ΔReal GDP, ΔSovereign Ratings, Chinn-Ito Index, ΔReal Global GDP and their interaction with a break dummy that takes value 1 after the break date (2009:Q1). The regressions also include a full set of country fixed effects.

Table 8 – Baseline with structural breaks, aggregate flows

	Dependent variable: ΔTotal cross-border flows (loans and debt securities)		
Explanatory variables	All	to banks	to non-banks
Pre-break			
Log(VIX)	-3.096***	-3.239**	-2.691***
	(0.664)	(1.299)	(0.691)
ΔFed funds rate (1)	-2.073***	-2.748***	-2.101***
	(0.356)	(0.657)	(0.373)
Post-break			
Log(VIX)	-2.240***	-0.839	-2.259***
	(0.700)	(1.336)	(0.653)
ΔFed funds rate (1)	-6.592***	-7.694***	-5.674***
	(0.844)	(1.274)	(0.788)
Observations	2,903	2,572	2,902
R-squared	0.182	0.128	0.121

Notes: The sample includes quarterly data on cross-border flows (loans and debt securities) for 64 recipient countries over the period 2000:Q1 - 2013:Q4. Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1. (1) Effective federal funds rate for the period 2001:Q1 – 2008:Q4, Wu-Xia Shadow rate for the period 2009:Q1 – 2013:Q4. The regressions include ΔReal GDP, ΔSovereign Ratings, Chinn-Ito Index, ΔReal Global GDP and their interaction with a break dummy that takes value 1 after the break date (2009:Q1). The regressions also include a full set of country fixed effects.

To sum up the results reveal that international flows that involve banks either as a borrower or as a lender are less flighty in response to global volatility (i.e. the VIX), but more flighty in response to US monetary policy (i.e. the federal funds rate). International flows that do not

involve banks either as a borrower or as a lender are more flighty with respect to both global volatility and US monetary policy.

Table 9 – Disentangling the effects in advanced and emerging market economies

	Dependent variable: ΔCross-border loans †		Dependent variable: ΔInternational debt securities ‡	
Explanatory variables	Advanced economies	Emerging economies	Advanced economies	Emerging economies
Pre-break				
Log(VIX)	-4.023***	-4.176***	1.051	-3.898***
	(1.231)	(1.425)	(2.124)	(1.278)
ΔFed funds rate (1)	-2.180***	-4.561***	-2.539	-0.647
	(0.662)	(0.731)	(1.881)	(0.732)
Post-break				
Log(VIX)	-1.696	-1.965	-0.626	-4.816***
	(1.288)	(1.296)	(2.212)	(1.563)
ΔFed funds rate (1)	-6.406***	-5.874***	-10.22***	-2.909*
	(1.596)	(1.531)	(3.917)	(1.669)
Observations	1,479	1,424	1,479	1,424
R-squared	0.220	0.157	0.071	0.122

Notes: The sample includes quarterly data on cross-border flows (loans and debt securities) for 64 recipient countries (29 advanced economies and 35 emerging economies) over the period 2000:Q1 - 2013:Q4. Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1. † to borrowers in country j. ‡ issued by borrowers in country j. (1) Effective federal funds rate for the period 2001:Q1 – 2008:Q4, Wu-Xia Shadow rate for the period 2009:Q1 – 2013:Q4. The regressions include ΔReal GDP, ΔSovereign Ratings, Chinn-Ito Index, ΔReal Global GDP and a break dummy that takes value 1 after the break date (2009:Q1). The regressions also include a full set of country fixed effects.

The role of prudential policies

In the next step of the analysis, we study the effect of destination country-specific prudential measures on the sensitivities of cross-border flows to global factors. In theory, global shocks should have a different impact on cross-border financial flows to countries that have applied prudential policies versus countries that have not. As discussed above, we follow the approach of Avdjiev et al (2016) and concentrate on the following prudential measures: loan-to-value ratio caps, capital requirements and reserve requirements. These prudential policies represents around three quarters of all prudential tools used by advanced and emerging market economies in the period under investigation (Altunbas et al 2016).

We define Pru_t^j, the main variable of interest in equation (5), as a variable that takes the value of +1 if the prudential tool has been tightened in a given quarter, -1 if it has been eased and zero if no changes have occurred during that quarter.[8] This definition does not take into account that prudential tools could accumulate its effects. Therefore we have also constructed a dummy that sums the dummy variables Pru_t^j over time (tightenings net of easings) leading to a measure of the quarterly prudential stance (Akinci and Olmstead-Rumsey, 2015).

The results presented in Table 10 reveal that the estimates for the impact of the federal funds rate on international capital flows are robust to controlling for prudential actions in the

[8] The variable for local currency reserve requirements also captures the intensity of the prudential measure on a scale from -3 to +5.

destination country. The sign and the statistical significance of the (pre- and post-crisis) estimated coefficients on the federal funds rate in all cases remain virtually unchanged. Furthermore, save for a few minor exceptions (mainly in the specifications which control for LTV caps), the estimated magnitudes of the respective sensitivities remain relatively stable.

Table 10 – Prudential instruments and structural breaks

		Dependent variable: ΔCross-border loans †			Dependent variable: ΔInternational debt securities ‡		
Explanatory variables		All	to banks	to non-banks	All	by banks	by non-banks
Controlling for LTV							
Pre-break	Log(VIX)	-3.626**	-4.750*	-3.567*	-2.795**	-7.368**	-2.493
		(1.655)	(2.750)	(2.099)	(1.375)	(3.713)	(1.537)
	ΔFed funds rate (1)	-3.148***	-3.024**	-4.005***	0.166	1.810	-1.037
		(0.830)	(1.426)	(1.058)	(0.783)	(1.597)	(0.957)
Post-break	Log(VIX)	-3.196**	-2.338	-3.958***	-4.311***	-4.981**	-3.640***
		(1.423)	(2.102)	(1.206)	(1.114)	(2.265)	(1.210)
	ΔFed funds rate (1)	-5.283***	-6.882**	-4.816***	-4.072**	-0.226	-4.809**
		(1.969)	(3.310)	(1.580)	(1.927)	(2.435)	(2.036)
Observations		1,031	1,031	1,031	1,031	926	1,031
R-squared		0.202	0.133	0.148	0.115	0.117	0.083
Controlling for capital requirements							
Pre-break	Log(VIX)	-4.032***	-4.538***	-4.469***	-0.984	-5.721**	-0.104
		(0.914)	(1.466)	(1.064)	(1.293)	(2.683)	(1.574)
	ΔFed funds rate (1)	-3.130***	-3.163***	-3.378***	-1.444	-1.263	-0.923
		(0.471)	(0.745)	(0.550)	(1.042)	(1.373)	(1.206)
Post-break	Log(VIX)	-1.332	-0.291	-2.461***	-2.298*	-1.382	-1.516
		(0.905)	(1.334)	(0.870)	(1.396)	(4.821)	(1.424)
	ΔFed funds rate (1)	-6.605***	-8.630***	-5.289***	-6.687***	-17.63	-6.653***
		(1.061)	(1.748)	(0.916)	(2.231)	(10.96)	(2.268)
Observations		2,847	2,847	2,847	2,847	2,516	2,847
R-squared		0.181	0.113	0.111	0.056	0.034	0.041
Controlling for reserve requirements							
Pre-break	Log(VIX)	-3.738***	-4.193**	-4.131***	-1.145	-5.477**	-0.316
		(0.942)	(1.639)	(1.070)	(1.204)	(2.700)	(1.495)
	ΔFed funds rate (1)	-3.093***	-3.302***	-3.327***	-1.470	-1.153	-0.966
		(0.494)	(0.810)	(0.559)	(1.078)	(1.372)	(1.238)
Post-break	Log(VIX)	-1.598*	-0.257	-2.562***	-2.954**	-3.420	-2.287*
		(0.932)	(1.471)	(0.899)	(1.355)	(4.652)	(1.359)
	ΔFed funds rate (1)	-6.214***	-8.231***	-5.035***	-6.463***	-14.58	-6.441***
		(1.151)	(1.798)	(1.045)	(2.173)	(10.68)	(2.217)
Observations		2,903	2,903	2,903	2,903	2,572	2,902
R-squared		0.167	0.106	0.106	0.070	0.035	0.045

Notes: The sample includes quarterly data on cross-border flows (loans and debt securities) for 64 recipient countries over the period 2000:Q1 - 2013:Q4. Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1. † to borrowers in country j. ‡ issued by borrowers in country j. (1) Effective federal funds rate for the period 2001:Q1 – 2008:Q4, Wu-Xia Shadow rate for the period 2009:Q1 – 2013:Q4. The regressions include ΔReal GDP, ΔSovereign Ratings, Chinn-Ito Index, ΔReal Global GDP and their interaction with a break dummy that takes value 1 after the break date (2009:Q1). The regressions also include a full set of country fixed effects and loan to value ratio caps (top panel), capital requirements (middle panel) and reserve requirements (bottom panel).

Controlling for LTV caps in the destination country has a considerable impact on the estimated sensitivities of international capital flows to the VIX. More concretely, once the LTV variable is included in the specification, the estimated post-crisis impact of the VIX becomes more negative and more significant. The magnitude of the estimated post-crisis impact of the VIX doubles from (-1.6 to -3.2) for cross-border loans and rises by nearly 50% (-3.0 to -4.3) for IDS. Furthermore, the estimated pre-crisis sensitivity of IDS to the VIX also rises considerably (-1.1 to -2.8) relative to the benchmark case. In contrast to LTV caps, controlling for the other two types of destination-country prudential actions (capital requirements and reserve requirements) does not affect the estimated sensitivities relative to the benchmark case.

In the next step of our empirical investigation, we move from the models in which we control for prudential policy actions with impulse variables (Table 10) to the models in which we control for prudential policy actions with the cumulative measures (Table 11). We find that save for a few exceptions, the main results tend to be qualitatively similar. In the case of LTV ratio caps (Table 11, top panel) and local currency reserve requirements (Table 11, bottom panel), there are no significant changes relative to the cases in which the respective impulse dummies are used. Conversely, when we control for capital requirements (Table 11, middle panel), the estimated sensitivity to the VIX in the post-crisis period is considerably higher than in the case in which the non-cumulative index is included. This is the case for both, cross-border loans (-2.9 with the cumulative prudential variable versus -1.3 with the impulse prudential variable) and international debt securities (-5.1 with the cumulative prudential variable versus -2.3 with the impulse prudential variable).

The results from Tables 10 and 11 could be interpreted as evidence that the inclusion of prudential tools explains partially, but not fully, the observed change in the sensitivity of international capital flows to global factors. Even though using a standard equation (4) - based on the drivers that are typically used in the literature - we find that the post-crisis sensitivities to the VIX have declined considerably for cross border loans, we find that including certain prudential controls (e.g. LTV caps) brings the sensitivities to the VIX closer (but not all the way) to the pre-crisis levels. One possible interpretation of that set of results is that the post-crisis decline in the sensitivities of cross border loans to the VIX could be partially (albeit not fully explained) by the prudential policy actions.

What explains the different responses of the estimated sensitivities to the inclusion of the various prudential controls? The most likely explanation is related to the different nature of each of the corresponding prudential policies. Whereas loan-to-value ratio caps apply to borrowers (thus affecting credit demand) in the host country, capital requirements and reserve requirements apply to lenders (thus affecting credit supply) in the host country. Therefore, the fact that the inclusion of prudential controls affects the sensitivity of cross-border flows to the global factors could indicate that the prudential controls pick up previously unmeasured shifts in loan demand (in the case of loan-to-value ratio caps) and loan supply (in the case of capital requirements and reserve requirements) in the host market.

Table 11 – Cumulative prudential instruments and structural breaks

		Dependent variable: ΔCross-border loans †			Dependent variable: ΔInternational debt securities ‡		
Explanatory variables		All	to banks	to non-banks	All	by banks	by non-banks
Controlling for cumulative LTV							
Pre-break	Log(VIX)	-3.819**	-4.996*	-3.790*	-2.952**	-7.619**	-2.622*
		(1.666)	(2.771)	(2.109)	(1.378)	(3.750)	(1.520)
	ΔFed funds rate (1)	-3.178***	-3.066**	-4.047***	0.131	1.738	-1.057
		(0.836)	(1.431)	(1.063)	(0.787)	(1.598)	(0.958)
Post-break	Log(VIX)	-2.730*	-1.763	-3.459***	-3.992***	-4.597**	-3.324***
		(1.427)	(2.110)	(1.213)	(1.143)	(2.316)	(1.259)
	ΔFed funds rate (1)	-5.439***	-7.082**	-4.997***	-4.200**	-0.455	-4.914**
		(1.948)	(3.292)	(1.551)	(1.913)	(2.424)	(2.029)
Observations		1,031	1,031	1,031	1,031	926	1,031
R-squared		0.204	0.135	0.151	0.118	0.118	0.084
Controlling for cumulative capital requirements							
Pre-break	Log(VIX)	-4.037***	-4.544***	-4.476***	-0.996	-5.719**	-0.119
		(0.914)	(1.467)	(1.064)	(1.292)	(2.684)	(1.573)
	ΔFed funds rate (1)	-3.133***	-3.166***	-3.380***	-1.449	-1.263	-0.929
		(0.471)	(0.745)	(0.550)	(1.042)	(1.373)	(1.206)
Post-break	Log(VIX)	-2.887**	-2.364	-3.575***	-5.143***	-2.893	-4.634**
		(1.184)	(1.786)	(1.189)	(1.989)	(4.694)	(2.045)
	ΔFed funds rate (1)	-6.009***	-7.765***	-5.005***	-5.675***	-17.06	-5.624***
		(1.079)	(1.768)	(0.941)	(2.104)	(10.74)	(2.145)
Observations		2,847	2,847	2,847	2,847	2,516	2,847
R-squared		0.181	0.112	0.111	0.057	0.034	0.042
Controlling for cumulative reserve requirements							
Pre-break	Log(VIX)	-4.000***	-4.440***	-4.429***	-0.988	-5.683**	-0.231
		(0.939)	(1.632)	(1.076)	(1.310)	(2.679)	(1.583)
	ΔFed funds rate (1)	-3.096***	-3.315***	-3.331***	-1.510	-1.123	-0.936
		(0.492)	(0.807)	(0.559)	(1.041)	(1.363)	(1.200)
Post-break	Log(VIX)	-1.631*	-0.279	-2.600***	-2.889**	-3.410	-2.309*
		(0.927)	(1.471)	(0.889)	(1.367)	(4.661)	(1.356)
	ΔFed funds rate (1)	-6.291***	-8.317***	-5.122***	-6.479***	-14.62	-6.372***
		(1.132)	(1.777)	(1.038)	(2.170)	(10.68)	(2.210)
Observations		2,903	2,903	2,903	2,903	2,572	2,902
R-squared		0.167	0.106	0.107	0.071	0.035	0.044

Notes: The sample includes quarterly data on cross-border flows (loans and debt securities) for 64 recipient countries over the period 2000:Q1 - 2013:Q4. Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1. † to borrowers in country j. ‡ issued by borrowers in country j. (1) Effective federal funds rate for the period 2001:Q1 – 2008:Q4, Wu-Xia Shadow rate for the period 2009:Q1 – 2013:Q4. The regressions include ΔReal GDP, ΔSovereign Ratings, Chinn-Ito Index, ΔReal Global GDP and their interaction with a break dummy that takes value 1 after the break date (2009:Q1). The regressions also include a full set of country fixed effects and *cumulative* loan to value ratio caps (top panel), *cumulative* capital requirements (middle panel) and *cumulative* reserve requirements (bottom panel). The cumulative prudential index is obtained in each quarter by adding the non-cumulative prudential index up to that quarter.

More generally, the fact that that pre- and post-break estimated parameters change when a prudential policy is included in the regression suggests that there is a correlation between the sensitivities to global factors and the policy itself. It is therefore interesting to answer the

following question: how are the sensitivities of international financial flows to a given country impacted by various types of prudential actions applied in that country?

In order to answer the above question, we estimate model (5), which includes interactions between the global factors and the prudential measures. The results are presented in Tables B1-B3 (available in Annex B), which summarize the pre- and the post-break estimated coefficients on the global drivers and on their interaction with the respective prudential variables. Tables B4-B6 display the corresponding results when the cumulative prudential variables are used instead of the impulse prudential variables.

The most interesting results concern the effects of a tightening of capital requirements in the destination country (Table B2). Increasing capital requirement levels reverses the negative post-break effect of a hike in the federal funds rate on both cross-border loans and international debt securities. That is, in response to a tightening of US monetary policy in the post-crisis world, international capital flows into countries that tighten capital requirements and out of countries that do not. The effect is particularly strong for cross-border loans to banks. The CBS results reveal a tightening of capital requirements for lenders also reverses the negative post-break effect of a hike in the federal funds rate on international bank lending.

Faced with a tightening of US monetary policy, internationally-active lenders would be more likely to cut cross-border credit to banks with lower capital requirements (who would, all else the same, be perceived as riskier) than to banks with higher capital requirements (who would, all else the same, be perceived as safer). Since a safer banking system is, all else the same, associated with a healthier economy, non-banks residing in a country with less risky banks would also be considered more creditworthy.

The results for local currency reserve requirements are presented in Table B3. They suggest that higher local currency reserve requirement levels increase the negative effect of a spike in the VIX (global volatility) on cross-border loans to non-banks. The most likely explanation for this finding is associated with the fact that higher local currency reserve requirements in a given economy are typically associated with a tightening of financial conditions in that economy. In turn, this has a negative impact on economic growth, thus making defaults by non-banks more likely. As a consequence, during periods of elevated global risks, foreign (bank and non-bank) creditors would be more likely to cut lending to non-banks in a recipient country in which reserve requirements have just been raised.

Controlling for heterogeneity among lending banking systems

In our empirical analysis up to this point, we have controlled for heterogeneity among borrowing countries. Nevertheless, we have not controlled for heterogeneity among lending banking systems. This is mainly due to data constraints – both the BIS LBS data and the BIS IDS do not contain information on the nationality of the lender, which could be used as a proxy for the relevant decision-making unit on the lending side (just as the country of the borrower is used as a proxy for the relevant decision-making unit on the borrowing side). That is why in the next step of our empirical investigation, we turn to the BIS Consolidated Banking Statistics (CBS), which contain information about both, the residence of the borrower as well as the nationality of the lending bank.

More specifically, we re-estimate all specifications from the previous section using the CBS data. This allows us to explicitly control not only for heterogeneity among borrowers (as we

did in the specifications based on cross-border loans and IDS), but also for heterogeneity among lenders.

Overall the results are roughly in line with the ones we obtained using the Locational Banking Statistics (LBS). Table 12 reveals that, in the CBS specifications (just as in the LBS specifications), the federal funds rate and the VIX are both negative and highly statistically significant in the full-sample estimation (i.e. in the estimation which does not allow for the existence of a structural break). Furthermore, the structural break test we conduct using the CBS data identifies the exact same break date (2009:Q1) as the structural break test based on the LBS data.

Table 12 – CBS baseline Model

	Dependent variable: ΔInternational claims			
Explanatory variables	All	to banks	to the public sector	to non-banks (private)
ΔFed funds rate (1)	-0.414**	0.00252	0.0385	-0.986***
	(0.182)	(0.341)	(0.359)	(0.176)
Log(VIX)	-4.515***	-5.943***	-4.858***	-4.380***
	(0.290)	(0.560)	(0.586)	(0.278)
ΔReal GDP	0.367***	0.526***	0.254***	0.288***
	(0.0301)	(0.0598)	(0.0609)	(0.0289)
ΔSovereign rating (2)	2.192***	4.210***	3.108***	0.900***
	(0.286)	(0.595)	(0.573)	(0.282)
Chinn-Ito index (3)	1.659**	2.639*	-1.863	1.214*
	(0.650)	(1.355)	(1.398)	(0.644)
ΔReal global GDP	-0.168***	-0.266**	-0.675***	-0.0280
	(0.0616)	(0.120)	(0.125)	(0.0580)
Observations	68,258	59,970	42,157	63,298
R-squared	0.018	0.012	0.012	0.018

Notes: The sample includes quarterly data on International claims (all, to private banks, to public banks, to non-banks) from lending banks in 30 countries to recipients in 64 countries over the period 2000:Q1 - 2013:Q4. Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1. (1) Effective federal funds rate for the period 2001:Q1 – 2008:Q4, Wu-Xia Shadow rate for the period 2009:Q1 – 2013:Q4. (2) LT foreign currency, average across 3 agencies. (3) Chinn and Ito (2006) measure of financial openness. The regression includes lending country and borrowing country fixed effects.

In the CBS specifications (just as in the LBS specifications), the negative impact of the federal funds rate increases considerably in the post-crisis period. This is true not only in the benchmark estimation (Table 13), but also in the estimations which include the various macroprudential controls (Tables 15 and 16). Both, AE and EME borrowers saw a sharp rise in the sensitivities of international capital flows to the federal funds rate after the crisis (Table 14).

Table 13 – CBS baseline model with structural breaks

	Dependent variable: ΔInternational claims			
Explanatory variables	All	to banks	to the public sector	to non-banks (private)
Pre-break				
Log(VIX)	-2.921***	-4.986***	-1.295	-2.955***
	(0.433)	(0.819)	(0.853)	(0.430)
ΔFed funds rate (1)	-0.872***	-0.305	0.865*	-1.820***
	(0.225)	(0.424)	(0.444)	(0.222)
Post-break				
Log(VIX)	-2.926***	-3.565***	-4.774***	-2.671***
	(0.422)	(0.841)	(0.881)	(0.391)
ΔFed funds rate (1)	-4.802***	-5.721***	-8.505***	-4.346***
	(0.524)	(1.025)	(1.086)	(0.480)
Observations	68,258	59,970	42,157	63,298
R-squared	0.025	0.015	0.015	0.026

Notes: The sample includes quarterly data on international claims (all, to private banks, to public banks, to non-banks) from lending banks in 30 countries to recipients in 64 countries over the period 2000:Q1 - 2013:Q4. Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1. (1) Effective federal funds rate for the period 2001:Q1 – 2008:Q4, Wu-Xia Shadow rate for the period 2009:Q1 – 2013:Q4. The regressions include ΔReal GDP, ΔSovereign Ratings, Chinn-Ito Index, ΔReal Global GDP and their interaction with a break dummy that takes value 1 after the break date (2009:Q1). The regressions also include a full set of borrowing country and lending country fixed effects.

Table 14 – Disentangling the effects in advanced and emerging market economies

	Dependent variable: ΔInternational claims	
Explanatory variables	Advanced economies	Emerging economies
Pre-break		
Log(VIX)	-2.524***	-3.530***
	(0.612)	(0.609)
ΔFed funds rate (1)	-0.128	-1.867***
	(0.321)	(0.317)
Post-break		
Log(VIX)	-3.688***	-2.250***
	(0.606)	(0.593)
ΔFed funds rate (1)	-5.191***	-4.269***
	(0.756)	(0.718)
Observations	35,952	32,306
R-squared	0.025	0.031

Notes: The sample includes quarterly data on international claims (all) from lending banks in 30 countries to recipients in 64 countries over the period 2000:Q1 - 2013:Q4. Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1. (1) Effective federal funds rate for the period 2001:Q1 – 2008:Q4, Wu-Xia Shadow rate for the period 2009:Q1 – 2013:Q4. The regressions include ΔReal GDP, ΔSovereign Ratings, Chinn-Ito Index, ΔReal Global GDP and a break dummy that takes value 1 after the break date (2009:Q1). The regressions also include a full set of borrowing country and lending country fixed effects.

Table 15 – CBS, prudential instruments and structural breaks

		Dependent variable: ΔInternational claims			
Explanatory variables		All	to banks	to the public sector	to non-banks (private)
Controlling for LTV					
Pre-break	Log(VIX)	-4.071**	-5.216	-3.787	-4.929***
		(1.794)	(3.304)	(3.166)	(1.793)
	ΔFed funds rate (1)	-1.551*	-1.358	-1.298	-2.728***
		(0.910)	(1.694)	(1.648)	(0.896)
Post-break	Log(VIX)	-3.789***	-5.814***	-6.114**	-3.387***
		(0.943)	(1.892)	(2.373)	(0.873)
	ΔFed funds rate (1)	-4.594***	-9.198***	-13.10***	-3.164***
		(1.286)	(2.575)	(3.063)	(1.158)
Observations		9,509	7,949	4,466	8,664
R-squared		0.029	0.025	0.023	0.028
Controlling for capital requirements					
Pre-break	Log(VIX)	-2.913***	-5.042***	-1.299	-2.951***
		(0.433)	(0.819)	(0.855)	(0.431)
	ΔFed funds rate (1)	-0.870***	-0.267	0.868*	-1.837***
		(0.226)	(0.424)	(0.446)	(0.222)
Post-break	Log(VIX)	-2.902***	-3.367***	-4.666***	-2.521***
		(0.439)	(0.872)	(0.904)	(0.405)
	ΔFed funds rate (1)	-4.767***	-5.726***	-8.668***	-4.547***
		(0.539)	(1.049)	(1.113)	(0.494)
Observations		67,023	59,259	41,593	62,129
R-squared		0.025	0.015	0.015	0.026
Controlling for reserve requirements					
Pre-break	Log(VIX)	-3.047***	-5.060***	-1.340	-3.207***
		(0.438)	(0.832)	(0.864)	(0.435)
	ΔFed funds rate (1)	-0.962***	-0.380	0.834*	-1.971***
		(0.229)	(0.431)	(0.452)	(0.225)
Post-break	Log(VIX)	-2.870***	-3.532***	-4.750***	-2.568***
		(0.423)	(0.842)	(0.883)	(0.391)
	ΔFed funds rate (1)	-4.897***	-5.755***	-8.527***	-4.539***
		(0.526)	(1.030)	(1.092)	(0.482)
Observations		68,258	59,970	42,157	63,298
R-squared		0.025	0.015	0.015	0.026

Notes: The sample includes quarterly data on international claims (all) from lending banks in 30 countries to recipients in 64 countries over the period 2000:Q1 - 2013:Q4. Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1. (1) Effective federal funds rate for the period 2001:Q1 – 2008:Q4, Wu-Xia Shadow rate for the period 2009:Q1 – 2013:Q4. The regressions include ΔReal GDP, ΔSovereign Ratings, Chinn-Ito Index, ΔReal Global GDP and a break dummy that takes value 1 after the break date (2009:Q1). The regressions also include a full set of borrowing country fixed effects, lending country fixed effects and loan to value ratio caps (top panel), capital requirements (middle panel) and reserve requirements (bottom panel).

Table 16 – CBS, cumulative prudential instruments and structural breaks

		Dependent variable: ΔInternational claims			
Explanatory variables		All	to banks	to the public sector	to non-banks (private)
Controlling for cumulative LTV					
Pre-break	Log(VIX)	-4.165**	-5.328	-3.856	-5.049***
		(1.797)	(3.311)	(3.163)	(1.793)
	ΔFed funds rate (1)	-1.517*	-1.210	-1.469	-2.770***
		(0.910)	(1.695)	(1.646)	(0.894)
Post-break	Log(VIX)	-3.095***	-4.750**	-5.333**	-2.911***
		(0.972)	(1.973)	(2.427)	(0.903)
	ΔFed funds rate (1)	-4.441***	-8.965***	-13.05***	-3.203***
		(1.283)	(2.572)	(3.067)	(1.157)
Observation		9,509	7,949	4,466	8,664
R-squared		0.029	0.025	0.023	0.028
Controlling for cumulative capital requirements					
Pre-break	Log(VIX)	-2.921***	-5.044***	-1.296	-2.955***
		(0.433)	(0.819)	(0.855)	(0.431)
	ΔFed funds rate (1)	-0.871***	-0.268	0.878**	-1.841***
		(0.226)	(0.424)	(0.446)	(0.222)
Post-break	Log(VIX)	-7.103***	-5.404***	-12.42***	-6.234***
		(0.661)	(1.319)	(1.342)	(0.613)
	ΔFed funds rate (1)	-3.616***	-4.995***	-6.426***	-3.394***
		(0.549)	(1.072)	(1.134)	(0.504)
Observation		67,023	59,259	41,593	62,129
R-squared		0.026	0.015	0.016	0.027
Controlling for cumulative reserve requirements					
Pre-break	Log(VIX)	-2.980***	-5.007***	-1.381	-2.994***
		(0.433)	(0.819)	(0.853)	(0.430)
	ΔFed funds rate (1)	-0.829***	-0.287	0.936**	-1.794***
		(0.226)	(0.424)	(0.444)	(0.222)
Post-break	Log(VIX)	-3.257***	-3.904***	-5.831***	-2.806***
		(0.435)	(0.862)	(0.932)	(0.405)
	ΔFed funds rate (1)	-4.689***	-5.604***	-8.067***	-4.297***
		(0.525)	(1.027)	(1.094)	(0.481)
Observation		68,258	59,970	42,157	63,298
R-squared		0.025	0.015	0.015	0.026

Notes: The sample includes quarterly data on international claims (all) from lending banks in 30 countries to recipients in 64 countries over the period 2000:Q1 - 2013:Q4. Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1. (1) Effective federal funds rate for the period 2001:Q1 – 2008:Q4, Wu-Xia Shadow rate for the period 2009:Q1 – 2013:Q4. The regressions include ΔReal GDP, ΔSovereign Ratings, Chinn-Ito Index, ΔReal Global GDP and a break dummy that takes value 1 after the break date (2009:Q1). The regressions also include a full set of borrowing country fixed effects, lending country fixed effects and *cumulative* loan to value ratio caps (top panel), *cumulative* capital requirements (middle panel) and *cumulative* reserve requirements (bottom panel). The cumulative prudential index is obtained in each quarter by adding the non-cumulative prudential index up to that quarter.

In both, the CBS and the LBS specifications, increasing capital requirement levels (in the destination country) reverses the negative post-break effect of a hike in the federal funds rate on cross-border bank lending (Tables B2 and B8). Similarly, higher reserve requirement levels

(in the destination country) increase the negative effect of a spike in the VIX on cross-border lending to non-banks in both cases (Tables B3 and B9).

The above results obtained using the CBS data demonstrate that our main findings about the global drivers of international capital flows are robust to controlling for variation across lenders as well as borrowers.

Despite all the above similarities between the LBS and the CBS estimates, there are also several important differences between the two sets of results. Most importantly, the post-break coefficient on the VIX in the CBS estimates, is virtually equal to its pre-break counterpart. This is in sharp contrast to the LBS estimates, in which the pre-break impact of the VIX is considerably larger than its post-break impact.

The differences between the results obtained using the CBS data (which contain information on both the borrower country and the lending bank nationality dimensions) and the LBS data (which contain information only on the borrower country dimension) highlight the importance of taking advantage of both (lender and borrower) dimensions. For instance, the most likely explanation for the fact that the post-crisis sensitivity of cross-border loans to the VIX changes considerably between the LBS and the CBS estimations is that the latter controls for heterogeneity among lending banking systems. It is entirely possible that different national baking systems have business models which differ with respect to their sensitivity to undiversifiable global risk (proxied by the VIX in our econometric specifications). As a consequence, controlling for heterogeneity among lending national banking systems increases the post-crisis sensitivity of the VIX relative to the respective LBS estimates, which ignore the lender dimension.

An additional advantage of using the CBS bilateral lending data is that they provide insights into the interactions between global factors and prudential actions taken in the jurisdiction of the lending bank (Tables B7-B12). For example, the results in Table B8 indicate that tightening capital requirement in the home country of the lending bank more than offsets the negative post-crisis impact of an increase in the federal funds rate on cross-border bank lending. The most likely explanation for this result is related to the fact that, else the same, better capitalized banks are less likely to cut lending during stress periods (Gambacorta and Shin, 2016).

7. Conclusions

We provide empirical evidence on the importance of global factors for cross-border loans and international debt securities. Using the BIS international banking and international debt securities statistics for a large panel of countries over fourteen years, we show that the aftermath of the global financial crisis has been characterized by a shift in the composition of international capital flows from bank lending toward direct market financing. We also demonstrate that the sensitivity of all major types of international financial flows to US monetary policy has increased dramatically since the Global Financial Crisis. The impact of global risk conditions has increased significantly for international bonds flows and has declined for cross-border loan flows, but remains qualitatively important. Some of the latter shifts in

the estimated sensitivities may be related to prudential policy actions and compositional shifts across and within lending sectors.

We find evidence for the presence of structural breaks in the sensitivity of cross-border bank loans and international debt securities to global factors around Lehman's default. Structural breaks are detected for all main drivers, but are particularly strong for global factors such as the VIX and the federal funds rate. Post-crisis, all types of global flows we examine became substantially more flighty with respect to US monetary policy. Furthermore, the sensitivity of IDS flows to global risk conditions also heightened considerably.

We also find that the pattern of policy instrument changes across countries and over time explains some, though not all, of the time variation in the sensitivities of cross-border flows to global drivers. In particular, we demonstrate that including certain prudential controls (most notably, LTV caps) brings the sensitivities to the VIX closer (but not all the way) to the pre-crisis levels.

Finally, we show that our main findings about the global drivers of international capital flows are robust to controlling for variation across lenders as well as borrowers. Furthermore, we demonstrate that controlling for heterogeneity among lending banking systems goes a long way towards explaining some of the post-crisis shifts in the sensitivities of capital flows to global drivers.

Overall, we confirm that global risk and economic conditions are demonstrably important, but capital flow sensitivities have not been stable over time. We find distinct breaks in sensitivities suggestive of evolution of the business models of these investor types over time, and in particular in relation to regulatory reforms. While cross-border financing through banks appears to be less responsive to risk conditions, total financing through banks and nonbanks and inclusive of debt securities still retains significant sensitivity. Indeed, sensitivity to US monetary policy is stronger in the post-crisis period across both loan and bond flows.

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Annex A: Country lists

Destination countries (64)

Argentina, Australia, Austria, Belgium, Brazil, Bulgaria, Canada, Chile, China, Colombia, Croatia, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hong Kong, Hungary, Iceland, India, Indonesia, Ireland, Israel, Italy, Japan, Korea, Kuwait, Latvia, Lebanon, Lithuania, Luxembourg, Malaysia, Malta, Mexico, Mongolia, Netherlands, New Zealand, Nigeria, Norway, Peru, Philippines, Poland, Portugal, Romania, Russia, Saudi Arabia, Serbia, Singapore, Slovakia, Slovenia, South Africa, Spain, Sweden, Switzerland, Taiwan, Thailand, Turkey, Ukraine, United Kingdom, United States, Uruguay, Vietnam.

Lending bank nationalities (31)

Australia, Austria, Belgium, Brazil, Canada, Chile, Denmark, Finland, France, Germany, Greece, Hong Kong, India, Ireland, Italy, Japan, Korea, Luxembourg, Mexico, Netherlands, Norway, Panama, Portugal, Singapore, Spain, Sweden, Switzerland, Taiwan, Turkey, United Kingdom, United States.

Annex B: Interactions between the global factors and the prudential variables

Table B1 – LTV with structural breaks and interactions with global factors

	Dependent variable: ΔCross-border loans †			Dependent variable: ΔInternational debt securities ‡		
Explanatory variables	All	to banks	to non-banks	All	by banks	by non-banks
Pre-break						
Log(VIX)	-3.685**	-4.817*	-3.591*	-2.809**	-7.382**	-2.498
	(1.661)	(2.757)	(2.100)	(1.375)	(3.720)	(1.540)
Log(VIX) * LTV (2)	1.377	1.618	-2.814	-1.553	3.386	-2.276
	(3.072)	(3.851)	(4.351)	(1.975)	(3.516)	(2.280)
ΔFed funds rate (1)	-3.152***	-3.025**	-4.015***	0.166	1.798	-1.039
	(0.833)	(1.429)	(1.059)	(0.785)	(1.600)	(0.958)
ΔFed funds rate * LTV (2)	-4.366	-5.194	-5.095	-3.529*	1.755	-3.216
	(3.092)	(3.742)	(3.367)	(1.910)	(3.215)	(2.450)
Post-break						
Log(VIX)	-3.236**	-2.374	-3.816***	-4.227***	-4.987**	-3.515***
	(1.424)	(2.116)	(1.201)	(1.118)	(2.320)	(1.211)
Log(VIX) * LTV (2)	1.630	2.071	-2.501	-1.088	2.917	-1.878
	(2.882)	(3.727)	(3.857)	(1.760)	(3.402)	(2.007)
ΔFed funds rate (1)	-5.231***	-6.794**	-4.839***	-4.046**	-0.0809	-4.796**
	(1.982)	(3.323)	(1.594)	(1.933)	(2.461)	(2.044)
ΔFed funds rate * LTV (2)	1.748	4.379	2.450	4.466	6.123	4.730
	(3.717)	(5.504)	(3.568)	(3.415)	(8.329)	(3.308)
Observations	1,031	1,031	1,031	1,031	926	1,031
R-squared	0.206	0.136	0.150	0.117	0.118	0.084

Notes: The sample includes quarterly data on cross-border flows (loans and debt securities) for 64 recipient countries over the period 2000:Q1 - 2013:Q4. Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1. † to borrowers in country j. ‡ issued by borrowers in country j. (1) Effective federal funds rate for the period 2001:Q1 – 2008:Q4, Wu-Xia Shadow rate for the period 2009:Q1 – 2013:Q4. (2) Loan-to-value ratio cap. The regressions include ΔReal GDP, ΔSovereign Ratings, Chinn-Ito Index, ΔReal Global GDP and their interaction with a break dummy that takes value 1 after the break date. The regressions also include a full set of country fixed effects and the following prudential index: loan to value ratio caps.

Table B2 – Capital requirements with structural breaks and interactions with global factors

	Dependent variable: ΔCross-border loans †			Dependent variable: ΔInternational debt securities ‡		
Explanatory variables	All	to banks	to non-banks	All	by banks	by non-banks
Pre-break						
Log(VIX)	-4.026***	-4.528***	-4.465***	-0.974	-5.716**	-0.0971
	(0.914)	(1.467)	(1.065)	(1.294)	(2.685)	(1.575)
Log(VIX) * CapReq (2)	-6.843*	-4.427	-7.290	0.124	2.962	0.469
	(3.760)	(4.901)	(4.504)	(3.821)	(16.23)	(3.484)
ΔFed funds rate (1)	-3.129***	-3.158***	-3.379***	-1.447	-1.281	-0.925
	(0.471)	(0.745)	(0.551)	(1.043)	(1.374)	(1.207)
ΔFed funds rate * CapReq (2)	-	-	-	-	-	-
Post-break						
Log(VIX)	-1.017	-0.0327	-2.164**	-2.376*	-1.820	-1.589
	(0.921)	(1.367)	(0.886)	(1.442)	(5.070)	(1.472)
Log(VIX) * CapReq (2)	-6.829	-4.402	-6.796	4.100	11.45	3.377
	(4.172)	(5.533)	(5.041)	(4.514)	(19.05)	(4.167)
ΔFed funds rate (1)	-6.966***	-9.196***	-5.523***	-6.968***	-17.37	-6.848***
	(1.069)	(1.760)	(0.924)	(2.269)	(11.11)	(2.306)
ΔFed funds rate * CapReq (2)	20.70***	36.07***	11.84	19.31**	-13.88	13.67*
	(6.146)	(11.85)	(7.872)	(8.242)	(27.87)	(8.273)
Observations	2,847	2,847	2,847	2,847	2,516	2,847
R-squared	0.183	0.114	0.112	0.057	0.034	0.041

Notes: The sample includes quarterly data on cross-border flows (loans and debt securities) for 64 recipient countries over the period 2000:Q1 - 2013:Q4. Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1. † to borrowers in country j. ‡ issued by borrowers in country j. (1) Effective federal funds rate for the period 2001:Q1 – 2008:Q4, Wu-Xia Shadow rate for the period 2009:Q1 – 2013:Q4. (2) Capital requirements. The regressions include ΔReal GDP, ΔSovereign Ratings, Chinn-Ito Index, ΔReal Global GDP and their interaction with a break dummy that takes value 1 after the break date. The regressions also include a full set of country fixed effects and the following prudential index: capital requirements. The pre-crisis interaction of the capital requirements variable and ΔFed funds rate is dropped from the regression since it is collinear with the interaction of the capital requirements variable and the log (VIX) in the pre-crisis period (due to the fact that capital requirements having been tightened in only once instance before the crisis). This does not affect in any way the estimated coefficients on post-crisis interaction of the capital requirements variable and ΔFed funds rate.

Table B3 – Reserve requirements with structural breaks and interactions with global factors

	Dependent variable: ΔCross-border loans †			Dependent variable: ΔInternational debt securities ‡		
Explanatory variables	All	to banks	to non-banks	All	by banks	by non-banks
Pre-break						
Log(VIX)	-3.753***	-4.291***	-4.092***	-0.999	-5.499**	-0.295
	(0.952)	(1.658)	(1.081)	(1.441)	(2.782)	(1.690)
Log(VIX) * ResReq (2)	-1.455	-0.296	-3.512**	1.017	1.068	0.621
	(1.766)	(2.865)	(1.573)	(4.965)	(4.568)	(5.266)
ΔFed funds rate (1)	-3.070***	-3.352***	-3.243***	-1.318	-1.213	-0.880
	(0.507)	(0.818)	(0.582)	(0.894)	(1.417)	(1.052)
ΔFed funds rate * ResReq (2)	0.205	-0.513	0.500	3.166	-1.164	2.393
	(1.241)	(1.723)	(1.384)	(4.664)	(2.739)	(4.844)
Post-break						
Log(VIX)	-1.683*	-0.389	-2.579***	-3.055**	-3.354	-2.406*
	(0.939)	(1.485)	(0.899)	(1.357)	(4.661)	(1.364)
Log(VIX) * ResReq (2)	-1.533	-0.232	-3.782**	1.548	0.744	1.510
	(1.883)	(3.025)	(1.564)	(5.050)	(4.551)	(5.115)
ΔFed funds rate (1)	-6.470***	-8.542***	-5.238***	-6.360***	-14.61	-6.276***
	(1.251)	(1.968)	(1.055)	(2.186)	(10.57)	(2.233)
ΔFed funds rate * ResReq (2)	-7.741	-11.67	-2.193	-4.671	1.988	-4.482
	(6.018)	(9.543)	(2.433)	(5.468)	(10.17)	(5.228)
Observations	2,903	2,903	2,903	2,903	2,572	2,902
R-squared	0.168	0.106	0.108	0.073	0.035	0.046

Notes: The sample includes quarterly data on cross-border flows (loans and debt securities) for 64 recipient countries over the period 2000:Q1 - 2013:Q4. Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1. † to borrowers in country j. ‡ issued by borrowers in country j. (1) Effective federal funds rate for the period 2001:Q1 – 2008:Q4, Wu-Xia Shadow rate for the period 2009:Q1 – 2013:Q4. (2) Reserve requirements. The regressions include ΔReal GDP, ΔSovereign Ratings, Chinn-Ito Index, ΔReal Global GDP and their interaction with a break dummy that takes value 1 after the break date. The regressions also include a full set of country fixed effects and the following prudential index: reserve requirements.

Table B4 – Cumulative LTV with structural breaks and interactions with global factors

	Dependent variable: ΔCross-border loans †			Dependent variable: ΔInternational debt securities ‡		
Explanatory variables	All	to banks	to non-banks	All	by banks	by non-banks
Pre-break						
Log(VIX)	-3.756**	-4.907*	-3.876*	-2.903**	-7.314*	-2.554*
	(1.667)	(2.792)	(2.129)	(1.386)	(3.770)	(1.513)
Log(VIX) * CumLTV (2)	-0.822	-0.858	-0.733	-0.116	-0.260	0.270
	(0.682)	(0.875)	(0.668)	(0.398)	(0.768)	(0.523)
ΔFed funds rate (1)	-3.243***	-3.174**	-3.947***	0.152	1.876	-1.086
	(0.829)	(1.446)	(1.058)	(0.784)	(1.612)	(0.949)
ΔFF rate * CumLTV (2)	-0.171	-0.0143	-0.891	0.0138	0.131	0.409
	(0.731)	(0.887)	(0.669)	(0.337)	(0.594)	(0.443)
Post-break						
Log(VIX)	-2.151	-1.167	-2.932**	-3.874***	-4.228*	-3.496***
	(1.507)	(2.253)	(1.297)	(1.216)	(2.475)	(1.302)
Log(VIX) *CumLTV (2)	-0.655	-0.633	-0.676	-0.123	-0.545	0.241
	(0.605)	(0.781)	(0.596)	(0.345)	(0.690)	(0.478)
ΔFed funds rate (1)	-5.735***	-7.736**	-4.942***	-4.861**	-1.105	-5.418***
	(2.084)	(3.571)	(1.612)	(1.950)	(2.506)	(2.030)
ΔΔFF rate * CumLTV (2)	0.449	1.017	-0.0814	1.080	1.098	0.819
	(0.734)	(0.958)	(0.856)	(0.768)	(0.856)	(0.923)
Observations	1,031	1,031	1,031	1,031	926	1,031
R-squared	0.206	0.137	0.153	0.120	0.121	0.085

Notes: The sample includes quarterly data on cross-border flows (loans and debt securities) for 64 recipient countries over the period 2000:Q1 - 2013:Q4. Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1. † to borrowers in country j. ‡ issued by borrowers in country j. (1) Effective federal funds rate for the period 2001:Q1 – 2008:Q4, Wu-Xia Shadow rate for the period 2009:Q1 – 2013:Q4. (2) Loan-to-value ratio cap. The regressions include ΔReal GDP, ΔSovereign Ratings, Chinn-Ito Index, ΔReal Global GDP and their interaction with a break dummy that takes value 1 after the break date. The regressions also include a full set of country fixed effects and the following *cumulative* prudential index: loan to value ratio caps. The cumulative prudential index is obtained in each quarter by adding the non-cumulative prudential index up to that quarter.

Table B5 – Cumulative capital requirements with structural breaks and interactions with global factors

	Dependent variable: ΔCross-border loans †			Dependent variable: ΔInternational debt securities ‡		
Explanatory variables	All	to banks	to non-banks	All	by banks	by non-banks
Pre-break						
Log(VIX)	-4.033***	-4.528***	-4.486***	-1.032	-5.816**	-0.143
	(0.915)	(1.469)	(1.067)	(1.302)	(2.694)	(1.582)
Log(VIX) * CapReq (2)	-1.089	-1.812	-1.174	4.904	4.018	5.596
	(1.989)	(2.923)	(2.187)	(3.703)	(6.645)	(3.730)
ΔFed funds rate (1)	-3.125***	-3.185***	-3.343***	-1.487	-1.325	-0.968
	(0.474)	(0.750)	(0.553)	(1.051)	(1.386)	(1.215)
ΔFF rate * CumCap (2)	-0.782	0.659	-2.729	3.322	2.667	3.854*
	(2.526)	(4.078)	(2.632)	(2.173)	(6.203)	(2.063)
Post-break						
Log(VIX)	-2.475*	-1.741	-3.194**	-6.270***	-3.666	-5.824***
	(1.290)	(1.981)	(1.292)	(1.669)	(5.858)	(1.753)
Log(VIX) * CumCap (2)	-0.691	-0.989	-0.812	4.480	5.814	4.585
	(1.909)	(2.774)	(1.951)	(3.576)	(6.160)	(3.595)
ΔFed funds rate (1)	-7.487***	-9.883***	-6.149***	-5.644**	-19.59	-5.708**
	(1.332)	(2.215)	(1.099)	(2.462)	(14.24)	(2.526)
ΔFF rate * CumCap (2)	4.110**	5.866**	3.218**	-0.582	6.202	-0.241
	(1.894)	(2.850)	(1.542)	(2.918)	(10.72)	(2.942)
Observations	2,847	2,847	2,847	2,847	2,516	2,847
R-squared	0.182	0.113	0.112	0.057	0.035	0.042

Notes: The sample includes quarterly data on cross-border flows (loans and debt securities) for 64 recipient countries over the period 2000:Q1 - 2013:Q4. Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1. † to borrowers in country j. ‡ issued by borrowers in country j. (1) Effective federal funds rate for the period 2001:Q1 – 2008:Q4, Wu-Xia Shadow rate for the period 2009:Q1 – 2013:Q4. (2) Capital requirements. The regressions include ΔReal GDP, ΔSovereign Ratings, Chinn-Ito Index, ΔReal Global GDP and their interaction with a break dummy that takes value 1 after the break date. The regressions also include a full set of country fixed effects and the following *cumulative* prudential index: capital requirements. The cumulative prudential index is obtained in each quarter by adding the non-cumulative prudential index up to that quarter.

Table B6 – Cumulative reserve requirements with structural breaks and interactions with global factors

	Dependent variable: ΔCross-border loans †			Dependent variable: ΔInternational debt securities ‡		
Explanatory variables	All	to banks	to non-banks	All	by banks	by non-banks
Pre-break						
Log(VIX)	-4.286***	-4.957***	-4.616***	-1.054	-6.086**	-0.282
	(0.945)	(1.654)	(1.087)	(1.342)	(2.679)	(1.630)
Log(VIX) * CumRes (2)	-1.063***	-1.597***	-0.713**	0.0151	-1.753	-0.0362
	(0.341)	(0.529)	(0.294)	(0.506)	(1.274)	(0.511)
ΔFed funds rate (1)	-3.366***	-3.619***	-3.505***	-1.366	-1.730	-0.820
	(0.512)	(0.821)	(0.579)	(0.935)	(1.348)	(1.136)
ΔFF rate * CumRes (2)	-0.446	-0.509	-0.262	0.349	-1.037	0.340
	(0.352)	(0.514)	(0.325)	(0.548)	(0.870)	(0.572)
Post-break						
Log(VIX)	-1.964**	-0.791	-2.820***	-2.883**	-3.627	-2.317*
	(0.924)	(1.462)	(0.900)	(1.363)	(4.688)	(1.336)
Log(VIX) * CumRes (2)	-0.678**	-1.160**	-0.432	-0.0504	-0.899	-0.0223
	(0.329)	(0.513)	(0.274)	(0.451)	(1.079)	(0.472)
ΔFed funds rate (1)	-5.972***	-7.833***	-4.834***	-6.231***	-13.88	-6.107***
	(1.122)	(1.671)	(1.106)	(1.993)	(11.00)	(2.047)
ΔFF rate * CumRes (2)	0.600	0.976	0.546	0.543	2.086	0.542
	(0.472)	(0.772)	(0.412)	(0.878)	(2.701)	(0.941)
Observations	2,903	2,903	2,903	2,903	2,572	2,902
R-squared	0.176	0.111	0.111	0.072	0.038	0.045

Notes: The sample includes quarterly data on cross-border flows (loans and debt securities) for 64 recipient countries over the period 2000:Q1 - 2013:Q4. Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1. † to borrowers in country j. ‡ issued by borrowers in country j. (1) Effective federal funds rate for the period 2001:Q1 – 2008:Q4, Wu-Xia Shadow rate for the period 2009:Q1 – 2013:Q4. (2) Reserve requirements. The regressions include ΔReal GDP, ΔSovereign Ratings, Chinn-Ito Index, ΔReal Global GDP and their interaction with a break dummy that takes value 1 after the break date. The regressions also include a full set of country fixed effects and the following *cumulative* prudential index: reserve requirements. The cumulative prudential index is obtained in each quarter by adding the non-cumulative prudential index up to that quarter.

Table B7 – CBS, LTV with structural breaks and interactions with global factors

Explanatory variables	Dependent variable: ΔInternational claims			
	All	to banks	to the public sector	to non-banks (private)
Pre-break				
Log(VIX)	-4.251**	-5.045	-4.524	-5.051***
	(1.795)	(3.313)	(3.170)	(1.796)
Log(VIX) * LTV borrower (2)	4.436	6.142	3.504	0.0648
	(2.911)	(5.201)	(6.413)	(2.750)
Log(VIX) * LTV lender (2)	-4.712	-1.508	-8.240	-11.74***
	(3.757)	(7.222)	(8.803)	(3.482)
ΔFed funds rate (1)	-1.649*	-1.207	-1.725	-2.833***
	(0.914)	(1.704)	(1.652)	(0.900)
ΔFF rate * LTV borrower (2)	1.232	0.366	7.305	-0.275
	(2.737)	(4.430)	(5.890)	(2.582)
ΔFF rate * LTV lender (2)	-3.304	-0.560	1.090	-8.436***
	(3.025)	(5.899)	(7.287)	(2.983)
Post-break				
Log(VIX)	-3.680***	-6.001***	-5.751**	-2.868***
	(0.969)	(1.944)	(2.439)	(0.900)
Log(VIX) * LTV borrower (2)	4.135	5.823	2.994	-0.468
	(2.836)	(4.983)	(6.119)	(2.660)
Log(VIX) * LTV lender (2)	-4.256	0.616	-10.25	-10.27***
	(3.641)	(6.938)	(8.065)	(3.387)
ΔFed funds rate (1)	-4.418***	-9.151***	-12.80***	-3.281***
	(1.297)	(2.592)	(3.096)	(1.169)
ΔFF rate * LTV borrower (2)	1.806	2.284	0.744	-2.493
	(5.144)	(8.914)	(9.952)	(4.583)
ΔFF rate * LTV lender (2)	4.859	4.442	1.623	-4.781
	(5.848)	(11.22)	(13.42)	(5.220)
Observations	9,509	7,949	4,466	8,664
R-squared	0.030	0.026	0.024	0.029

Notes: The sample includes quarterly data on International claims (all, to private banks, to public banks, to non-banks) from lending banks in 30 countries to recipients in 64 countries over the period 2000:Q1 - 2013:Q4. Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1. (1) Effective federal funds rate for the period 2001:Q1 – 2008:Q4, Wu-Xia Shadow rate for the period 2009:Q1 – 2013:Q4. The regressions include ΔReal GDP, ΔSovereign Ratings, Chinn-Ito Index, ΔReal Global GDP and their interaction with a break dummy that takes value 1 after the break date. The regressions also include a full set of borrowing country fixed effects, lending country fixed effects and (2) loan-to-value ratio cap.

Table B8 – CBS, capital requirements with structural breaks and interactions with global factors

Explanatory variables	Dependent variable: ΔInternational claims			
	All	to banks	to the public sector	to non-banks (private)
Pre-break				
Log(VIX)	-2.911***	-5.037***	-1.284	-2.951***
	(0.433)	(0.819)	(0.855)	(0.431)
Log(VIX) * CapReq borrower (2)	1.221	-5.155	-0.500	3.371
	(2.344)	(4.144)	(4.485)	(2.391)
Log(VIX) * CapReq lender (2)	-	-	-	-
ΔFed funds rate (1)	-0.867***	-0.266	0.877**	-1.834***
	(0.226)	(0.424)	(0.446)	(0.222)
ΔFF rate * CapReq borrower (2)	-	-	-	-
ΔFF rate * CapReq lender (2)	-	-	-	-
Post-break				
Log(VIX)	-2.497***	-2.626***	-4.039***	-2.304***
	(0.462)	(0.916)	(0.950)	(0.426)
Log(VIX) * CapReq borrower (2)	0.989	-4.210	-0.388	2.677
	(2.275)	(3.965)	(4.384)	(2.165)
Log(VIX) * CapReq lender (2)	-5.667***	-8.577**	-6.459	-3.087*
	(1.846)	(4.177)	(4.151)	(1.741)
ΔFed funds rate (1)	-5.360***	-6.395***	-9.505***	-5.016***
	(0.548)	(1.066)	(1.134)	(0.501)
ΔFF rate * CapReq borrower (2)	21.85***	29.17***	26.52***	15.18***
	(4.474)	(8.105)	(8.613)	(4.657)
ΔFF rate * CapReq lender (2)	14.40***	7.047	23.79***	16.10***
	(4.352)	(9.402)	(8.012)	(4.022)
Observations	67,023	59,259	41,593	62,129
R-squared	0.026	0.015	0.015	0.027

Notes The sample includes quarterly data on International claims (all, to private banks, to public banks, to non-banks) from lending banks in 30 countries to recipients in 64 countries over the period 2000:Q1 - 2013:Q4. Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1. (1) Effective federal funds rate for the period 2001:Q1 – 2008:Q4, Wu-Xia Shadow rate for the period 2009:Q1 – 2013:Q4. The regressions include ΔReal GDP, ΔSovereign Ratings, Chinn-Ito Index, ΔReal Global GDP and their interaction with a break dummy that takes value 1 after the break date. The regressions also include a full set of borrowing country fixed effects, lending country fixed effects and (2) capital requirements. The pre-crisis interaction of the capital requirements variable and ΔFed funds rate is dropped from the regression since it is collinear with the interaction of the capital requirements variable and the log (VIX) in the pre-crisis period (due to the fact that capital requirements having been tightened in only once instance before the crisis). This does not affect in any way the estimated coefficients on post-crisis interaction of the capital requirements variable and ΔFed funds rate.

Table B9 – CBS, reserve requirements with structural breaks and interactions with global factors

Explanatory variables	Dependent variable: ΔInternational claims			
	All	to banks	to the public sector	to non-banks (private)
Pre-break				
Log(VIX)	-2.960***	-4.895***	-2.178**	-3.107***
	(0.456)	(0.867)	(0.893)	(0.453)
Log(VIX) * ResReq borrower (2)	-1.421*	-2.115	-1.694	-2.350***
	(0.817)	(1.543)	(1.762)	(0.805)
Log(VIX) * ResReq lender (2)	1.273	1.574	2.518	1.900
	(1.422)	(2.766)	(5.584)	(1.409)
ΔFed funds rate (1)	-0.912***	-0.290	0.350	-1.909***
	(0.240)	(0.453)	(0.470)	(0.236)
ΔFF rate * ResReq borrower (2)	-1.677***	-3.542***	-2.778**	-1.430**
	(0.565)	(1.058)	(1.164)	(0.560)
ΔFF rate * ResReq lender (2)	1.109*	2.362*	-3.040*	0.872
	(0.654)	(1.211)	(1.848)	(0.651)
Post-break				
Log(VIX)	-2.863***	-3.500***	-4.862***	-2.557***
	(0.424)	(0.843)	(0.884)	(0.392)
Log(VIX) * ResReq borrower (2)	-1.066	-1.263	-1.067	-2.416***
	(0.807)	(1.524)	(1.747)	(0.791)
Log(VIX) * ResReq lender (2)	0.828	0.633	3.239	1.617
	(1.577)	(3.063)	(6.192)	(1.556)
ΔFed funds rate (1)	-5.060***	-5.935***	-8.468***	-4.828***
	(0.534)	(1.044)	(1.105)	(0.488)
ΔFF rate * ResReq borrower (2)	-0.259	2.819	-1.741	-2.781
	(1.897)	(3.760)	(3.976)	(1.786)
ΔFF rate * ResReq lender (2)	-6.009	-12.54	-15.97	-4.555
	(3.986)	(7.666)	(13.19)	(4.003)
Observations	68,258	59,970	42,157	63,298
R-squared	0.025	0.015	0.015	0.027

Notes: The sample includes quarterly data on International claims (all, to private banks, to public banks, to non-banks) from lending banks in 30 countries to recipients in 64 countries over the period 2000:Q1 - 2013:Q4. Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1. (1) Effective federal funds rate for the period 2001:Q1 – 2008:Q4, Wu-Xia Shadow rate for the period 2009:Q1 – 2013:Q4. The regressions include ΔReal GDP, ΔSovereign Ratings, Chinn-Ito Index, ΔReal Global GDP and their interaction with a break dummy that takes value 1 after the break date. The regressions also include a full set of borrowing country fixed effects, lending country fixed effects and (2) reserve requirements.

Table B10 – CBS, cumulative LTV with structural breaks and interactions with global factors

Explanatory variables	Dependent variable: ΔInternational claims			
	All	to banks	to the public sector	to non-banks (private)
Pre-break				
Log(VIX)	-3.851**	-4.908	-4.077	-4.921***
	(1.810)	(3.341)	(3.172)	(1.805)
Log(VIX) * cumLTV borrower (2)	0.185	-0.335	-0.118	0.271
	(0.457)	(0.846)	(1.134)	(0.439)
Log(VIX) * cumLTV lender (2)	-0.267	0.0608	1.833	-0.162
	(0.593)	(1.183)	(1.397)	(0.539)
ΔFed funds rate (1)	-1.514*	-1.217	-1.272	-2.675***
	(0.919)	(1.719)	(1.642)	(0.906)
ΔFF rate * cumLTV borrower (2)	0.658	0.510	-1.527	0.183
	(0.503)	(0.912)	(1.087)	(0.474)
ΔFF rate * cumLTV lender (2)	-0.130	0.400	1.795	0.180
	(0.573)	(1.108)	(1.302)	(0.514)
Post-break				
Log(VIX)	-4.926***	-9.073***	-10.93***	-3.852***
	(1.428)	(2.954)	(3.403)	(1.279)
Log(VIX) * cumLTV borrower (2)	-2.963***	-4.263*	-6.286**	-2.986***
	(1.081)	(2.249)	(2.606)	(1.003)
Log(VIX) * cumLTV lender (2)	1.727**	-0.0180	2.059	2.110***
	(0.684)	(1.375)	(1.522)	(0.617)
ΔFed funds rate (1)	-0.299	-0.140	1.441	-0.146
	(0.534)	(1.060)	(1.282)	(0.487)
ΔFF rate * cumLTV borrower (2)	-0.751	0.213	-3.814***	-0.970*
	(0.611)	(1.090)	(1.449)	(0.531)
ΔFF rate * cumLTV lender (2)	-0.0931	-0.519	-0.178	0.0763
	(0.405)	(0.748)	(1.018)	(0.387)
Observations	9,509	7,949	4,466	8,664
R-squared	0.030	0.025	0.026	0.030

Notes: The sample includes quarterly data on International claims (all, to private banks, to public banks, to non-banks) from lending banks in 30 countries to recipients in 64 countries over the period 2000:Q1 - 2013:Q4. Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1. (1) Effective federal funds rate for the period 2001:Q1 – 2008:Q4, Wu-Xia Shadow rate for the period 2009:Q1 – 2013:Q4. The regressions include ΔReal GDP, ΔSovereign Ratings, Chinn-Ito Index, ΔReal Global GDP and their interaction with a break dummy that takes value 1 after the break date. The regressions also include a full set of borrowing country fixed effects, lending country fixed effects and (2) *cumulative* loan to value ratio caps. The cumulative prudential index is obtained in each quarter by adding the non-cumulative prudential index up to that quarter.

Table B11 – CBS, cumulative capital requirements with structural breaks and interactions with global factors

Explanatory variables	Dependent variable: ΔInternational claims			
	All	to banks	to the public sector	to non-banks (private)
Pre-break				
Log(VIX)	-2.964***	-5.061***	-1.314	-2.976***
	(0.434)	(0.820)	(0.856)	(0.431)
Log(VIX) * cumCap borrower (2)	2.507**	1.278	4.055*	0.159
	(1.184)	(2.537)	(2.335)	(1.096)
Log(VIX) * cumCap lender (2)	-	-	-	-
ΔFed funds rate (1)	-0.876***	-0.281	0.844*	-1.831***
	(0.227)	(0.425)	(0.448)	(0.223)
ΔFF rate * cumCap borrower (2)	0.367	0.983	3.009	-0.959
	(1.350)	(2.996)	(2.500)	(1.333)
ΔFF rate * cumCap lender (2)	-	-	-	-
Post-break				
Log(VIX)	-6.390***	-3.269**	-12.17***	-5.736***
	(0.764)	(1.496)	(1.605)	(0.712)
Log(VIX) * cumCap borrower (2)	2.559**	0.861	2.671	0.561
	(1.075)	(2.260)	(2.141)	(0.988)
Log(VIX) * cumCap lender (2)	-3.846***	-7.543***	-3.633*	-1.446
	(1.059)	(2.233)	(2.143)	(1.001)
ΔFed funds rate (1)	-4.472***	-6.043***	-5.506***	-4.126***
	(0.689)	(1.314)	(1.441)	(0.631)
ΔFF rate * cumCap borrower (2)	-0.705	0.185	-4.989*	-0.717
	(1.372)	(2.766)	(2.915)	(1.280)
ΔFF rate * cumCap lender (2)	2.731**	3.068	2.345	2.375*
	(1.290)	(2.642)	(2.711)	(1.215)
Observations	67,023	59,259	41,593	62,129
R-squared	0.026	0.015	0.016	0.027

Notes: The sample includes quarterly data on International claims (all, to private banks, to public banks, to non-banks) from lending banks in 30 countries to recipients in 64 countries over the period 2000:Q1 - 2013:Q4. Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1. (1) Effective federal funds rate for the period 2001:Q1 – 2008:Q4, Wu-Xia Shadow rate for the period 2009:Q1 – 2013:Q4. The regressions include ΔReal GDP, ΔSovereign Ratings, Chinn-Ito Index, ΔReal Global GDP and their interaction with a break dummy that takes value 1 after the break date. The regressions also include a full set of borrowing country fixed effects, lending country fixed effects and (2) *cumulative* capital requirements. The cumulative prudential index is obtained in each quarter by adding the non-cumulative prudential index up to that quarter.

Table B12 – CBS, cumulative reserve requirements with structural breaks and interactions with global factors

Explanatory variables	Dependent variable: ΔInternational claims			
	All	to banks	to the public sector	to non-banks (private)
Pre-break				
Log(VIX)	-3.023***	-4.426***	-0.550	-3.499***
	(0.478)	(0.904)	(0.993)	(0.470)
Log(VIX) * cumRes borrower (2)	-0.162	-0.532*	0.0940	-0.0812
	(0.141)	(0.296)	(0.304)	(0.135)
Log(VIX) * cumRes lender (2)	-0.0336	1.278**	1.386*	-0.883***
	(0.323)	(0.623)	(0.824)	(0.313)
ΔFed funds rate (1)	-0.987***	-0.264	2.047***	-2.223***
	(0.277)	(0.520)	(0.601)	(0.270)
ΔFF rate * cumRes borrower (2)	0.0241	-0.260	0.257	-0.0343
	(0.133)	(0.267)	(0.269)	(0.130)
ΔFF rate * cumRes lender (2)	-0.0718	0.437	1.809***	-0.514*
	(0.278)	(0.519)	(0.652)	(0.272)
Post-break				
Log(VIX)	-3.436***	-3.483***	-4.916***	-3.371***
	(0.474)	(0.924)	(1.072)	(0.445)
Log(VIX) * cumRes borrower	-0.0269	-0.272	0.0623	0.0250
	(0.131)	(0.272)	(0.283)	(0.125)
Log(VIX) * cumRes lender (2)	0.361	1.597***	1.972**	-0.422
	(0.315)	(0.603)	(0.803)	(0.305)
ΔFed funds rate (1)	-4.271***	-5.333***	-7.852***	-3.909***
	(0.626)	(1.203)	(1.474)	(0.583)
ΔFF rate * cumRes borrower (2)	0.198	0.635	-0.0218	0.00103
	(0.208)	(0.430)	(0.464)	(0.196)
ΔFF rate * cumRes lender (2)	0.411	-0.269	0.122	0.512
	(0.538)	(1.044)	(1.297)	(0.508)
Observations	68,258	59,970	42,157	63,298
R-squared	0.026	0.015	0.016	0.027

Notes: The sample includes quarterly data on International claims (all, to private banks, to public banks, to non-banks) from lending banks in 30 countries to recipients in 64 countries over the period 2000:Q1 - 2013:Q4. Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1. (1) Effective federal funds rate for the period 2001:Q1 – 2008:Q4, Wu-Xia Shadow rate for the period 2009:Q1 – 2013:Q4. The regressions include ΔReal GDP, ΔSovereign Ratings, Chinn-Ito Index, ΔReal Global GDP and their interaction with a break dummy that takes value 1 after the break date. The regressions also include a full set of borrowing country fixed effects, lending country fixed effects and (2) *cumulative* reserve requirements. The cumulative prudential index is obtained in each quarter by adding the non-cumulative prudential index up to that quarter.

Annex C: Supplementary Tables and Graphs

Tables

Table C1 – Summary statistics, pre-break

		Mean			Standard deviation		
Sector	*Region*	XBL	IDS	XBL+IDS	XBL	IDS	XBL+IDS
All	All	2.33	3.79	2.87	3.32	1.48	2.08
	AE	2.47	4.02	3.06	3.49	1.62	2.18
	EME	1.40	1.42	1.43	4.13	1.68	2.95
Banks	All	2.27	4.45	2.79	3.45	1.89	2.78
	AE	2.42	4.57	2.95	3.58	1.94	2.85
	EME	1.14	2.05	1.24	5.00	3.48	4.66
Non-banks	All	2.48	3.39	2.98	3.85	1.76	1.71
	AE	2.59	3.66	3.20	4.24	1.98	1.87
	EME	1.86	1.29	1.61	3.97	1.83	2.02

Notes: XBL = Cross-border loans: Quarterly Growth Rate$_t$ = Adjusted Flows$_t$ / Outstanding Stock$_{t-1}$; IDS = International Debt Securities: Quarterly Growth Rate$_t$ = Net Issuance$_t$ / Outstanding Stock$_{t-1}$. Sources: BIS Locational Banking Statistics by residence; BIS International Debt Securities Statistics.

Table C2 – Summary statistics, post-break

		Mean			Standard deviation		
Sector	*Region*	XBL	IDS	XBL+IDS	XBL	IDS	XBL+IDS
All	All	–0.61	0.72	0.04	1.72	0.84	0.91
	AE	–1.12	0.52	–0.28	1.68	0.92	0.91
	EME	2.19	3.47	2.56	3.85	1.23	2.79
Banks	All	–0.92	0.06	–0.58	1.98	1.36	1.55
	AE	–1.45	–0.13	–0.96	1.95	1.41	1.51
	EME	2.23	4.47	2.51	5.11	3.12	4.49
Non-banks	All	0.12	1.16	0.81	2.11	0.97	0.61
	AE	–0.33	0.97	0.56	2.32	1.11	0.74
	EME	2.08	3.19	2.57	2.21	1.15	1.35

Notes: XBL = Cross-border loans: Quarterly Growth Rate$_t$ = Adjusted Flows$_t$ / Outstanding Stock$_{t-1}$; IDS = International Debt Securities: Quarterly Growth Rate$_t$ = Net Issuance$_t$ / Outstanding Stock$_{t-1}$. Sources: BIS Locational Banking Statistics by residence; BIS International Debt Securities Statistics.

Table C3 – Correlations, pre-break

Sector	*Region*	XBL, IDS	XBL, VIX	XBL, FF	IDS, VIX	IDS, FF
All	All	0.22	–0.48***	0.29*	–0.18	–0.01
	AE	0.24	–0.43***	0.29*	–0.11	–0.05
	EME	0.20	–0.52***	0.08	–0.53***	0.36**
Banks	All	0.51***	–0.42***	0.30*	–0.58***	0.36**
	AE	0.52***	–0.37**	0.31*	–0.54***	0.34**
	EME	0.58***	–0.47***	0.10	–0.67***	0.37**
Non-banks	All	0.00	–0.51***	0.17	0.14	–0.22
	AE	0.00	–0.47***	0.18	0.19	–0.26
	EME	–0.03	–0.45***	–0.01	–0.32*	0.26

Notes: *** p<0.01, ** p<0.05, * p<0.1. XBL = Cross-border loans: Quarterly Growth Rate$_t$ = Adjusted Flows$_t$ / Outstanding Stock$_{t-1}$; IDS = International Debt Securities: Quarterly Growth Rate$_t$ = Net Issuance$_t$ / Outstanding Stock$_{t-1}$; VIX = log of VIX; FF = ΔEffective federal funds rate for the period 2001:Q1–2008:Q4, ΔWu-Xia Shadow rate for the period 2009:Q1–2013:Q4. Sources: Wu and Xia (2015); Bloomberg; BIS Locational Banking Statistics by residence; BIS International Debt Securities Statistics.

Table C4– Correlations, post-break

Sector	*Region*	XBL, IDS	XBL, VIX	XBL, FF	IDS, VIX	IDS, FF
All	All	–0.13	–0.19	0.42*	0.37	–0.63***
	AE	–0.03	0.03	0.34	0.45**	–0.67***
	EME	0.30	–0.57***	0.48**	–0.76***	0.61***
Banks	All	0.42*	–0.12	0.32	–0.01	–0.16
	AE	0.40*	0.10	0.22	0.06	–0.20
	EME	0.11	–0.52**	0.44*	–0.58***	0.34
Non-banks	All	–0.53**	–0.24	0.42*	0.58***	–0.79***
	AE	–0.41*	–0.12	0.36	0.62***	–0.80***
	EME	0.20	–0.62***	0.53**	–0.59***	0.58***

Notes: *** p<0.01, ** p<0.05, * p<0.1. XBL = Cross-border loans: Quarterly Growth Rate$_t$ = Adjusted Flows$_t$ / Outstanding Stock$_{t-1}$; IDS = International Debt Securities: Quarterly Growth Rate$_t$ = Net Issuance$_t$ / Outstanding Stock$_{t-1}$; VIX = log of VIX; FF = ΔEffective federal funds rate for the period 2001:Q1–2008:Q4, ΔWu-Xia Shadow rate for the period 2009:Q1–2013:Q4. Sources: Wu and Xia (2015); Bloomberg; BIS Locational Banking Statistics by residence; BIS International Debt Securities Statistics.

Table C5 – Model with composite macro-prudential index and with structural breaks

	Dependent variable: ΔCross-border loans †			Dependent variable: ΔInternational debt securities ‡		
Explanatory variables	All	to banks	to non-banks	All	by banks	by non-banks
ΔFed funds rate (1)	-3.089***	-3.289***	-3.346***	-1.443	-1.122	-0.942
	(0.492)	(0.806)	(0.558)	(1.056)	(1.373)	(1.218)
Log(VIX)	-3.678***	-4.096**	-4.149***	-1.060	-5.366**	-0.250
	(0.941)	(1.636)	(1.070)	(1.226)	(2.680)	(1.515)
ΔReal GDP	0.370***	0.393**	0.415***	-0.0718	0.409	0.00597
	(0.101)	(0.175)	(0.108)	(0.127)	(0.352)	(0.186)
ΔSovereign rating (2)	3.915**	6.784***	0.00282	0.865	-2.061	-0.244
	(1.811)	(2.569)	(1.091)	(1.101)	(2.146)	(1.652)
Chinn-Ito index (3)	1.213	0.726	2.136	8.717***	16.73**	5.602
	(1.892)	(3.109)	(1.891)	(3.286)	(6.927)	(3.490)
ΔReal global GDP	1.647***	1.790***	1.418***	0.977	0.309	0.645
	(0.273)	(0.472)	(0.286)	(0.612)	(0.744)	(0.812)
Break dummy (4)	1.802	-3.688	2.592	10.39	3.204	11.55
	(4.840)	(8.171)	(5.094)	(7.763)	(17.46)	(8.566)
ΔFed funds rate*Break	-6.364***	-8.384***	-5.199***	-6.422***	-14.65	-6.372***
	(1.140)	(1.784)	(1.042)	(2.172)	(10.70)	(2.214)
Log(VIX)*Break	-1.414	-0.0506	-2.408***	-2.948**	-3.280	-2.321*
	(0.934)	(1.475)	(0.897)	(1.367)	(4.706)	(1.366)
ΔReal GDP*Break	0.559***	0.540***	0.476***	0.465***	0.0132	0.377***
	(0.0939)	(0.149)	(0.0947)	(0.138)	(0.528)	(0.133)
ΔSovereign rating*Break	0.0745	0.597	-1.999**	1.218	-2.825	1.685*
	(0.881)	(1.273)	(0.969)	(1.050)	(5.457)	(0.967)
Chinn-Ito Index*Break	-3.992**	-5.931*	-1.888	9.025***	8.395*	4.407
	(2.032)	(3.139)	(2.138)	(2.888)	(4.753)	(3.058)
ΔReal global GDP*Break	-0.375**	-0.0717	-0.396**	-0.994***	-0.722	-1.014***
	(0.188)	(0.265)	(0.187)	(0.284)	(0.837)	(0.280)
PruC (5)	1.769***	2.054***	1.340**	0.229	1.631	-0.162
	(0.492)	(0.702)	(0.529)	(0.983)	(1.329)	(0.978)
Observations	2,903	2,903	2,903	2,903	2,572	2,902
R-squared	0.169	0.107	0.106	0.070	0.035	0.044

Notes: The sample includes quarterly data on cross-border flows (loans and debt securities) for 64 recipient countries over the period 2000:Q1 - 2013:Q4. Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1. † to borrowers in country j. ‡ issued by borrowers in country j. (1) Effective federal funds rate for the period 2001:Q1 – 2008:Q4, Wu-Xia Shadow rate for the period 2009:Q1 – 2013:Q4. (2) LT foreign currency, average across 3 agencies. (3) Chinn and Ito (2006) measure of financial openness. (4) The break dummy equals 1 for every period after (and including) the break date. (5) Composite macro-prudential index. The regressions also include a full set of country fixed effects.

Table C6a - LTV and structural breaks

	Dependent variable: ΔCross-border loans †			Dependent variable: ΔInternational debt securities ‡		
Explanatory variables	All	to banks	to non-banks	All	by banks	by non-banks
ΔFed funds rate (1)	-3.148***	-3.024**	-4.005***	0.166	1.810	-1.037
	(0.830)	(1.426)	(1.058)	(0.783)	(1.597)	(0.957)
Log(VIX)	-3.626**	-4.750*	-3.567*	-2.795**	-7.368**	-2.493
	(1.655)	(2.750)	(2.099)	(1.375)	(3.713)	(1.537)
ΔReal GDP	0.222	0.148	0.456**	-0.122	0.566	-0.147
	(0.178)	(0.264)	(0.219)	(0.187)	(0.436)	(0.234)
ΔSovereign rating (2)	6.440***	7.214**	0.445	0.881	0.775	1.159
	(2.280)	(3.232)	(1.443)	(1.357)	(1.903)	(1.739)
Chinn-Ito index (3)	7.992***	6.434	8.515***	6.972***	14.41***	2.578
	(3.009)	(5.958)	(3.135)	(2.316)	(5.354)	(2.417)
ΔReal global GDP	2.045***	1.863***	1.861***	0.131	-1.905*	0.356
	(0.457)	(0.722)	(0.500)	(0.413)	(1.088)	(0.461)
Break dummy (4)	11.41	4.335	13.35	4.922	-12.00	7.249
	(7.823)	(12.40)	(8.733)	(6.336)	(15.38)	(7.105)
ΔFed funds rate*Break	-5.283***	-6.882**	-4.816***	-4.072**	-0.226	-4.809**
	(1.969)	(3.310)	(1.580)	(1.927)	(2.435)	(2.036)
Log(VIX)*Break	-3.196**	-2.338	-3.958***	-4.311***	-4.981**	-3.640***
	(1.423)	(2.102)	(1.206)	(1.114)	(2.265)	(1.210)
ΔReal GDP*Break	0.578***	0.500**	0.468***	0.560***	0.628***	0.392*
	(0.150)	(0.216)	(0.154)	(0.190)	(0.241)	(0.209)
ΔSovereign rating*Break	0.165	0.279	-1.063	2.261**	4.044**	2.161**
	(1.177)	(1.752)	(1.016)	(0.929)	(1.674)	(1.051)
Chinn-Ito Index*Break	-0.749	-4.113	2.013	8.417***	11.03***	1.670
	(3.129)	(4.962)	(3.553)	(2.136)	(3.859)	(2.338)
ΔReal global GDP*Break	-0.238	0.113	-0.422	-1.036***	-0.305	-0.893***
	(0.296)	(0.420)	(0.280)	(0.280)	(0.512)	(0.306)
LTV (5)	0.927	0.968	0.666	0.123	-1.075	0.645
	(1.068)	(1.344)	(1.133)	(0.721)	(1.073)	(0.809)
Observations	1,031	1,031	1,031	1,031	926	1,031
R-squared	0.202	0.133	0.148	0.115	0.117	0.083

Notes: The sample includes quarterly data on cross-border flows (loans and debt securities) for 64 recipient countries over the period 2000:Q1 - 2013:Q4. Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1. † to borrowers in country j. ‡ issued by borrowers in country j. (1) Effective federal funds rate for the period 2001:Q1 – 2008:Q4, Wu-Xia Shadow rate for the period 2009:Q1 – 2013:Q4. (2) LT foreign currency, average across 3 agencies. (3) Chinn and Ito (2006) measure of financial openness. (4) The break dummy equals 1 for every period after (and including) the break date. (5) Loan to value ratio caps. The regressions also include a full set of country fixed effects.

Table C6b – Capital requirements and structural breaks

	Dependent variable: ΔCross-border loans †			Dependent variable: ΔInternational debt securities ‡		
Explanatory variables	All	to banks	to non-banks	All	by banks	by non-banks
ΔFed funds rate (1)	-3.130***	-3.163***	-3.378***	-1.444	-1.263	-0.923
	(0.471)	(0.745)	(0.550)	(1.042)	(1.373)	(1.206)
Log(VIX)	-4.032***	-4.538***	-4.469***	-0.984	-5.721**	-0.104
	(0.914)	(1.466)	(1.064)	(1.293)	(2.683)	(1.574)
ΔReal GDP	0.433***	0.545***	0.443***	-0.0564	0.440	0.0186
	(0.0997)	(0.161)	(0.108)	(0.133)	(0.360)	(0.193)
ΔSovereign rating (2)	3.713**	4.902**	0.302	0.868	-1.831	-0.291
	(1.756)	(2.157)	(1.088)	(1.101)	(2.135)	(1.660)
Chinn-Ito index (3)	1.250	0.685	2.215	8.643***	16.57**	5.560
	(1.886)	(3.099)	(1.891)	(3.312)	(6.934)	(3.518)
ΔReal global GDP	1.587***	1.500***	1.379***	0.970	0.342	0.627
	(0.263)	(0.403)	(0.283)	(0.608)	(0.749)	(0.812)
Break dummy (4)	0.628	-4.620	1.956	8.556	-3.668	9.198
	(4.668)	(7.187)	(5.000)	(7.874)	(17.99)	(8.728)
ΔFed funds rate*Break	-6.605***	-8.630***	-5.289***	-6.687***	-17.63	-6.653***
	(1.061)	(1.748)	(0.916)	(2.231)	(10.96)	(2.268)
Log(VIX)*Break	-1.332	-0.291	-2.461***	-2.298*	-1.382	-1.516
	(0.905)	(1.334)	(0.870)	(1.396)	(4.821)	(1.424)
ΔReal GDP*Break	0.587***	0.647***	0.485***	0.463***	0.00622	0.376***
	(0.0876)	(0.123)	(0.0903)	(0.143)	(0.533)	(0.138)
ΔSovereign rating*Break	-0.207	0.130	-2.195***	1.597	-2.725	1.955**
	(0.702)	(1.165)	(0.791)	(1.074)	(5.538)	(0.992)
Chinn-Ito Index*Break	-4.381**	-6.066**	-2.185	8.935***	7.716	4.397
	(2.020)	(3.033)	(2.142)	(2.919)	(4.779)	(3.091)
ΔReal global GDP*Break	-0.345**	-0.209	-0.359**	-0.990***	-0.608	-0.964***
	(0.165)	(0.231)	(0.163)	(0.285)	(0.827)	(0.286)
CapReq (5)	2.020**	3.431**	-0.0626	2.863*	1.960	2.285
	(1.020)	(1.507)	(1.077)	(1.539)	(3.345)	(1.654)
Observations	2,847	2,847	2,847	2,847	2,516	2,847
R-squared	0.181	0.113	0.111	0.056	0.034	0.041

Notes: The sample includes quarterly data on cross-border flows (loans and debt securities) for 64 recipient countries over the period 2000:Q1 - 2013:Q4. Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1. † to borrowers in country j. ‡ issued by borrowers in country j. (1) Effective federal funds rate for the period 2001:Q1 – 2008:Q4, Wu-Xia Shadow rate for the period 2009:Q1 – 2013:Q4. (2) LT foreign currency, average across 3 agencies. (3) Chinn and Ito (2006) measure of financial openness. (4) The break dummy equals 1 for every period after (and including) the break date. (5) Capital requirements. The regressions also include a full set of country fixed effects.

Table C6c – Reserve requirements

	Dependent variable: ΔCross-border loans †			Dependent variable: ΔInternational debt securities ‡		
Explanatory variables	All	to banks	to non-banks	All	by banks	by non-banks
ΔFed funds rate (1)	-3.093***	-3.302***	-3.327***	-1.470	-1.153	-0.966
	(0.494)	(0.810)	(0.559)	(1.078)	(1.372)	(1.238)
Log(VIX)	-3.738***	-4.193**	-4.131***	-1.145	-5.477**	-0.316
	(0.942)	(1.639)	(1.070)	(1.204)	(2.700)	(1.495)
ΔReal GDP	0.389***	0.417**	0.427***	-0.0662	0.429	0.00701
	(0.101)	(0.174)	(0.109)	(0.129)	(0.353)	(0.188)
ΔSovereign rating (2)	4.025**	6.912***	0.0842	0.881	-1.960	-0.253
	(1.794)	(2.547)	(1.111)	(1.092)	(2.137)	(1.642)
Chinn-Ito index (3)	1.189	0.691	2.135	8.692***	16.70**	5.585
	(1.888)	(3.108)	(1.887)	(3.279)	(6.901)	(3.484)
ΔReal global GDP	1.650***	1.798***	1.413***	0.987	0.325	0.654
	(0.273)	(0.473)	(0.286)	(0.619)	(0.744)	(0.818)
Break dummy (4)	2.427	-3.045	3.258	10.24	3.598	11.28
	(4.853)	(8.184)	(5.102)	(7.435)	(17.36)	(8.262)
ΔFed funds rate*Break	-6.214***	-8.231***	-5.035***	-6.463***	-14.58	-6.441***
	(1.151)	(1.798)	(1.045)	(2.173)	(10.68)	(2.217)
Log(VIX)*Break	-1.598*	-0.257	-2.562***	-2.954**	-3.420	-2.287*
	(0.932)	(1.471)	(0.899)	(1.355)	(4.652)	(1.359)
ΔReal GDP*Break	0.578***	0.562***	0.492***	0.466***	0.0290	0.374***
	(0.0942)	(0.150)	(0.0954)	(0.140)	(0.526)	(0.135)
ΔSovereign rating*Break	0.0693	0.596	-2.016**	1.233	-2.813	1.700*
	(0.879)	(1.269)	(0.970)	(1.050)	(5.457)	(0.970)
Chinn-Ito Index*Break	-4.033**	-5.996*	-1.881	8.972***	8.296*	4.368
	(2.030)	(3.140)	(2.131)	(2.881)	(4.718)	(3.051)
ΔReal global GDP*Break	-0.367*	-0.0598	-0.397**	-0.985***	-0.703	-1.007***
	(0.188)	(0.265)	(0.187)	(0.286)	(0.839)	(0.282)
ResReq (5)	1.203**	1.203	1.365**	-0.396	0.663	-0.617
	(0.542)	(0.855)	(0.598)	(1.388)	(1.710)	(1.484)
Observations	2,903	2,903	2,903	2,903	2,572	2,902
R-squared	0.167	0.106	0.106	0.070	0.035	0.045

Notes: The sample includes quarterly data on cross-border flows (loans and debt securities) for 64 recipient countries over the period 2000:Q1 - 2013:Q4. Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1. † to borrowers in country j. ‡ issued by borrowers in country j. (1) Effective federal funds rate for the period 2001:Q1 – 2008:Q4, Wu-Xia Shadow rate for the period 2009:Q1 – 2013:Q4. (2) LT foreign currency, average across 3 agencies. (3) Chinn and Ito (2006) measure of financial openness. (4) The break dummy equals 1 for every period after (and including) the break date. (5) Reserve requirements in local currency. The regressions also include a full set of country fixed effects.

Table C7a – Cumulative LTV with structural breaks

	Dependent variable: ΔCross-border loans †			Dependent variable: ΔInternational debt securities ‡		
Explanatory variables	All	to banks	to non-banks	All	by banks	by non-banks
ΔFed funds rate (1)	-3.178***	-3.066**	-4.047***	0.131	1.738	-1.057
	(0.836)	(1.431)	(1.063)	(0.787)	(1.598)	(0.958)
Log(VIX)	-3.819**	-4.996*	-3.790*	-2.952**	-7.619**	-2.622*
	(1.666)	(2.771)	(2.109)	(1.378)	(3.750)	(1.520)
ΔReal GDP	0.293	0.236	0.534**	-0.0687	0.628	-0.100
	(0.181)	(0.268)	(0.222)	(0.192)	(0.463)	(0.245)
ΔSovereign rating (2)	6.443***	7.200**	0.414	0.830	0.680	1.163
	(2.233)	(3.174)	(1.458)	(1.341)	(1.885)	(1.703)
Chinn-Ito index (3)	6.902**	5.076	7.320**	6.182***	13.07**	1.841
	(3.029)	(6.109)	(3.121)	(2.296)	(5.105)	(2.387)
ΔReal global GDP	1.940***	1.731**	1.744***	0.0516	-2.015*	0.285
	(0.456)	(0.726)	(0.501)	(0.407)	(1.123)	(0.450)
Break dummy (4)	9.103	1.479	10.86	3.312	-14.19	5.686
	(7.819)	(12.56)	(8.693)	(6.288)	(15.74)	(6.936)
ΔFed funds rate*Break	-5.439***	-7.082**	-4.997***	-4.200**	-0.455	-4.914**
	(1.948)	(3.292)	(1.551)	(1.913)	(2.424)	(2.029)
Log(VIX)*Break	-2.730*	-1.763	-3.459***	-3.992***	-4.597**	-3.324***
	(1.427)	(2.110)	(1.213)	(1.143)	(2.316)	(1.259)
ΔReal GDP*Break	0.539***	0.448**	0.419***	0.522***	0.555**	0.366*
	(0.147)	(0.211)	(0.153)	(0.193)	(0.241)	(0.211)
ΔSovereign rating*Break	0.113	0.207	-1.133	2.204**	3.901**	2.126**
	(1.170)	(1.748)	(1.002)	(0.924)	(1.667)	(1.057)
Chinn-Ito Index*Break	-1.976	-5.669	0.617	7.445***	9.370**	0.844
	(3.214)	(5.183)	(3.635)	(2.266)	(4.052)	(2.496)
ΔReal global GDP*Break	-0.189	0.171	-0.372	-1.007***	-0.282	-0.860***
	(0.292)	(0.414)	(0.275)	(0.281)	(0.511)	(0.306)
CumLTV (5)	0.592**	0.750**	0.672*	0.465*	0.581	0.399
	(0.286)	(0.378)	(0.344)	(0.276)	(0.487)	(0.353)
Observations	1,031	1,031	1,031	1,031	926	1,031
R-squared	0.204	0.135	0.151	0.118	0.118	0.084

Notes: The sample includes quarterly data on cross-border flows (loans and debt securities) for 64 recipient countries over the period 2000:Q1 - 2013:Q4. Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1. † to borrowers in country j. ‡ issued by borrowers in country j. (1) Effective federal funds rate for the period 2001:Q1 – 2008:Q4, Wu-Xia Shadow rate for the period 2009:Q1 – 2013:Q4. (2) LT foreign currency, average across 3 agencies. (3) Chinn and Ito (2006) measure of financial openness. (4) The break dummy equals 1 for every period after (and including) the break date. (5) Cumulative loan-to-value ratio caps. The regressions also include a full set of country fixed effects.

Table C7b – Cumulative capital requirements with structural breaks

	Dependent variable: ΔCross-border loans †			Dependent variable: ΔInternational debt securities ‡		
Explanatory variables	All	to banks	to non-banks	All	by banks	by non-banks
ΔFed funds rate (1)	-3.133***	-3.166***	-3.380***	-1.449	-1.263	-0.929
	(0.471)	(0.745)	(0.550)	(1.042)	(1.373)	(1.206)
Log(VIX)	-4.037***	-4.544***	-4.476***	-0.996	-5.719**	-0.119
	(0.914)	(1.467)	(1.064)	(1.292)	(2.684)	(1.573)
ΔReal GDP	0.434***	0.546***	0.444***	-0.0545	0.441	0.0209
	(0.0998)	(0.161)	(0.108)	(0.133)	(0.360)	(0.193)
ΔSovereign rating (2)	3.697**	4.880**	0.290	0.838	-1.856	-0.324
	(1.757)	(2.159)	(1.087)	(1.096)	(2.140)	(1.656)
Chinn-Ito index (3)	1.337	0.804	2.270	8.798***	16.73**	5.726
	(1.886)	(3.100)	(1.890)	(3.327)	(6.904)	(3.531)
ΔReal global GDP	1.584***	1.497***	1.376***	0.964	0.340	0.620
	(0.263)	(0.403)	(0.283)	(0.608)	(0.748)	(0.812)
Break dummy (4)	5.882	2.411	5.666	18.13*	1.488	19.67*
	(5.302)	(8.222)	(5.714)	(9.654)	(17.17)	(10.44)
ΔFed funds rate*Break	-6.009***	-7.765***	-5.005***	-5.675***	-17.06	-5.624***
	(1.079)	(1.768)	(0.941)	(2.104)	(10.74)	(2.145)
Log(VIX)*Break	-2.887**	-2.364	-3.575***	-5.143***	-2.893	-4.634**
	(1.184)	(1.786)	(1.189)	(1.989)	(4.694)	(2.045)
ΔReal GDP*Break	0.601***	0.666***	0.491***	0.485***	0.0155	0.399***
	(0.0875)	(0.122)	(0.0903)	(0.142)	(0.532)	(0.137)
ΔSovereign rating*Break	-0.340	-0.0947	-2.194***	1.406	-2.846	1.800*
	(0.693)	(1.162)	(0.795)	(1.045)	(5.494)	(0.976)
Chinn-Ito Index*Break	-3.930*	-5.468*	-1.855	9.763***	8.177*	5.308*
	(2.028)	(3.044)	(2.142)	(3.020)	(4.797)	(3.195)
ΔReal global GDP*Break	-0.446***	-0.344	-0.429***	-1.172***	-0.702	-1.162***
	(0.171)	(0.244)	(0.166)	(0.315)	(0.879)	(0.318)
CumCapReq (5)	-0.884	-1.093	-0.806	-1.711*	-0.836	-1.974**
	(0.538)	(0.827)	(0.537)	(0.904)	(1.670)	(0.927)
Observations	2,847	2,847	2,847	2,847	2,516	2,847
R-squared	0.181	0.112	0.111	0.057	0.034	0.042

Notes: The sample includes quarterly data on cross-border flows (loans and debt securities) for 64 recipient countries over the period 2000:Q1 - 2013:Q4. Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1. † to borrowers in country j. ‡ issued by borrowers in country j. (1) Effective federal funds rate for the period 2001:Q1 – 2008:Q4, Wu-Xia Shadow rate for the period 2009:Q1 – 2013:Q4. (2) LT foreign currency, average across 3 agencies. (3) Chinn and Ito (2006) measure of financial openness. (4) The break dummy equals 1 for every period after (and including) the break date. (5) Cumulative capital requirements. The regressions also include a full set of country fixed effects.

Table C7c – Cumulative reserve requirements with structural breaks

	Dependent variable: ΔCross-border loans †			Dependent variable: ΔInternational debt securities ‡		
Explanatory variables	All	to banks	to non-banks	All	by banks	by non-banks
ΔFed funds rate (1)	-3.096***	-3.315***	-3.331***	-1.510	-1.123	-0.936
	(0.492)	(0.807)	(0.559)	(1.041)	(1.363)	(1.200)
Log(VIX)	-4.000***	-4.440***	-4.429***	-0.988	-5.683**	-0.231
	(0.939)	(1.632)	(1.076)	(1.310)	(2.679)	(1.583)
ΔReal GDP	0.430***	0.452***	0.473***	-0.105	0.483	0.00425
	(0.101)	(0.173)	(0.111)	(0.138)	(0.375)	(0.191)
ΔSovereign rating (2)	4.033**	6.920***	0.0943	0.875	-1.958	-0.255
	(1.763)	(2.528)	(1.081)	(1.093)	(2.145)	(1.642)
Chinn-Ito index (3)	0.994	0.520	1.913	8.868***	16.66**	5.606
	(1.888)	(3.115)	(1.891)	(3.356)	(6.896)	(3.560)
ΔReal global GDP	1.599***	1.759***	1.355***	1.059*	0.238	0.642
	(0.274)	(0.474)	(0.288)	(0.619)	(0.765)	(0.810)
Break dummy (4)	1.345	-4.036	2.026	11.03	2.378	11.53
	(4.810)	(8.162)	(5.080)	(7.804)	(17.45)	(8.632)
ΔFed funds rate*Break	-6.291***	-8.317***	-5.122***	-6.479***	-14.62	-6.372***
	(1.132)	(1.777)	(1.038)	(2.170)	(10.68)	(2.210)
Log(VIX)*Break	-1.631*	-0.279	-2.600***	-2.889**	-3.410	-2.309*
	(0.927)	(1.471)	(0.889)	(1.367)	(4.661)	(1.356)
ΔReal GDP*Break	0.538***	0.528***	0.446***	0.508***	-0.0343	0.375***
	(0.0941)	(0.149)	(0.0941)	(0.148)	(0.542)	(0.138)
ΔSovereign rating*Break	0.140	0.661	-1.935**	1.180	-2.722	1.684*
	(0.869)	(1.264)	(0.957)	(1.053)	(5.448)	(0.969)
Chinn-Ito Index*Break	-3.873*	-5.877*	-1.697	8.720***	8.642*	4.426
	(2.054)	(3.160)	(2.168)	(2.847)	(4.634)	(3.009)
ΔReal global GDP*Break	-0.316*	-0.0136	-0.339*	-1.027***	-0.631	-1.015***
	(0.186)	(0.262)	(0.184)	(0.281)	(0.819)	(0.279)
CumResReq (5)	0.412**	0.347	0.471**	-0.448	0.531	0.00809
	(0.174)	(0.259)	(0.196)	(0.376)	(0.584)	(0.250)
Observations	2,903	2,903	2,903	2,903	2,572	2,902
R-squared	0.167	0.106	0.107	0.071	0.035	0.044

Notes: The sample includes quarterly data on cross-border flows (loans and debt securities) for 64 recipient countries over the period 2000:Q1 - 2013:Q4. Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1. † to borrowers in country j. ‡ issued by borrowers in country j. (1) Effective federal funds rate for the period 2001:Q1 – 2008:Q4, Wu-Xia Shadow rate for the period 2009:Q1 – 2013:Q4. (2) LT foreign currency, average across 3 agencies. (3) Chinn and Ito (2006) measure of financial openness. (4) The break dummy equals 1 for every period after (and including) the break date. (5) Cumulative reserve requirements. The regressions also include a full set of country fixed effects.

Table C8a - LTV with structural breaks and interactions with global factors

	ΔCross-border loans †			ΔInternational debt securities ‡		
Explanatory variables	All	to banks	to non-banks	All	by banks	by non-banks
ΔFed funds rate (1)	-3.152***	-3.025**	-4.015***	0.166	1.798	-1.039
	(0.833)	(1.429)	(1.059)	(0.785)	(1.600)	(0.958)
Log(VIX)	-3.685**	-4.817*	-3.591*	-2.809**	-7.382**	-2.498
	(1.661)	(2.757)	(2.100)	(1.375)	(3.720)	(1.540)
ΔReal GDP	0.205	0.130	0.445**	-0.126	0.548	-0.151
	(0.178)	(0.266)	(0.214)	(0.188)	(0.446)	(0.237)
ΔSovereign rating (2)	6.561***	7.360**	0.538	0.962	0.635	1.215
	(2.278)	(3.229)	(1.471)	(1.365)	(1.912)	(1.751)
Chinn-Ito index (3)	7.655**	6.050	8.316***	6.828***	14.60***	2.496
	(3.029)	(6.004)	(3.156)	(2.326)	(5.405)	(2.445)
ΔReal global GDP	2.013***	1.823**	1.846***	0.113	-1.887*	0.345
	(0.445)	(0.715)	(0.494)	(0.417)	(1.099)	(0.461)
Break dummy (4)	10.87	3.708	12.49	4.408	-11.92	6.702
	(7.834)	(12.46)	(8.711)	(6.348)	(15.48)	(7.127)
ΔFed funds rate*Break	-5.231***	-6.794**	-4.839***	-4.046**	-0.0809	-4.796**
	(1.982)	(3.323)	(1.594)	(1.933)	(2.461)	(2.044)
Log(VIX)*Break	-3.236**	-2.374	-3.816***	-4.227***	-4.987**	-3.515***
	(1.424)	(2.116)	(1.201)	(1.118)	(2.320)	(1.211)
ΔReal GDP*Break	0.567***	0.486**	0.466***	0.555***	0.634***	0.390*
	(0.150)	(0.217)	(0.156)	(0.190)	(0.241)	(0.210)
ΔSovereign rating*Break	0.196	0.303	-1.062	2.249**	4.051**	2.142**
	(1.177)	(1.754)	(1.015)	(0.934)	(1.684)	(1.056)
Chinn-Ito Index*Break	-0.734	-4.136	1.974	8.331***	11.17***	1.584
	(3.147)	(4.986)	(3.551)	(2.146)	(3.884)	(2.361)
ΔReal global GDP*Break	-0.232	0.119	-0.390	-1.019***	-0.306	-0.871***
	(0.299)	(0.427)	(0.284)	(0.284)	(0.521)	(0.310)
ΔFF rate*LTV*Break	1.748	4.379	2.450	4.466	6.123	4.730
	(3.717)	(5.504)	(3.568)	(3.415)	(8.329)	(3.308)
Log(VIX)* LTV*Break	1.630	2.071	-2.501	-1.088	2.917	-1.878
	(2.882)	(3.727)	(3.857)	(1.760)	(3.402)	(2.007)
LTV (5)	-3.992	-4.921	8.242	3.954	-9.909	6.816
	(8.672)	(11.17)	(11.73)	(5.451)	(9.964)	(6.336)
ΔFF rate*LTV	-4.366	-5.194	-5.095	-3.529*	1.755	-3.216
	(3.092)	(3.742)	(3.367)	(1.910)	(3.215)	(2.450)
Log(VIX)* LTV	1.377	1.618	-2.814	-1.553	3.386	-2.276
	(3.072)	(3.851)	(4.351)	(1.975)	(3.516)	(2.280)
Observations	1,031	1,031	1,031	1,031	926	1,031
R-squared	0.206	0.136	0.150	0.117	0.118	0.084

Notes: The sample includes quarterly data on cross-border flows (loans and debt securities) for 64 recipient countries over the period 2000:Q1 - 2013:Q4. Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1. † to borrowers in country j. ‡ issued by borrowers in country j. (1) Effective federal funds rate for the period 2001:Q1 – 2008:Q4, Wu-Xia Shadow rate for the period 2009:Q1 – 2013:Q4. (2) LT foreign currency, average across 3 agencies. (3) Chinn and Ito (2006) measure of financial openness. (4) The break dummy equals 1 for every period after (and including) the break date. (5) Loan-to-value ratio caps. The regressions also include a full set of country fixed effects.

Table C8b – Capital requirements with structural breaks and interactions with global factors

	ΔCross-border loans †			ΔInternational debt securities ‡		
Explanatory variables	All	to banks	to non-banks	All	by banks	by non-banks
ΔFed funds rate (1)	-3.129***	-3.158***	-3.379***	-1.447	-1.281	-0.925
	(0.471)	(0.745)	(0.551)	(1.043)	(1.374)	(1.207)
Log(VIX)	-4.026***	-4.528***	-4.465***	-0.974	-5.716**	-0.0971
	(0.914)	(1.467)	(1.065)	(1.294)	(2.685)	(1.575)
ΔReal GDP	0.432***	0.543***	0.442***	-0.0603	0.435	0.0158
	(0.0997)	(0.161)	(0.108)	(0.134)	(0.360)	(0.194)
ΔSovereign rating (2)	3.712**	4.900**	0.303	0.880	-1.795	-0.282
	(1.756)	(2.157)	(1.089)	(1.102)	(2.139)	(1.661)
Chinn-Ito index (3)	1.313	0.793	2.253	8.712***	16.55**	5.609
	(1.886)	(3.100)	(1.892)	(3.318)	(6.946)	(3.524)
ΔReal global GDP	1.587***	1.501***	1.379***	0.972	0.346	0.628
	(0.263)	(0.403)	(0.283)	(0.608)	(0.749)	(0.813)
Break dummy (4)	-0.525	-5.570	0.869	8.804	-2.146	9.437
	(4.705)	(7.264)	(5.045)	(7.960)	(18.70)	(8.814)
ΔFed funds rate*Break	-6.966***	-9.196***	-5.523***	-6.968***	-17.37	-6.848***
	(1.069)	(1.760)	(0.924)	(2.269)	(11.11)	(2.306)
Log(VIX)*Break	-1.017	-0.0327	-2.164**	-2.376*	-1.820	-1.589
	(0.921)	(1.367)	(0.886)	(1.442)	(5.070)	(1.472)
ΔReal GDP*Break	0.584***	0.642***	0.483***	0.459***	0.00712	0.374***
	(0.0876)	(0.123)	(0.0904)	(0.143)	(0.535)	(0.138)
ΔSovereign rating*Break	-0.305	0.0413	-2.282***	1.629	-2.563	1.983**
	(0.697)	(1.175)	(0.781)	(1.076)	(5.585)	(0.992)
Chinn-Ito Index*Break	-4.247**	-5.928*	-2.065	8.970***	7.645	4.417
	(2.024)	(3.036)	(2.151)	(2.920)	(4.781)	(3.093)
ΔReal global GDP*Break	-0.313*	-0.180	-0.330**	-0.994***	-0.651	-0.968***
	(0.166)	(0.233)	(0.164)	(0.287)	(0.834)	(0.288)
ΔFF rate* CapReq *Break	20.70***	36.07***	11.84	19.31**	-13.88	13.67*
	(6.146)	(11.85)	(7.872)	(8.242)	(27.87)	(8.273)
Log(VIX)* CapReq *Break	-6.829	-4.402	-6.796	4.100	11.45	3.377
	(4.172)	(5.533)	(5.041)	(4.514)	(19.05)	(4.167)
CapReq (5)	21.78*	16.48	19.51	-8.336	-30.37	-6.992
	(12.13)	(15.78)	(14.55)	(12.38)	(52.62)	(11.30)
ΔFF rate* CapReq	-	-	-	-	-	-
Log(VIX)* CapReq	-6.843*	-4.427	-7.290	0.124	2.962	0.469
	(3.760)	(4.901)	(4.504)	(3.821)	(16.23)	(3.484)
Observations	2,847	2,847	2,847	2,847	2,516	2,847
R-squared	0.183	0.114	0.112	0.057	0.034	0.041

Notes: The sample includes quarterly data on cross-border flows (loans and debt securities) for 64 recipient countries over the period 2000:Q1 - 2013:Q4. Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1. † to borrowers in country j. ‡ issued by borrowers in country j. (1) Effective federal funds rate for the period 2001:Q1 – 2008:Q4, Wu-Xia Shadow rate for the period 2009:Q1 – 2013:Q4. (2) LT foreign currency, average across 3 agencies. (3) Chinn and Ito (2006) measure of financial openness. (4) The break dummy equals 1 for every period after (and including) the break date. (5) Capital requirements. The regressions also include a full set of country fixed effects.

Table C8c – Reserve requirements with structural breaks and interactions with global factors

	ΔCross-border loans †			ΔInternational debt securities ‡		
Explanatory variables	All	to banks	to non-banks	All	by banks	by non-banks
ΔFed funds rate (1)	-3.070***	-3.352***	-3.243***	-1.318	-1.213	-0.880
	(0.507)	(0.818)	(0.582)	(0.894)	(1.417)	(1.052)
Log(VIX)	-3.753***	-4.291***	-4.092***	-0.999	-5.499**	-0.295
	(0.952)	(1.658)	(1.081)	(1.441)	(2.782)	(1.690)
ΔReal GDP	0.387***	0.420**	0.416***	-0.0620	0.429	0.0133
	(0.101)	(0.174)	(0.108)	(0.128)	(0.351)	(0.189)
ΔSovereign rating (2)	4.088**	6.878***	0.227	1.171	-2.116	-0.0227
	(1.786)	(2.565)	(1.127)	(1.201)	(2.154)	(1.729)
Chinn-Ito index (3)	1.106	0.646	2.008	8.624***	16.78**	5.541
	(1.891)	(3.117)	(1.889)	(3.265)	(6.929)	(3.472)
ΔReal global GDP	1.687***	1.787***	1.494***	1.118	0.239	0.767
	(0.276)	(0.481)	(0.287)	(0.731)	(0.766)	(0.916)
Break dummy (4)	2.593	-3.300	3.712	11.55	2.934	12.21
	(4.871)	(8.242)	(5.108)	(8.619)	(17.58)	(9.362)
ΔFed funds rate*Break	-6.470***	-8.542***	-5.238***	-6.360***	-14.61	-6.276***
	(1.251)	(1.968)	(1.055)	(2.186)	(10.57)	(2.233)
Log(VIX)*Break	-1.683*	-0.389	-2.579***	-3.055**	-3.354	-2.406*
	(0.939)	(1.485)	(0.899)	(1.357)	(4.661)	(1.364)
ΔReal GDP*Break	0.580***	0.566***	0.490***	0.465***	0.0361	0.370***
	(0.0947)	(0.150)	(0.0958)	(0.140)	(0.532)	(0.134)
ΔSovereign rating*Break	0.149	0.711	-1.992**	1.276	-2.794	1.716*
	(0.874)	(1.250)	(0.975)	(1.061)	(5.466)	(0.980)
Chinn-Ito Index*Break	-3.971*	-5.753*	-2.058	9.024***	8.384*	4.479
	(2.038)	(3.148)	(2.158)	(2.905)	(4.743)	(3.060)
ΔReal global GDP*Break	-0.356*	-0.0524	-0.377**	-1.006***	-0.701	-1.032***
	(0.191)	(0.269)	(0.187)	(0.284)	(0.841)	(0.279)
ΔFF rate* ResReq *Break	-7.741	-11.67	-2.193	-4.671	1.988	-4.482
	(6.018)	(9.543)	(2.433)	(5.468)	(10.17)	(5.228)
Log(VIX)* ResReq *Break	-1.533	-0.232	-3.782**	1.548	0.744	1.510
	(1.883)	(3.025)	(1.564)	(5.050)	(4.551)	(5.115)
ResReq (5)	5.709	1.672	12.72**	-3.667	-2.511	-3.252
	(5.477)	(8.950)	(4.944)	(15.61)	(14.08)	(16.49)
ΔFF rate* ResReq	0.205	-0.513	0.500	3.166	-1.164	2.393
	(1.241)	(1.723)	(1.384)	(4.664)	(2.739)	(4.844)
Log(VIX)* ResReq	-1.455	-0.296	-3.512**	1.017	1.068	0.621
	(1.766)	(2.865)	(1.573)	(4.965)	(4.568)	(5.266)
Observations	2,903	2,903	2,903	2,903	2,572	2,902
R-squared	0.168	0.106	0.108	0.073	0.035	0.046

Notes: The sample includes quarterly data on cross-border flows (loans and debt securities) for 64 recipient countries over the period 2000:Q1 - 2013:Q4. Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1. † to borrowers in country j. ‡ issued by borrowers in country j. (1) Effective federal funds rate for the period 2001:Q1 – 2008:Q4, Wu-Xia Shadow rate for the period 2009:Q1 – 2013:Q4. (2) LT foreign currency, average across 3 agencies. (3) Chinn and Ito (2006) measure of financial openness. (4) The break dummy equals 1 for every period after (and including) the break date. (5) Reserve requirements. The regressions also include a full set of country fixed effects.

Table C9a – Cumulative LTV with structural breaks and interactions with global factors

	ΔCross-border loans †			ΔInternational debt securities ‡		
Explanatory variables	All	to banks	to non-banks	All	by banks	by non-banks
ΔFed funds rate (1)	-3.243***	-3.174**	-3.947***	0.152	1.876	-1.086
	(0.829)	(1.446)	(1.058)	(0.784)	(1.612)	(0.949)
Log(VIX)	-3.756**	-4.907*	-3.876*	-2.903**	-7.314*	-2.554*
	(1.667)	(2.792)	(2.129)	(1.386)	(3.770)	(1.513)
ΔReal GDP	0.316*	0.268	0.534**	-0.0719	0.586	-0.103
	(0.183)	(0.272)	(0.225)	(0.195)	(0.467)	(0.247)
ΔSovereign rating (2)	6.936***	7.877**	0.211	0.812	0.176	1.232
	(2.378)	(3.393)	(1.568)	(1.410)	(2.012)	(1.777)
Chinn-Ito index (3)	6.497**	4.502	7.288**	6.503***	16.20***	2.066
	(3.143)	(6.630)	(3.255)	(2.473)	(5.747)	(2.540)
ΔReal global GDP	1.923***	1.717**	1.704***	0.0501	-1.964*	0.302
	(0.455)	(0.728)	(0.505)	(0.409)	(1.133)	(0.449)
Break dummy (4)	7.236	-0.433	8.744	3.089	-13.41	6.515
	(7.978)	(12.93)	(8.946)	(6.527)	(16.31)	(7.004)
ΔFed funds rate*Break	-5.735***	-7.736**	-4.942***	-4.861**	-1.105	-5.418***
	(2.084)	(3.571)	(1.612)	(1.950)	(2.506)	(2.030)
Log(VIX)*Break	-2.151	-1.167	-2.932**	-3.874***	-4.228*	-3.496***
	(1.507)	(2.253)	(1.297)	(1.216)	(2.475)	(1.302)
ΔReal GDP*Break	0.550***	0.457**	0.441***	0.535***	0.596**	0.364*
	(0.146)	(0.210)	(0.152)	(0.195)	(0.244)	(0.214)
ΔSovereign rating*Break	0.140	0.168	-1.052	2.063**	3.720**	1.986*
	(1.195)	(1.779)	(1.023)	(0.920)	(1.659)	(1.080)
Chinn-Ito Index*Break	-2.270	-6.099	0.598	7.644***	11.51***	0.980
	(3.231)	(5.461)	(3.669)	(2.348)	(4.411)	(2.547)
ΔReal global GDP*Break	-0.163	0.202	-0.358	-1.003***	-0.270	-0.865***
	(0.291)	(0.414)	(0.276)	(0.282)	(0.516)	(0.308)
ΔFF rate*CumLTV*Break	0.449	1.017	-0.0814	1.080	1.098	0.819
	(0.734)	(0.958)	(0.856)	(0.768)	(0.856)	(0.923)
Log(VIX)*CumLTV*Break	-0.655	-0.633	-0.676	-0.123	-0.545	0.241
	(0.605)	(0.781)	(0.596)	(0.345)	(0.690)	(0.478)
CumLTV (5)	2.598	2.784	2.593	0.928	2.134	-0.204
	(1.804)	(2.321)	(1.837)	(1.027)	(2.011)	(1.387)
ΔFF rate*CumLTV	-0.171	-0.0143	-0.891	0.0138	0.131	0.409
	(0.731)	(0.887)	(0.669)	(0.337)	(0.594)	(0.443)
Log(VIX)*CumLTV	-0.822	-0.858	-0.733	-0.116	-0.260	0.270
	(0.682)	(0.875)	(0.668)	(0.398)	(0.768)	(0.523)
Observations	1,031	1,031	1,031	1,031	926	1,031
R-squared	0.206	0.137	0.153	0.120	0.121	0.085

Notes: The sample includes quarterly data on cross-border flows (loans and debt securities) for 64 recipient countries over the period 2000:Q1 - 2013:Q4. Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1. † to borrowers in country j. ‡ issued by borrowers in country j. (1) Effective federal funds rate for the period 2001:Q1 – 2008:Q4, Wu-Xia Shadow rate for the period 2009:Q1 – 2013:Q4. (2) LT foreign currency, average across 3 agencies. (3) Chinn and Ito (2006) measure of financial openness. (4) The break dummy equals 1 for every period after (and including) the break date. (5) Cumulative loan-to-value ratio caps. The regressions also include a full set of country fixed effects.

Table C9b – Cumulative capital requirements with structural breaks and interactions with global factors

	ΔCross-border loans †			ΔInternational debt securities ‡		
Explanatory variables	All	to banks	to non-banks	All	by banks	by non-banks
ΔFed funds rate (1)	-3.125***	-3.185***	-3.343***	-1.487	-1.325	-0.968
	(0.474)	(0.750)	(0.553)	(1.051)	(1.386)	(1.215)
Log(VIX)	-4.033***	-4.528***	-4.486***	-1.032	-5.816**	-0.143
	(0.915)	(1.469)	(1.067)	(1.302)	(2.694)	(1.582)
ΔReal GDP	0.434***	0.547***	0.443***	-0.0545	0.441	0.0210
	(0.0999)	(0.161)	(0.109)	(0.133)	(0.360)	(0.194)
ΔSovereign rating (2)	3.690**	4.883**	0.259	0.854	-1.924	-0.281
	(1.763)	(2.168)	(1.090)	(1.099)	(2.127)	(1.659)
Chinn-Ito index (3)	1.346	0.853	2.270	8.725***	16.96**	5.598
	(1.891)	(3.106)	(1.899)	(3.341)	(6.819)	(3.546)
ΔReal global GDP	1.581***	1.492***	1.374***	0.972	0.339	0.632
	(0.263)	(0.403)	(0.283)	(0.608)	(0.749)	(0.812)
Break dummy (4)	4.287	-0.0413	4.186	21.91**	3.084	23.84**
	(5.601)	(8.723)	(6.006)	(8.612)	(20.21)	(9.526)
ΔFed funds rate*Break	-7.487***	-9.883***	-6.149***	-5.644**	-19.59	-5.708**
	(1.332)	(2.215)	(1.099)	(2.462)	(14.24)	(2.526)
Log(VIX)*Break	-2.475*	-1.741	-3.194**	-6.270***	-3.666	-5.824***
	(1.290)	(1.981)	(1.292)	(1.669)	(5.858)	(1.753)
ΔReal GDP*Break	0.603***	0.669***	0.493***	0.485***	0.0196	0.401***
	(0.0875)	(0.122)	(0.0903)	(0.143)	(0.519)	(0.138)
ΔSovereign rating*Break	-0.339	-0.107	-2.195***	1.482	-2.814	1.902*
	(0.694)	(1.172)	(0.790)	(1.063)	(5.570)	(0.997)
Chinn-Ito Index*Break	-3.964*	-5.406*	-1.897	9.605***	8.588*	4.962
	(2.063)	(3.080)	(2.200)	(3.033)	(5.019)	(3.212)
ΔReal global GDP*Break	-0.414**	-0.296	-0.401**	-1.252***	-0.756	-1.248***
	(0.174)	(0.251)	(0.170)	(0.301)	(0.895)	(0.304)
ΔFF rate*CumCap*Break	4.110**	5.866**	3.218**	-0.582	6.202	-0.241
	(1.894)	(2.850)	(1.542)	(2.918)	(10.72)	(2.942)
Log(VIX)*CumCap*Break	-0.691	-0.989	-0.812	4.480	5.814	4.585
	(1.909)	(2.774)	(1.951)	(3.576)	(6.160)	(3.595)
CumCap (5)	1.652	2.562	1.935	-14.40	-16.07	-14.95
	(5.441)	(7.928)	(5.528)	(9.687)	(17.54)	(9.764)
ΔFF rate*CumCap	-0.782	0.659	-2.729	3.322	2.667	3.854*
	(2.526)	(4.078)	(2.632)	(2.173)	(6.203)	(2.063)
Log(VIX)*CumCap	-1.089	-1.812	-1.174	4.904	4.018	5.596
	(1.989)	(2.923)	(2.187)	(3.703)	(6.645)	(3.730)
Observations	2,847	2,847	2,847	2,847	2,516	2,847
R-squared	0.182	0.113	0.112	0.057	0.035	0.042

Notes: The sample includes quarterly data on cross-border flows (loans and debt securities) for 64 recipient countries over the period 2000:Q1 - 2013:Q4. Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1. † to borrowers in country j. ‡ issued by borrowers in country j. (1) Effective federal funds rate for the period 2001:Q1 – 2008:Q4, Wu-Xia Shadow rate for the period 2009:Q1 – 2013:Q4. (2) LT foreign currency, average across 3 agencies. (3) Chinn and Ito (2006) measure of financial openness. (4) The break dummy equals 1 for every period after (and including) the break date. (5) Cumulative capital requirements. The regressions also include a full set of country fixed effects.

Table C9c – Cumulative reserve requirements with structural breaks and interactions with global factors

	ΔCross-border loans †			ΔInternational debt securities ‡		
Explanatory variables	All	to banks	to non-banks	All	by banks	by non-banks
ΔFed funds rate (1)	-3.366***	-3.619***	-3.505***	-1.366	-1.730	-0.820
	(0.512)	(0.821)	(0.579)	(0.935)	(1.348)	(1.136)
Log(VIX)	-4.286***	-4.957***	-4.616***	-1.054	-6.086**	-0.282
	(0.945)	(1.654)	(1.087)	(1.342)	(2.679)	(1.630)
ΔReal GDP	0.422***	0.438**	0.468***	-0.107	0.504	0.00252
	(0.102)	(0.175)	(0.112)	(0.137)	(0.381)	(0.191)
ΔSovereign rating (2)	3.932**	6.918***	0.0390	1.099	-1.909	-0.0550
	(1.811)	(2.594)	(1.081)	(1.135)	(2.193)	(1.666)
Chinn-Ito index (3)	1.176	0.833	2.053	8.989***	15.85**	5.750
	(1.881)	(3.098)	(1.891)	(3.461)	(6.799)	(3.661)
ΔReal global GDP	1.680***	1.850***	1.413***	1.044*	0.346	0.644
	(0.270)	(0.468)	(0.287)	(0.626)	(0.767)	(0.819)
Break dummy (4)	1.703	-3.820	2.279	10.74	1.872	11.37
	(4.790)	(8.162)	(5.072)	(7.793)	(17.27)	(8.636)
ΔFed funds rate*Break	-5.972***	-7.833***	-4.834***	-6.231***	-13.88	-6.107***
	(1.122)	(1.671)	(1.106)	(1.993)	(11.00)	(2.047)
Log(VIX)*Break	-1.964**	-0.791	-2.820***	-2.883**	-3.627	-2.317*
	(0.924)	(1.462)	(0.900)	(1.363)	(4.688)	(1.336)
ΔReal GDP*Break	0.453***	0.443***	0.382***	0.526***	-0.239	0.368**
	(0.0921)	(0.142)	(0.0947)	(0.164)	(0.583)	(0.147)
ΔSovereign rating*Break	-0.107	0.361	-2.117**	1.199	-3.220	1.659*
	(0.873)	(1.304)	(0.928)	(1.042)	(5.508)	(0.955)
Chinn-Ito Index*Break	-3.111	-4.908	-1.131	8.759***	9.053**	4.626
	(2.049)	(3.155)	(2.182)	(2.963)	(4.579)	(3.121)
ΔReal global GDP*Break	-0.220	0.0887	-0.267	-1.044***	-0.389	-1.008***
	(0.186)	(0.261)	(0.184)	(0.290)	(0.795)	(0.288)
ΔFF rate*CumRes*Break	0.600	0.976	0.546	0.543	2.086	0.542
	(0.472)	(0.772)	(0.412)	(0.878)	(2.701)	(0.941)
Log(VIX)*CumRes*Break	-0.678**	-1.160**	-0.432	-0.0504	-0.899	-0.0223
	(0.329)	(0.513)	(0.274)	(0.451)	(1.079)	(0.472)
CumRes (5)	2.764***	4.199***	2.017**	-0.279	4.012	0.164
	(0.980)	(1.521)	(0.831)	(1.567)	(3.668)	(1.491)
ΔFF rate*CumRes	-0.446	-0.509	-0.262	0.349	-1.037	0.340
	(0.352)	(0.514)	(0.325)	(0.548)	(0.870)	(0.572)
Log(VIX)*CumRes	-1.063***	-1.597***	-0.713**	0.0151	-1.753	-0.0362
	(0.341)	(0.529)	(0.294)	(0.506)	(1.274)	(0.511)
Observations	2,903	2,903	2,903	2,903	2,572	2,902
R-squared	0.176	0.111	0.111	0.072	0.038	0.045

Notes: The sample includes quarterly data on cross-border flows (loans and debt securities) for 64 recipient countries over the period 2000:Q1 - 2013:Q4. Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1. † to borrowers in country j. ‡ issued by borrowers in country j. (1) Effective federal funds rate for the period 2001:Q1 – 2008:Q4, Wu-Xia Shadow rate for the period 2009:Q1 – 2013:Q4. (2) LT foreign currency, average across 3 agencies. (3) Chinn and Ito (2006) measure of financial openness. (4) The break dummy equals 1 for every period after (and including) the break date. (5) Cumulative reserve requirements. The regressions also include a full set of country fixed effects.

Table C10 – Baseline with structural breaks, aggregate flows

	Dependent variable:		
	ΔTotal cross-border flows (loans and debt securities)		
Explanatory variables	All	to banks	to non-banks
ΔFed funds rate (1)	-2.073***	-2.748***	-2.101***
	(0.356)	(0.657)	(0.373)
Log(VIX)	-3.096***	-3.239**	-2.691***
	(0.664)	(1.299)	(0.691)
ΔReal GDP	0.284***	0.299**	0.213***
	(0.0798)	(0.151)	(0.0807)
ΔSovereign rating (2)	1.462	3.101**	0.0259
	(1.002)	(1.502)	(0.760)
Chinn-Ito index (3)	3.266***	6.608***	2.556**
	(1.217)	(2.502)	(1.175)
ΔReal global GDP	1.083***	1.814***	0.778***
	(0.198)	(0.372)	(0.202)
Break dummy (4)	4.141	1.004	4.665
	(3.449)	(6.889)	(3.427)
ΔFed funds rate*Break	-6.592***	-7.694***	-5.674***
	(0.844)	(1.274)	(0.788)
Log(VIX)*Break	-2.241***	-0.859	-2.259***
	(0.700)	(1.336)	(0.653)
ΔReal GDP*Break	0.513***	0.616***	0.424***
	(0.0676)	(0.132)	(0.0747)
ΔSovereign rating*Break	-0.338	0.598	0.0500
	(0.685)	(1.284)	(0.564)
Chinn-Ito Index*Break	-0.752	1.813	-0.425
	(1.321)	(2.546)	(1.275)
ΔReal global GDP*Break	-0.554***	-0.0863	-0.655***
	(0.130)	(0.241)	(0.137)
Observations	2,903	2,572	2,902
R-squared	0.182	0.128	0.121

Notes: The sample includes quarterly data on cross-border flows (loans and debt securities) for 64 recipient countries over the period 2000:Q1 - 2013:Q4. Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1 (1) Effective federal funds rate for the period 2001:Q1 – 2008:Q4, Wu-Xia Shadow rate for the period 2009:Q1 – 2013:Q4. (2) LT foreign currency, average across 3 agencies. (3) Chinn and Ito (2006) measure of financial openness. (4) The break dummy equals 1 for every period after (and including) the break date. The regressions also include a full set of country fixed effects.

Table C11 – CBS baseline model with structural breaks

	Dependent variable: ΔInternational claims †			
Explanatory variables	All	to banks	to the public sector	to non-banks (private)
ΔFed funds rate (1)	-0.872***	-0.305	0.865*	-1.820***
	(0.225)	(0.424)	(0.444)	(0.222)
Log(VIX)	-2.921***	-4.986***	-1.295	-2.955***
	(0.433)	(0.819)	(0.853)	(0.430)
ΔReal GDP	0.252***	0.301***	0.0955	0.221***
	(0.0423)	(0.0831)	(0.0860)	(0.0412)
ΔSovereign rating (2)	1.616***	4.311***	2.956***	0.125
	(0.452)	(0.906)	(0.949)	(0.451)
Chinn-Ito index (3)	2.087***	3.321**	-1.168	1.677**
	(0.681)	(1.408)	(1.462)	(0.677)
ΔReal global GDP	1.074***	0.837***	0.516**	1.328***
	(0.117)	(0.222)	(0.229)	(0.114)
Break dummy (4)	5.555***	-0.0238	15.34***	5.954***
	(2.150)	(4.177)	(4.348)	(2.075)
ΔFed funds rate*Break	-4.802***	-5.721***	-8.505***	-4.346***
	(0.524)	(1.025)	(1.086)	(0.480)
Log(VIX)*Break	-2.926***	-3.565***	-4.774***	-2.671***
	(0.422)	(0.841)	(0.881)	(0.391)
ΔReal GDP*Break	0.348***	0.596***	0.370***	0.213***
	(0.0416)	(0.0844)	(0.0867)	(0.0387)
ΔSovereign rating*Break	1.611***	2.926***	2.176***	0.474
	(0.368)	(0.791)	(0.715)	(0.360)
Chinn-Ito Index*Break	0.00132	1.207	-2.595	-1.037
	(0.746)	(1.553)	(1.596)	(0.724)
ΔReal global GDP*Break	-0.647***	-0.764***	-1.201***	-0.493***
	(0.0744)	(0.147)	(0.155)	(0.0688)
Observations	68,258	59,970	42,157	63,298
R-squared	0.025	0.015	0.015	0.026

Notes: The sample includes quarterly data on international claims (all, to private banks, to public banks, to non-banks) from lending banks in 30 countries to recipients in 64 countries over the period 2000:Q1 - 2013:Q4. Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1. (1) Effective federal funds rate for the period 2001:Q1 – 2008:Q4, Wu-Xia Shadow rate for the period 2009:Q1 – 2013:Q4. (2) LT foreign currency, average across 3 agencies. (3) Chinn and Ito (2006) measure of financial openness. (4) The break dummy equals 1 for every period after (and including) the break date. The regression includes lending country and borrowing country fixed effects.

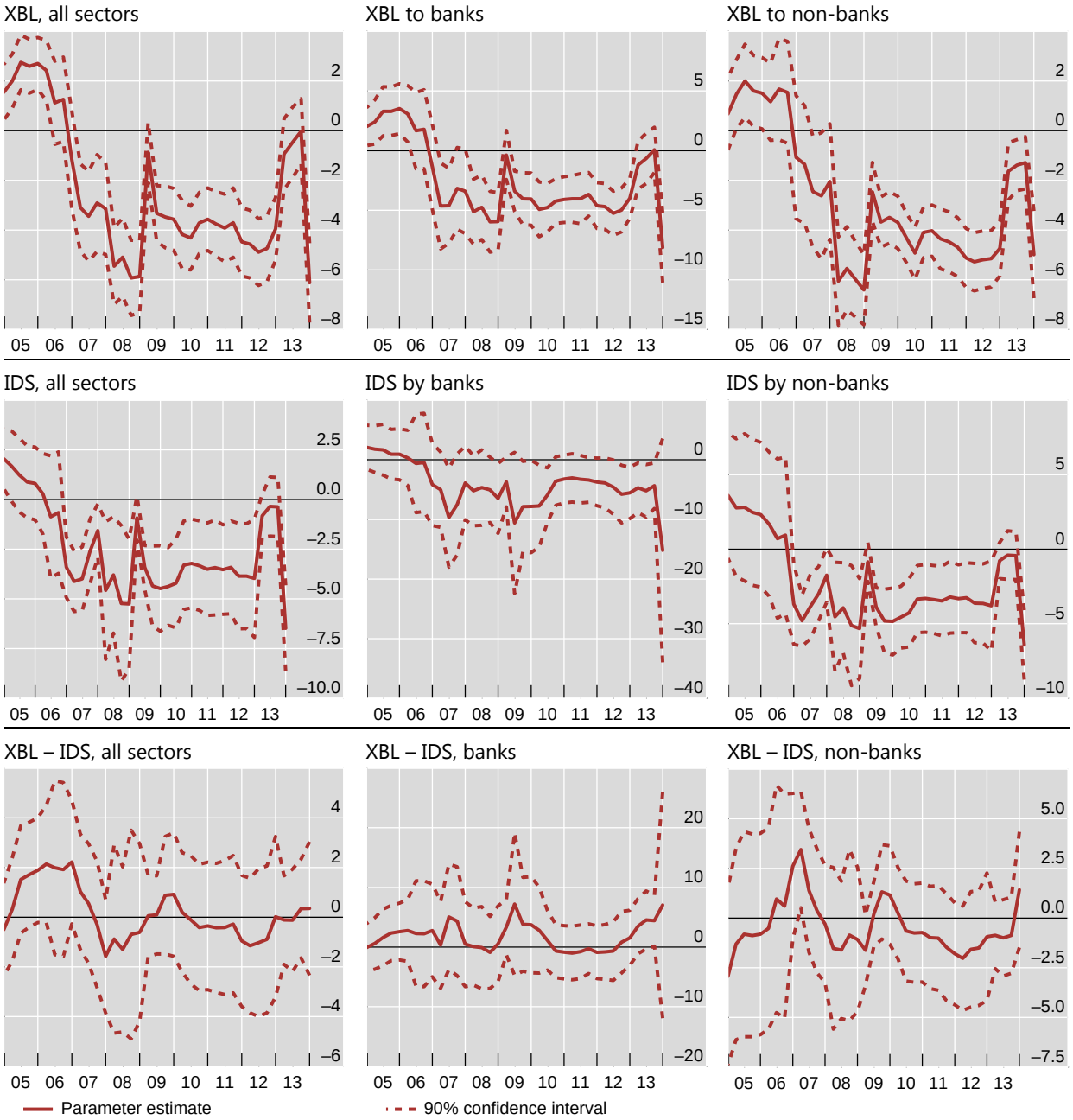
Table C12 XBL and IDS, typical lenders and borrowers

	Typical Lenders	Typical Borrowers	*Notes*
XB loans to banks	Internationally-active banks	Banks (all sizes)	*Interbank market (unsecured and repo)*
XB loans to nonbanks	Internationally-active banks	Large non-financial corporates; exporting/importing firms; Leveraged non-bank financials	*Syndicated loan market; trade credit; project financing*
IDS issued by banks	Pension funds; Insurance companies; Money Market Mutual Funds; Hedge funds	Large and mid-sized banks	*Smaller investor base than for IDS issued by non-banks*
IDS issued by non-banks	Pension funds; Insurance companies; Mutual Funds; Hedge funds	Non-financial corporates; governments; Insurance companies	*Broader investor base than for IDS issued by banks*

Graphs

Five-year rolling window estimation for the coefficient on the ΔFED fund rate

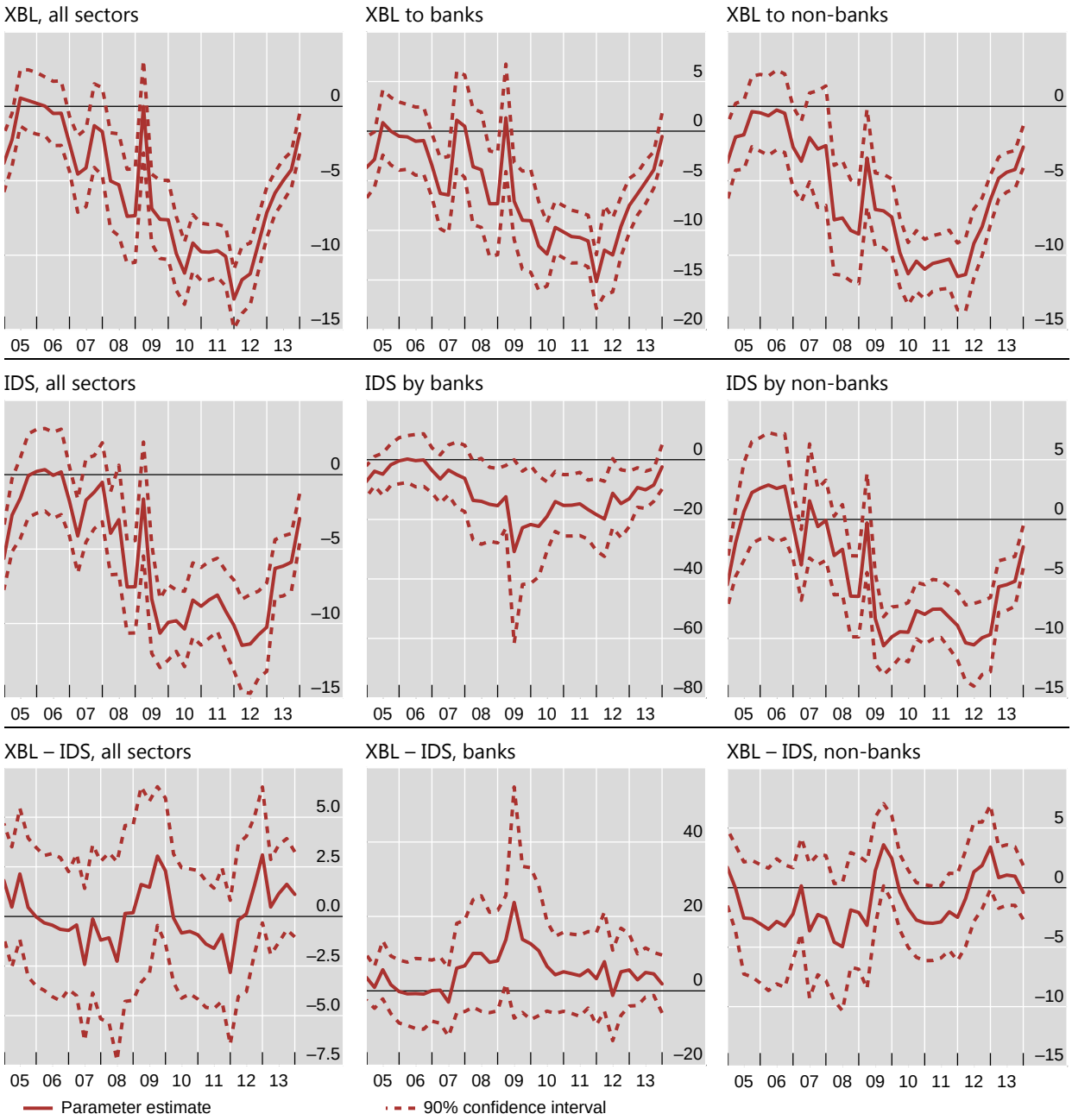
Graph C1



Notes: The first row reports the value of the coefficient of ΔFed fund rates, together with 90% confidence intervals obtained by rolling-window regression of cross-border loans (to all, to banks, to non banks) using the specification reported in the first column of Table 3. The second row reports the value of the coefficient of ΔFed fund rates, together with 90% confidence intervals obtained by rolling-window regression of international debt securities (issued by all, by banks, by non banks) using the specification reported in the second column of Table 3. The window size of the rolling regressions is 40 quarters. The dates shown on the x-axis are the last ones included in every window. The last row reports the difference between the impact of ΔFed fund rates on cross-border loans and IDS for every different sector.

Five-year rolling window estimation for the coefficient on the log(VIX)

Graph C2



Notes: The first row reports the value of the coefficient of log(VIX), together with 90% confidence intervals obtained by rolling-window regression of cross-border loans (to all, to banks, to non banks) using the specification reported in the first column of Table 3. The second row reports the value of the coefficient of log(VIX), together with 90% confidence intervals obtained by rolling-window regression of international debt securities (issued by all, by banks, by non banks) using the specification reported in the second column of Table 3. The window size of the rolling regressions is 40 quarters. The dates shown on the x-axis are the last ones included in every window. The last row reports the difference between the impact of log(VIX) on cross-border loans and IDS for every different sector.

Graph C3: Sum of square residuals (SSR) test on structural breaks for all parameters