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ABSTRACT

Since the 1990s, domestic bank credit has been reallocated away from lending to non-financial business and toward households. An expanding literature discusses negative effects on growth and stability of this change in credit allocation. We research its drivers. We hypothesize that if foreign capital flows into economies with few investment opportunities, it may substitute for domestic bank lending to non-financial business, so that bank balance sheets become more dominated by household lending. In GMM estimations on data for 36 economies over 1990–2011, we find evidence consistent with this mechanism. Foreign capital inflows into the non-bank sector (but not into the bank sector) are associated with lower shares of business lending in domestic bank portfolios. The association is weaker in economies with more investment opportunities, whether proxied by investment shares, current account surpluses, or EMU membership. Our results highlight the importance of sectoral destination in determining the effects of capital flows.

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1. Introduction

The level and allocation of bank loans has changed profoundly in recent decades. In a sample of 17 advanced economies, Jorda et al. (2014) observe an average increase of credit-to-GDP of 78 percentage points between 1960 and 2010. While traditionally most bank credit goes to non-financial business, more than two thirds of the increase observed by Jorda et al. (2014) was an expansion of

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household credit. In the present paper, we find that over 1990–2011 in a sample of 36 countries, the non-financial business credit share in all bank loans declined from 54% to 42% on average.

The rapid change in allocation of domestic bank credit raises concerns about its growth and stability effects, as a small but expanding literature shows. Less lending to business, and more household credit, causes lower private savings (Jappelli and Pagano, 1994) and slower economic growth (Beck et al., 2012; Bezemer et al., 2014). Economies with more household credit have larger external imbalances (Büyükkarabacak and Krause, 2009), increased probability of crisis, and both deeper and longer post-crisis recessions (Barba and Pivetti, 2009; Claessens et al., 2010; Büyükkarabacak and Valev, 2010; Cecchetti et al., 2011; Lane and Milesi-Ferretti, 2011; Berkmen et al., 2012; IMF, 2012; Sutherland et al., 2012; Babecky et al., 2013; Jappelli et al., 2013; Beck et al., 2014). These effects run through both consumption channels (Dyhan, 2012; Mian and Sufi, 2009, 2014) and investment channels (Chakraborty et al., 2014). This evidence points to the danger that the relative decline of loans to non-financial business increases financial fragility.

In this paper we research the conditions in which this change occurred, focusing on capital flows. Since net capital flows reveal little about financing conditions (Borio and Disyatat, 2011; Borio et al., 2014), we use gross capital inflows. We separate capital inflows according to their sectoral destination as inflows into banks and into non-banks. We test the hypothesis that capital inflows into non-banks are associated with a decrease in the share of domestic bank loans to non-financial businesses (the ‘non-financial business loan share’): businesses substitute domestic bank loans for foreign finance.

In order to observe the allocation of bank loans, we collected data from the consolidated balance sheets of monetary financial institutions in 36 countries over 1990–2011 (with the time period dictated by data availability). We also gathered data on debt and equity capital inflows separately into the bank and non-bank sectors, and control variables.

Exploration of the data shows that the decline in banks’ non-financial business loan share coincided with a surge in capital inflows, especially from around 2002–2003. In panel GMM models, we find that the decline in the non-financial business loan share is significantly associated with growth in credit-to-GDP ratios, credit market deregulation, stock market capitalization, and capital inflows into the non-bank sector. The association of a falling non-financial business loan share with foreign capital into the non-bank sector is stronger in economies with scarce investment opportunities, where domestic and foreign finance compete for funding investments. Investment opportunities are likely to be larger in countries with high investment-to-GDP ratios, in current account surplus economies, and in EMU member states, with its large internal market and common currency (15 of 36 countries in our sample are EMU members). Using each of these variables as proxies for investment opportunities, we find positive and significant marginal effects. This indicates weaker associations of falling non-financial business loan share with foreign capital flows into the non-bank sector in economies with more investment opportunities.

Our findings are in line with the hypothesis that the link from larger capital inflows to more fragile bank loan portfolios (dominated by household rather than non-financial business credit) runs via foreign capital into the non-bank sector, and that this link is stronger when investment opportunities are fewer. There are potential implications for macroprudential policy and for the regulation of capital flows, which we discuss in more detail in the concluding section. Our methods and data constitute limitations on the firmness of our conclusions, and we suggest that this hypothesis merits further research.

The paper proceeds as follows. In Section 2 we discuss the conditions which may link capital inflows to domestic credit allocation. In Section 3 we introduce and explore the data. Section 4 describes the methodology. In Section 5 we present and discuss the estimation results. Section 6 concludes with a summary and reflection on the limitations of this study, and avenues for future work.

2. Capital flows and domestic credit allocation

Capital flows may be part of the catching-up process of less productive economies through formation and upgrading of productive capacity. They may support growth and external sustainability, provided capital flows finance productive investment in tradable goods, such that repayment is assured by a future export surplus (Blanchard and Giavazzi, 2002; Eichengreen, 2010; Lucas, 1990). In this scenario, capital flows should lead to rising investment by non-financial firms in the tradable sector.

Many deficit countries, however, lag behind in productivity growth. They experienced booms in real estate and consumption, rather than in non-financial business investment (Obstfeld, 2012). Lane (2013) discusses how the nontradable sector rather than the tradable sector expands during a high-deficit phase. Benigno et al. (2015) test this argument for 69 countries over 1975–2010 and find that large capital inflows are associated with growth of the nontradable sectors at the expense of the tradable sectors, such as agriculture and manufacturing. This raises questions about the “distinction between productive and unproductive purposes of foreign borrowing” and investment, as Giavazzi and Spaventa (2010, p. 7) note.

Capital inflows are reported by their sectoral destination as inflows into the bank and non-bank sectors. The ‘bank’ sector includes deposit-taking corporations (banks). The non-bank sector consists of non-financial business firms, non-bank financial firms, and households. While the risks of cross-border loans and capital flows into the *bank* sector are well recognized, capital flowing into the *non-bank* sector may be equally, if not more important for sustainability of capital flows (Eichengreen, 2010). Specifically, we suggest that capital inflows into the non-bank sector may have an unintended side effect on the allocation of domestic bank credit, by crowding out domestic bank loans. These inflows result from rational investment strategies if foreign capital costs are lower than costs of domestic bank lending. But if the result is that domestic bank loan portfolios become more tilted toward credit to households for consumption and mortgages, this may create macro vulnerabilities and adverse growth effects, as the literature shows.

A substitution effect between domestic bank loans and foreign capital is especially relevant in economies with limited investment opportunities (Rodrik and Subramanian, 2009). Here, domestic and foreign finance are more likely to compete for investment opportunities. The substitution effect does not imply that *total* bank lending falls: in fact, financial openness tends to cause domestic credit booms, as a large literature discusses.¹ It allows domestic banks to fund domestic lending with international capital, rather than with domestic bank deposits only. Access to foreign sources of funding loosens banks’ financing constraint. Simultaneously, due to substitution effects, domestic banks may experience falling demand for their loans by domestic non-financial business. If banks respond to this by expanding lending to households as consumer finance and household mortgages, then the non-financial business loan share in domestic bank portfolios will fall.

We illustrate this mechanism in the balance sheets in Fig. 1, for the case of capital inflows into both bank and non-bank sectors. Non-financial firms increase their liabilities to foreign investors or lenders and decrease domestic bank loans. Banks reduce their lending to non-financial firms and issue foreign liabilities. Banks maintain their loan books by expanding mortgage lending to households, even more than they reduced lending to non-financial business.² Note that in this mechanism, household debt expansion does *not* hinge on the expansion of foreign liabilities in banks. The substitution effect occurs due to capital inflows into non-banks, which crowd out domestic lending. This is the key point we illustrate. With foreign capital flowing only into banks, then all else equal, there are no pressures for change in the allocation of domestic bank loans over the household and business sectors. It follows that the variable driving the decline of the non-financial business loan share is foreign capital inflows to the non-bank sector (and, within this sector, mainly to non-financial firms), substituting domestic bank loans. This mechanism is empirically tested in Section 5. We first consider the data.

¹ Agénor et al. (2014) build an open economy DSGE model which shows that capital flows generate credit expansion and asset price booms. Empirically, Lane and McQuade (2014) examine 54 countries over 1994–2008 and find that net debt inflows increase domestic credit growth. This is particularly evident during the boom period 2003–2008. Additionally, Borio et al. (2011) and Bruno and Shin (2013) show that capital inflows into the domestic banking sector boost bank lending. Mendoza and Terrones (2008), Ostry et al. (2011) and Calderón and Kubota (2012) report that a capital inflow surge causes domestic credit booms. In line with this, 2011 IMF World Economic Outlook surveys 47 economies over 1960–2011 and finds that financial inflows systematically precede credit booms. See also Furceri et al. (2012); Magud et al. (2012).

² For simplicity, we assume no changes to their capital investment and bank deposits, nor in domestic bonds, reserves or equity (although each of these are likely to be affected). We also assume that there are no demand side constraints to household debt expansion.

Non-financial business

Banks

Fig. 1. Balance sheets of non-financial business firms and banks with(out) capital inflows.

3. Data

3.1. Description of the dataset

Our dataset covers 36 countries over the period 1990–2011, with the time period dictated by data availability. The country sample includes 25 (eventual) EU member countries – of which 15 are EMU member-states – plus 11 other OECD economies (see Table 1 for a list of countries).³ The data for bank credit were collected from central bank statistics on the consolidated balance sheets of Monetary Fi-

³ No data were available on bank and non-bank inflows in New Zealand. As in, e.g., Lane and McQuade (2014), we exclude Luxembourg, Ireland and Iceland due to their extremely large capital inflows during 2002–2007 (e.g. up to 900% of GDP in Luxembourg).

Table 1

List of countries included in the sample.

EU countries					
Country	EMU	Country	EMU	Country	EMU
Austria	1999	Germany	1999	Poland	–
Belgium	1999	Greece	2001	Portugal	1999
Bulgaria	–	Hungary	–	Romania	–
Cyprus	2008	Italy	1999	Slovakia	2009
Czech Rep.	–	Lithuania	–	Slovenia	2007
Denmark	–	Latvia	–	Spain	1999
Estonia	2011	Malta	2008	Sweden	–
Finland	1999	Netherlands	1999	UK	–
France	1999				
Non-EU countries					
Australia	Canada	Chile	Israel	Japan	S. Korea
Norway	Turkey	Mexico	Switzerland	USA	

financial Institutions (see Supplementary Material for detailed data sources). Four types of domestic bank credit are distinguished: credit to non-financial business, credit to financial business (insurance companies, pension funds, and other non-bank financial institutions), household consumption credit, and mortgages to households. We focus the analysis on the share of credit to non-financial business in total bank credit.

Since net capital flows and current account positions reveal little about financing conditions and activities (Borio and Disyatat, 2011; Borio et al., 2014), we use gross capital inflows.⁴ Bank and non-bank inflows are constructed as the sum of portfolio equity, portfolio debt, and other investment (loans) into banking and non-banking sectors. A limitation of the data is that FDI is not reported separately by sector. We must therefore include total FDI in the analysis. All capital inflows are measured in percentage of nominal GDP.

Our choice of controls is guided by the literature. We include: initial income level (log of real GDP per capita in constant 2005 USD, at the beginning of each 3-year period), the CPI inflation rate, the overnight money market interest rate (capturing domestic money market conditions and risk perceptions), stock market capitalization, and the credit market deregulation index. Higher values of the deregulation index indicate less regulation of credit markets, which tends to stimulate credit growth (Giannone et al., 2011; Lane and McQuade, 2014).

We will proxy investment opportunities initially by the percentage share of non-residential investment in nominal GDP. Alternatively, we explore other proxies for an improved investment climate: a positive current account and membership in the extensive European market within the Eurozone (EMU membership). Appendix B gives details and sources for all the data.

Descriptive statistics are reported in Table A.1. Tables A.2–A.3 show correlations of the non-financial business credit share with all explanatory variables. It is significantly and negatively correlated with all categories of capital inflows (except FDI), lagged one period, most strongly with non-bank inflows.

3.2. Trends in domestic credit and capital flows

Fig. 2 shows that the ratio of total bank credit to GDP in the full, unbalanced sample increased rapidly, from 72% of GDP in 1990 to about 109% in 2011. The share of loans to non-financial business declined over 1990–2011 from 54% to 42% of total bank credit. The household mortgage share rose from 28% of total credit in 1990 to 38% in 2011, while shares for household consumption loans and for financial firms oscillated around 13–15% and 7–9% of total credit, respectively. After 2008, the non-

⁴ In sensitivity analysis, we test the robustness of results by including net instead of gross inflows.

Fig. 2. Total credit and non-financial business credit share. Source: Authors' calculations based on central banks' statistics.

financial business credit share continued to decline, but the growth of the total credit-to-GDP ratio reversed during the global credit crunch.

Economies in our sample experienced a large decline in the non-financial business credit share in the same years in which they absorbed large capital inflows (Fig. 3). From 1990 to 2007, total capital inflows increased by 14% of GDP, of which 7 percentage points (p.p.) were due to the growth of debt and equity bank inflows, 2 p.p. due to debt and equity non-bank inflows, and 5 p.p. due to FDI. In these years, the non-financial credit share decreased by 11 p.p. of total bank credit. The financial crisis in 2008–2010 was marked by a reversal of capital inflows. In the crisis years 2008–2011, the drop in bank inflows was large and they even turned negative. Non-banks inflows also dropped but remained just positive. On average from 2007 to 2011, total capital inflows decreased by 14% of GDP, mostly due to the decline in bank inflows (which dropped by 8% of GDP). In Appendix A we present the structure of capital inflows in detail (Fig. A.1).

Table 2 shows average bank and non-bank inflows for 1990–2011 and for sub-periods, and reports the non-financial credit share for five significant years: sample start (1990), EMU-stage III start (1999), capital flow boom start (2002) and end (2007), and sample end (2011). Over 1990–2011, countries in our sample attracted bank inflows equal to 1.9% of GDP per year, slightly more than non-bank inflows (1.7%). During the 2002–2007 capital flow boom years, that difference widened to 4.9% compared to 2.4%.

The average total bank credit-to-GDP ratio increased dramatically between 2002 and 2007 by 21% of GDP, while the non-financial credit share in the same period dropped by 5 p.p. The mean values make clear that expansion of domestic credit coincided with changes in bank loan allocation. Tables A.4–A.5 in Appendix A report non-financial business loan shares, bank capital inflows and non-bank capital inflows by country for 3-year periods over 1990–2010.

We present bivariate scatter plots of the non-financial credit share with capital inflows to banks and non-banks in Fig. 4.⁵ The graphs visualize that the non-financial credit share was smaller for larger

⁵ For comparability of the plots, we exclude extreme values for bank inflows outside the –10% to +20% of GDP window.

Fig. 3. Non-financial credit share and capital inflows. Source: Authors' calculations based on central banks statistics.

Table 2

Credit, bank and non-bank inflows.

	Bank inflows (% GDP)	Non-bank inflows (% GDP)
1990–2011	1.86	1.74
1990–1998	0.63	1.47
1999–2001	2.29	2.44
2002–2007	4.90	2.37
2008–2011	−0.23	0.89
	Total credit (% of GDP)	Non-financial credit (% of total credit)
1990–2011	82.87	49.46
1990	72.36	53.63
1999	73.83	54.54
2002	78.56	48.14
2007	100.01	42.60
2011	108.95	41.93

capital inflows. As the correlation coefficients suggested, this negative relation is strongest for non-bank inflows. In these data, 23% of the bank inflows and 12% of the non-bank inflows observations are negative, all during the capital flow reversals in the crisis years 2008–2011. This is not alarmingly large, but we will exclude negative inflows in the robustness check to investigate whether the analysis is driven by outflows.

4. Methodology

The aim of the analysis is to examine the association of capital inflows with the non-financial business loan share, taking into account the sectoral destination of capital inflows and controlling for a number of covariates. We use 3-year non-overlapping averages of annual data over 1990–2010 to reduce short-term volatility while still retaining enough observations.⁶

⁶ We also estimated equations for 4- and 5-year non-overlapping windows over 1990–2009 (the years 2010–2011 could not

Fig. 4. Non-financial credit share, bank and non-bank inflows: scatter plots. Source: Authors' calculations based on IMF BoP and central banks statistics.

The baseline model specification is the following:

$$NFC_{it} = \alpha + \beta_1 CRD_{it}^0 + \kappa INF_{i,t-1} + \gamma X_{it} + \mu_i + \omega_t + \varepsilon_{it}, \quad i = 1, \dots, N; \quad t = 1, \dots, T, \quad (1)$$

where NFC_{it} is the share of credit to non-financial business in all bank credit to the private sector of country i in period t . To control for initial financial development, we include the total credit-to-GDP ratio at the beginning of period t , CRD_{it}^0 .

$INF_{i,t-1}$ is a matrix of explanatory variables of capital inflows. Depending on the specification of inflows, this matrix will consist of one, two, or three variables: (i) total capital inflows as the sum of FDI, bank and non-bank inflows; (ii) bank and non-bank inflows separately; and (iii) bank, non-bank, and FDI inflows separately. κ is a vector of estimated parameters for capital inflows. All categories of capital inflows are included in the model with a one-period lag.

X_{it} is a matrix of control variables, as described in Section 3.1. μ_i is country-specific fixed effects. We include time dummies ω_t to control for time fixed effects. Finally, ε_{it} is an independently and identically distributed white noise error term with mean 0 and variance σ_ε^2 .

A potential problem in our model is that the initial level of total credit-to-GDP might be an endogenous regressor, which implies $E(CRD_{it}^0 \varepsilon_{it}) \neq 0$. High credit-to-GDP ratios tend to go together with a low share of credit to non-financial business. To deal with this, we estimate a panel system-GMM model⁷ which combines equation (1) in levels with the equation in first differences. The endogenous variable CRD_{it}^0 is then instrumented by its lags in the first-difference equation and by its first-differences in the level equation.

GMM estimation produces consistent and unbiased estimates, provided that the error term in the baseline equation (1) is not serially correlated and that the instruments, used to deal with endogenous regressors, are valid. We will compute a Hansen test of over-identifying restrictions to check for the joint validity of instruments. We also test for first- and second-order autocorrelation of the

be used to generate full 4- or 5-year periods). All outcomes are similar to the results with a 3-year window, which we report below. The coefficient estimate of non-bank inflows becomes smaller (in absolute value) with using 4- and 5-year averages. This, however, does not affect the conclusions. All estimation results are available on request.

⁷ See Arellano and Bond (1991), Arellano and Bover (1995), and Blundell and Bond (1998) for a description of system GMM estimators.

Table 3

Do capital inflows change credit allocation?

	(1)	(2)	(3)	(4)	(5)	(6)
	1990–2010	1990–2007	1990–2010	1990–2007	1990–2010	1990–2007
Total credit ₀	−0.086** (0.040)	−0.123** (0.056)	−0.069* (0.037)	−0.115* (0.060)	−0.068* (0.035)	−0.118* (0.059)
Total inflows	−0.009 (0.089)	−0.053 (0.245)				
FDI inflows					−0.077 (0.240)	−0.077 (0.300)
Bank inflows			0.119** (0.058)	0.321 (0.205)	0.136 (0.086)	0.274 (0.221)
Non-bank inflows			−1.091*** (0.341)	−1.011*** (0.326)	−1.057*** (0.339)	−0.986** (0.374)
GDP per capita ₀	−2.527 (3.822)	−2.317 (4.650)	−3.171 (3.634)	−2.846 (4.245)	−3.062 (3.435)	−3.251 (4.123)
Inflation	0.038 (0.069)	0.033 (0.037)	0.024 (0.064)	0.017 (0.026)	0.031 (0.068)	0.015 (0.026)
Interest rate	0.068 (0.071)	0.025 (0.085)	0.083 (0.053)	0.032 (0.070)	0.084 (0.051)	0.032 (0.068)
Credit market deregulation	−4.536*** (1.540)	−5.755*** (1.800)	−4.420*** (1.283)	−5.569*** (1.611)	−4.258*** (1.298)	−5.230*** (1.660)
Stock market capitalization	−0.087** (0.040)	−0.067 (0.048)	−0.083*** (0.029)	−0.071** (0.034)	−0.085*** (0.030)	−0.069* (0.037)
Observations	148	113	148	113	148	113
Countries	35	33	35	33	35	33
Hansen test p-value	0.23	0.10	0.24	0.16	0.26	0.12
AR(1) test p-value	0.68	0.90	0.41	0.92	0.36	0.85
AR(2) test p-value	0.78	0.94	0.49	0.84	0.45	0.79

Notes: The dependent variable is the share of domestic bank credit to non-financial business in all bank credit. The Table reports coefficient estimates with robust standard errors in parentheses. ***p < 0.01, **p < 0.05, *p < 0.1. Constant, time dummies, and country-fixed effects are included in the estimations (not shown). AR(1) and AR(2) are the Arellano–Bond tests for first- and second-order serial correlation of residuals, respectively. The Hansen test reports the Hansen over-identification statistic.

residuals. Obviously, the system GMM estimator does not solve the endogeneity concerns completely, but given the data, it is the best method available.⁸ One common source of concern is the variation in GMM estimation results depending on the choice of lags in instrumenting the endogenous regressor. In our case, there is not much choice due to the data restrictions, and the results are not sensitive to the number of lags we select.

5. Empirical analysis

5.1. Credit allocation and sectoral destination of capital inflows

We start by estimating equation (1) with total capital inflows (the sum of FDI, bank and non-bank inflows). To isolate the effect of the 2008–2010 crisis years, we conduct estimations separately for 1990–2010 and 1990–2007. The results in Table 3, columns (1) and (2), where we lump bank, non-bank, and FDI inflows together, suggest that these aggregated capital inflows are not significantly associated with domestic credit allocation.

⁸ Alternatively, one could estimate IV-GMM model which uses only the level equation. The drawbacks of this method are that it does not take into account country-fixed effects and reduces the sample size (and degrees of freedom) substantially when including lagged values of regressors as instruments. As a robustness check, we estimated IV-GMM models using the first lag or first lagged difference of total credit as instruments. The results were comparable to system GMM in terms of significance, signs, and magnitudes of variables (results available on request). We thank Rients Galema, Martien Lammers, and Rob Allesie for drawing our attention to this.

We then examine the effects of capital inflows distinguished by sectoral destination, as bank and non-bank inflows. In columns (3) and (4) in Table 3, we find that the columns' (1) and (2) results can be decomposed into an insignificant positive coefficient of bank inflows and a significant negative coefficient of non-bank inflows. In line with our hypothesis, capital inflows into the non-banking sector are significantly correlated to reductions of the non-financial business loan share. This correlation is larger in magnitude in the period 1990–2010 that includes crisis years. The coefficient implies that an increase of non-bank inflows by 1% of GDP is associated with an annual decline of the loan share to non-financial business of 1.0–1.1 percentage point of total bank credit. This finding is consistent with substitution of domestic bank lending by foreign capital. In contrast, more foreign capital flowing into banks is *not* significantly correlated to changes in banks' loan portfolio mix between lending to non-financial business and to other sectors.

In a third analysis, shown in columns (5) and (6), we add FDI inflows. Recall that data on FDI are not available separately by institutional sectors. Therefore, we include total FDI inflows. The results suggest no significant correlation to the non-financial business loan share in either period. One interpretation is that one should disaggregate FDI into bank- and non-bank sectors to identify this effect, just as we did for other capital flows. Alternatively, it is plausible that FDI serves other funding needs, and does not compete with domestic bank lending. Our data do not allow us to distinguish between these two interpretations. The coefficients on other capital flows are robust to the inclusion of FDI.

Control variables are included in all specifications. We also ran estimations without controls to ensure that they do not drive results. A larger initial total-credit-to-GDP ratio is significantly correlated with lower non-financial business loan share. Thus, financial development in the 1990s and 2000s entailed credit allocation away from non-financial business and toward household consumption and mortgages. Initial income level, inflation, and interest rate are insignificant in all models.⁹

We observe that like foreign capital inflows to non-banks, higher stock market capitalization significantly reduces the share of bank credit going to non-financial business. This is understandable given our hypothesis that both these alternatives to domestic bank credit may crowd out bank loans, leading to bank loan portfolios with smaller non-financial business loan shares, and larger household credit shares. This appears an interesting addition to the well-known 'banks versus markets' debate: the presence of stock markets may affect the allocation of bank credit. This merits further research beyond the scope of this paper.

A striking and robust result is that credit market deregulation has a strongly negative effect on domestic credit allocation. Deregulated credit markets lead to more risk-taking by banks and, subsequently, facilitate the shift in bank lending toward real estate and consumption, as also other literature finds.

5.2. Do investment opportunities matter?

We now probe the conditions in which substitution of business loans by foreign capital may occur. The literature on foreign capital and growth shows that in economies with limited investment opportunities, the positive effects of capital inflows are muted (Rodrik and Subramanian, 2009). Applying this finding to our context, it is plausible that limited investment opportunities intensify the substitution of domestic loans for foreign funding. To begin with, in Table 4, we proxy investment opportunities with the non-residential investment-to-GDP ratio at the beginning of each 3-year period. We interact this with bank and non-bank capital inflows to test our hypothesis. Given that both interacted variables are continuous, we cannot make inference solely on the basis of the interaction coefficient estimate, which is an average over all observations. We follow Brambor et al. (2006) and calculate marginal effects of capital inflows conditional on different values for investment, with their standard errors and confidence intervals.

⁹ Inflation and interest rate are highly correlated, which could cause a potential multicollinearity problem. As a sensitivity test, we re-estimate all models while including inflation and interest rate separately. We find that none of these variables affects the results, which are available on request. We include both in the regressions.

Table 4

The impact of investment opportunities.

	1990–2010	1990–2007
Total credit ₀	–0.085** (0.041)	–0.119* (0.065)
Bank inflows	–0.506 (0.500)	0.605 (1.041)
Non-bank inflows	–2.870*** (1.068)	–0.892 (2.047)
Non-residential investment ₀	–0.313 (0.500)	–0.010 (0.526)
Non-residential investment ₀ × bank inflows	0.042 (0.035)	–0.016 (0.058)
Non-residential investment ₀ × non-bank inflows	0.119* (0.070)	–0.006 (0.132)
GDP per capita ₀	–2.518 (4.407)	–2.729 (5.059)
Inflation	0.017 (0.055)	0.017 (0.052)
Interest rate	0.082 (0.058)	0.034 (0.072)
Credit market deregulation	–4.450*** (1.489)	–5.423*** (1.703)
Stock market capitalization	–0.077** (0.031)	–0.067* (0.033)
Observations	148	113
Countries	35	33
Hansen test p-value	0.22	0.19
AR(1) test p-value	0.58	0.93
AR(2) test p-value	0.72	0.75

Notes: The dependent variable is the share of domestic bank credit to non-financial business in all bank credit. The Table reports coefficient estimates with robust standard errors in parentheses. ***p < 0.01, **p < 0.05, *p < 0.1. Constant, time dummies, and country-fixed effects are included in the estimations (not shown). AR(1) and AR(2) are the Arellano–Bond tests for first- and second-order serial correlation of residuals, respectively. The Hansen test reports the Hansen over-identification statistic.

The estimation results including non-residential investment-to-GDP are presented in Table 4. There are important differences between foreign capital flowing into banks and into the non-bank sector. The marginal effect of bank inflows on the non-financial credit share is insignificant in both analyzed periods; thus, the level of non-residential investment does not influence the relationship between bank inflows and credit allocation. Meanwhile, capital inflows into non-banks have a *smaller* negative correlation with the non-financial business loan share in countries with *more* investment opportunities. Fig. 5 shows the marginal effect of non-bank inflows for different levels of non-residential investment. The figure is based on the statistically significant coefficient estimate in the first column of Table 4, using data for the entire period 1990–2010. It shows that for assessing these effects, taking into account both capital flow ‘boom’ and ‘bust’ periods is important. Marginal effects for the pre-crisis sample in the second column of Table 4, are insignificant plausibly due to the smaller number of observations (113 compared to 148 in the longer sample).

The marginal effect of non-bank inflows on the non-financial credit share is significantly negative for low levels of non-residential investment, below 18% of GDP (Fig. 5), which includes 64% of all observations. This finding reinforces the message from Table 3 that the trade-off between foreign capital and domestic loans exists for foreign capital into the non-bank sector; and it adds the condition that this only occurs when investment opportunities are limited.¹⁰

¹⁰ We tested the robustness of results in Tables 3–4 to using net capital flows. This yielded qualitatively similar outcomes (though recall that including capital outflows in the flow measure may mask the effect of inflows; theoretically, gross flows are better). We also checked sensitivity of results to extreme and negative values for capital inflows. We re-estimated models

Fig. 5. The effect of non-bank inflows on non-financial business loan share conditional on investment opportunities.

Notes: The solid line shows the marginal effect of non-bank inflows on the business loan share at different levels of investment; vertical boundaries indicate 95% confidence interval. The marginal effect is significant when the solid line and confidence intervals are above (below) zero.

Extending this analysis, we note that proxying investment opportunities by fixed capital formation for non-residential purposes has its limitations – e.g., it runs the risk of missing investment opportunities in intangibles, and it is a backward-looking measure of realized investments, rather than a forward-looking measure of future opportunities. We therefore also use two alternative proxies. First, trade surplus countries with strong export sectors are less likely to be investment-constrained and more likely to utilize capital inflows productively, encouraging more credit for non-financial business. Here, foreign capital and bank loans may not be substitutes. Given strong export sectors hungry for investment, capital inflows could even crowd in domestic bank loans, so that foreign and domestic finance are symbiotic. Conversely, deficit countries are more likely to be investment-constrained and to use capital inflows for consumption, as the literature shows. In an export-driven growth environment, current account status might capture dimensions of investment opportunities not reflected in investment shares.

Since current account size is highly correlated to gross capital flows, we create a binary variable that reflects current account status (1 = surplus, 0 = deficit). To test the effect on credit allocation, we interact current account status with bank and non-bank capital inflows. The results in [Table 5](#), columns (1) and (2), show that in the surplus economies within this sample, the negative correlation of non-bank inflows with the non-financial business loan share is substantially reduced (by about two thirds), regardless of whether we include the post-2007 crisis years. The marginal effect of bank inflows on the non-financial credit share is significantly positive. Thus, proxying investment opportunities by current account status yields results consistent with using investment shares. Note also that the results are qualitatively identical to those in [Table 3](#), columns (3) and (4). Foreign capital flowing into banks in interaction with current account status has now a significant coefficient estimate. The positive correlation of bank inflows itself is not robust to alternative specification, as comparison to [Tables 3 and 4](#) shows.

while (i) excluding negative values for bank and non-bank inflows and (ii) excluding extreme values for bank inflows above 20% and below –10% of GDP. The results were not affected by these modifications of the sample. We also reran the analysis with 3-year periods for 1991–2011 instead of 1990–2010 so that we can include year 2011 observations. We now find a smaller coefficient estimate for non-bank inflows, and no effect of investment opportunities. This is plausibly due the reversed capital flows in EMU crisis year 2011. All results of sensitivity checks are available on request.

Table 5

Alternative drivers of the foreign capital impact: Current account position and EMU membership.

	(1)	(2)	(3)	(4)
	1990–2010	1990–2007	1990–2010	1990–2007
Total credit ₀	−0.057* (0.034)	−0.101* (0.056)	−0.081** (0.039)	−0.158** (0.071)
Bank inflows	0.117 (0.100)	0.448** (0.176)	0.220 (0.159)	0.317 (0.233)
Non-bank inflows	−1.271*** (0.406)	−1.266*** (0.276)	−1.231*** (0.375)	−1.383*** (0.238)
CA position	2.683 (4.202)	3.195 (3.804)		
CA × bank inflows	−0.119 (0.199)	−0.450 (0.273)		
CA × non-bank inflows	0.874* (0.519)	0.813** (0.386)		
EMU membership			1.724 (2.586)	0.526 (3.085)
EMU × bank inflows			−0.181 (0.173)	0.539 (0.729)
EMU × non-bank inflows			0.572 (0.625)	0.978** (0.502)
GDP per capita ₀	−5.319 (4.899)	−4.854 (4.910)	−3.455 (3.838)	−2.861 (4.349)
Inflation	0.000 (0.072)	−0.015 (0.053)	0.025 (0.67)	0.021 (0.055)
Interest rate	0.107* (0.056)	0.055 (0.060)	0.084 (0.055)	0.019 (0.069)
Credit market deregulation	−4.355*** (1.247)	−5.759*** (1.659)	−4.352*** (1.389)	−5.514*** (1.644)
Stock market capitalization	−0.078** (0.032)	−0.072* (0.037)	−0.072** (0.029)	−0.047 (0.030)
Observations	148	113	148	113
Countries	35	33	35	33
Hansen test p-value	0.08	0.15	0.16	0.16
AR(1) test p-value	0.62	0.88	0.43	0.88
AR(2) test p-value	0.47	0.83	0.53	0.89

Notes: The dependent variable is the share of domestic bank credit to non-financial business in all bank credit. The Table reports coefficient estimates with robust standard errors in parentheses. ***p < 0.01, **p < 0.05, *p < 0.1. Constant, time dummies, and country-fixed effects are included in the estimations (not shown). AR(1) and AR(2) are the Arellano–Bond tests for first- and second-order serial correlation of residuals, respectively. The Hansen test reports the Hansen over-identification statistic.

A second extension we study is membership in the European Economic and Monetary Union (EMU). This applies to 15 of 36 economies in our sample. More financial integration led to larger capital flows within the euro area (Lane, 2013; Spiegel, 2009). As a result, non-banks can borrow more easily abroad within the EMU and banks have easier access to international interbank markets (Obstfeld, 2012). Cross-border access to finance is further enhanced by the absence of exchange rate risk and (in the case of EMU) borrowing at the low risk premium of the strongest creditor economies. EMU also created vastly larger investment opportunities by substantially reducing the costs of trade – at least, before the Eurocrisis. In addition, since domestic and foreign capital costs converged in EMU, the impetus for substitution based on lower foreign capital costs diminished. Since most capital flows to EMU members are intra-EMU flows,¹¹ both these arguments are relevant.

Enhanced investment opportunities due to EMU are indeed evident in column (4), where the interaction term with non-bank inflows is significantly positive for pre-crisis years – but not for a sample

¹¹ Chen et al. (2013) document that capital flows within the Eurozone play the largest role in the increase of net external financing for EMU debtor countries.

including the Eurocrisis (column 3). Thus, we find that in EMU member economies before the crisis, the reduction in the share of domestic bank credit to business associated with foreign capital inflows is smaller than elsewhere. A plausible explanation is that the EMU, simultaneously with inducing more capital flows, also created more investment opportunities. EMU membership has no effect on the correlation of foreign capital into the bank sector with the non-financial business credit share.

Overall, these explorations confirm that sectoral distinction of capital inflows matters to its effect on domestic credit allocation. We find consistently negative correlations with inflows into the non-bank sector, but not the bank sector. The negative correlations are mitigated by investment opportunities, as proxied by investment shares, current account status, or pre-crisis EMU membership.

5.3. Robustness checks

As an additional robustness check, we included house prices as a potentially important factor that could influence demand and supply of mortgage credit, changing the allocation of credit. We use real house price changes.¹² This variable is available for 171 observations, which is only 70% of our sample. This means we cannot compare results for the reduced sample with house prices to those for the full sample without house prices, but we will compare results for identical, smaller samples below.

We re-estimated all models including real house price change. Adding this variable reduced the sample size from 148 to 122 observations for the period 1990–2010, and from 113 to 88 for the period 1990–2007. We find that the coefficient estimate of real house price change is always insignificant. Additionally, non-bank capital inflows and their interaction terms with investment, CA status and EMU are now less (sometimes not) significant.

We investigated whether these changes in results are due to the inclusion of house prices (which would confirm their relevance in the analysis) or due to the fewer observations: the smaller sample means that the efficiency of statistical inference is weaker. For this purpose, we compared the regression results for exactly the same sample that was used for estimation when house prices are included. We re-estimated all models with and without house prices for this smaller sample (results available on request). We find that the results for the smaller sample with and without house prices are very similar in terms of signs, significance and even magnitude of coefficient estimates, while house prices are always insignificant. However, the results for the full and the smaller sample differ in terms of significance of inflows, EMU, or CA variables and their interaction terms. We deduce that it is the number of observations that drives the change in results when we include house prices, not the inclusion of house prices. This suggests that house prices are not a significant variable explaining the change in credit allocation for our particular sample.

Conducting the analysis based on 3-year periods might hide valuable information due to reduced volatility.¹³ To check how sensitive the results are to this smoothing of the time series, we re-estimate all models using annual data. We included total credit, capital inflows, and investment with a one-year lag.

Tables A.6–A.7 in Appendix A present the results. Our findings for annual data are comparable to the results for 3-year periods. Non-bank inflows have a significant negative correlation with the non-financial business credit share, which supports our hypothesis. Moreover, larger bank inflows are significantly associated with higher business credit share. The signs and significance of other explanatory variables are similar to earlier results; also, inflation and interest rate become significant with a positive sign.

6. Summary and conclusion

In many economies, domestic bank lending has been reallocated in recent decades, away from loans to non-financial business, with increasing lending volumes to households. The literature identifies a

¹² We also tried real house price index and nominal house price index/change, but that did not affect the outcomes. Therefore, following the literature, we focused on real house price change.

¹³ We thank an anonymous referee for pointing this out.

number of detrimental effects of this reallocation. In this paper we investigate whether capital inflows were among the drivers of the change in domestic bank loan allocation. We hypothesize that capital inflows into the non-bank sector compete with domestic bank lending, especially in economies with limited investment opportunities. We use recently collected data to construct a measure for the share of bank credit to non-financial business (the ‘non-financial business loan share’) for 36 countries over 1990–2011. We observe large declines in this share, especially during the pre-crisis capital flow boom period in 2002–2007. We distinguish capital inflows according to their sectoral destination, into flows into banks and into non-bank sectors.

We explore the data and estimate system-GMM regressions. We find that a decline in the non-financial business loan share is significantly larger in those economies which experience more capital inflows into their non-bank sectors. Capital inflows into banks do not correlate with domestic credit allocation. The negative impact on business loan share is smaller in countries with more investment opportunities, measured by the non-residential investment-to-GDP ratio.

We test the generality of this result by specifying alternative measures which might capture investment opportunities: current account status and EMU membership. Surplus countries with strong export sectors are less likely to be investment-constrained and more likely to utilize capital inflows productively by channeling them into credit for non-financial business. We find that in surplus economies within this sample, the negative relation between non-bank inflows and credit allocation is mitigated.

Fifteen of the 36 economies in our sample are EMU members. We conjecture that EMU, simultaneously with inducing more capital flows, also created more investment opportunities. We find indeed that in EMU economies, the crowding out of domestic bank lending to non-financial firms by foreign capital is much less than outside the EMU. However, the positive EMU results are observed only in pre-2008 sample, excluding the Eurocrisis years.

We conclude that financial integration and capital mobility may have detrimental effects on domestic allocation of bank credit, in particular if capital is flowing into the non-bank sector. This may crowd out domestic loans to non-financial business, creating profound changes in bank loan portfolios. The literature shows that this change is associated with real estate and consumption booms, financial fragility, higher probability of crisis, and larger and longer post-crisis recessions. This present research suggests that creating more investment opportunities, for instance by monetary integration and export-led growth, may mitigate these adverse effects.

These findings invite further research into the drivers of domestic credit allocation. Other robust determinants observed in this study include credit market deregulation and stock market capitalization. This suggests that in environments of vigorous financial liberalization and financial market development, fragile bank loan portfolios are more likely to develop. While this is now, seven years after the credit crisis, an unremarkable finding, we still know surprisingly little about the mechanisms through which this happens, and about possible generalizations of these findings. This promises fruitful work on revisiting existing literature on banks versus markets and on the link between financial fragility and market regulation.

Another avenue for future research is to examine credit allocation at the bank level. This opens up opportunities to pin down causal mechanisms better than could be done in this country-level study. It also allows for research into bank-level determinants of lending patterns, such as funding methods, access to international markets, bank network effects and monetary policy.

There are also implications for macroprudential policy and the regulation of international capital flows. The systemic risks implied in high levels of household mortgage credit are now broadly recognized. In response, the ‘Basel’ rules are planned to be adapted to this new insight, by requiring banks to hold significantly more capital against real estate lending (BIS, 2015). But targeting real estate lending instead of regulation that takes into account the entire loan portfolio may be less effective than hoped. In this paper we point to the interdependence of growth in mortgages and declines in business lending. The findings imply that the drivers of mortgage lending may be unrelated to the mortgage loan market itself (to opportunities for securitization of mortgages, real estate prices, loan-to-value norms and rules) and may have to do with development in other segments of the loan market. Thus, the results support a broader regulatory approach even where specific loan types are recognized to be problematic.

Another policy application is to reinforce caution toward large capital flows. This is not new, but we may have identified a new channel (credit allocation) through which capital inflows lead to lower growth and financial fragility. In conjunction with the mounting evidence, discussed in this paper, that this allocation matters to growth and stability, this is a relevant argument in the debate on capital flows. In particular, our findings stress that the type of capital flows, and the mechanisms through which they affect domestic conditions, matter greatly. Perhaps counter-intuitively, the implication is that it is foreign lending by non-banks, not bank capital inflows, which alter domestic credit allocation. The importance of the investment climate and investment opportunities are also relevant to policy efforts. Attracting capital inflows should be accompanied by fostering investment opportunities. This study suggests that reducing costs of trade and stimulating export sectors appear important conditions for realizing synergies (rather than crowding-out) between foreign capital and domestic banking sectors.

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Appendix A. Composition and periodization of capital inflows

In Fig. A.1 we disaggregate bank and non-bank inflows over 1990–2011 into portfolio equity, portfolio debt, and other investment loans. Bank inflows are on average larger and more volatile than

Fig. A.1. Composition of bank and non-bank inflows. Source: Authors' calculations based on IMF BoP and central banks statistics.

Table A.1

Descriptive statistics, 1990–2010 (3-year periods).

Variable	Unit	No. obs.	Mean	SD	Min	Max
Credit variables						
Non-financial credit	% of total credit	187	48.71	17.33	18.64	98.33
Initial total credit	% of GDP	175	83.15	52.85	2.56	379.89
Capital inflows						
Total inflows	% of GDP	228	7.58	8.56	–22.96	73.83
FDI inflows	% of GDP	241	3.47	3.58	–0.63	23.22
Bank inflows	% of GDP	229	2.18	5.94	–28.29	56.02
Non-bank inflows	% of GDP	239	1.79	2.25	–1.99	14.86
Control variables						
Initial GDP per capita	In log	183	9.88	0.76	7.77	11.11
Inflation	%	199	8.56	32.64	–0.60	399.55
Overnight interest rate	%	189	7.89	17.02	0.00	148.91
Credit market deregulation	1 to 10	200	8.40	1.52	1.47	10
Stock market capitalization	% of GDP	240	53.00	45.92	0.19	259.93
Current account position	0/1	246	0.36	0.48	0	1
EMU membership	0/1	246	0.18	0.39	0	1
Non-residential investment	% of GDP	234	17.59	4.51	8.59	31.53
Real house price change	%	171	1.79	7.55	–20.61	34.92

Table A.2

Correlations of non-financial business loan share with capital inflows (lagged one period).

	Non-financial credit	Total inflows	FDI inflows	Bank inflows	Non-bank inflows
Non-financial credit	1.00				
Total inflows	–0.26***	1.00			
FDI inflows	–0.09	0.74***	1.00		
Bank inflows	–0.18**	0.85***	0.38***	1.00	
Non-bank inflows	–0.32***	0.42***	0.24***	0.07	1.00

Note: The Table reports pairwise correlation coefficients. ***p < 0.001, **p < 0.05, *p < 0.1.

non-bank inflows. Debt inflows – portfolio debt and other investment loans – constitute the largest share of bank inflows, while other investment loans dominate in non-bank inflows. Moreover, debt inflows had higher volatility than equity, especially from 1999 onward.

Fig. A.1 suggests a periodization for capital inflows. First, the 1990–1998 pre-EMU years, with low and stable growth of capital inflows when average annual bank and non-bank inflows were equal 0.6% and 1.5% of GDP, respectively. Second, the period 1999–2001: the start of EMU in 1999 inaugurated faster growth of capital inflows in many European countries. Bank inflows rose to 2.3% of GDP on average and non-bank inflows to 2.4%. The period 2002–2007 were the capital boom years. Both bank and non-bank inflows more than tripled in size relative to GDP, from 2.5% in 2002 to 7.2% of GDP in 2007 for bank inflows, and from 1% to 3% for non-bank inflows. Lane (2013) notes that the growth of international financial transactions in these years was more rapid than the growth in international trade of goods and services. A fourth period are the financial crisis years 2008–2011, which saw a remarkable drop in capital inflows. Bank debt inflows declined most dramatically, from over 7% of GDP in 2007 to –1.7% in 2011, while non-bank inflows remained positive.

Appendix B. Description of variables and their data sources

Data on capital inflows were collected from the database of IMF Balance of Payments (BoP) Statistics, Financial Accounts, according to the BPM5 and BPM6 methodology. Bank and non-bank inflows are constructed as the sum of portfolio equity, portfolio debt securities, and other investment (loans) into, respectively, banking and non-banking sectors. Following the IMF methodology, bank inflows are defined as capital inflows into deposit-taking corporations except the central bank. Non-bank inflows

Table A.3

Correlations of non-financial business loan share with other explanatory variables.

	Non-fin. credit	Initial total credit	GDP p.c.	Inflation	Interest rate	Credit mkt dereg.	Stock mkt cap.	CA position	EMU	Investm.	House price ch.
Non-fin. credit	1.00										
Initial total credit	−0.51***	1.00									
GDP p.c.	−0.63***	0.54***	1.00								
Inflation	0.39***	−0.16**	−0.38***	1.00							
Interest rate	0.50***	−0.25***	−0.44***	0.86***	1.00						
Credit mkt dereg.	−0.68***	0.31***	0.46***	−0.41***	−0.47***	1.00					
Stock market cap.	−0.59***	0.41***	0.54***	−0.21***	−0.25***	0.46***	1.00				
CA position	−0.21***	0.34***	0.50***	−0.02	−0.11	0.27***	0.35***	1.00			
EMU	−0.13*	0.30***	0.28***	−0.11	−0.18**	0.17**	0.09	0.11*	1.00		
Investment	0.09	−0.08	−0.27***	−0.08	−0.19***	0.06	−0.14**	−0.15**	−0.21***	1.00	
House price ch.	−0.12	−0.07	0.01	−0.15*	−0.01	0.27***	0.20***	0.08	0.03	−0.23***	1.00

Note: The Table reports pairwise correlation coefficients. ***p < 0.01, **p < 0.05, *p < 0.1.

Table A.4

Non-financial business loan share, bank and non-bank inflows by country, 3-year periods.

Country	Variable	1990– 1992	1993– 1995	1996– 1998	1999– 2001	2002– 2004	2005– 2007	2008– 2010
Australia	Non-fin. credit	47.34	38.60	40.30	39.60	34.11	34.04	32.23
	Bank inflows	1.61	1.28	2.24	3.54	4.61	5.19	3.90
	Non-bank inflows	1.61	1.51	1.47	2.29	2.28	4.94	2.09
Austria	Non-fin. credit	–	56.75	56.95	55.94	51.77	46.91	47.14
	Bank inflows	–0.13	0.39	1.99	5.47	3.45	6.77	–0.98
	Non-bank inflows	1.48	0.44	1.13	1.78	3.45	4.19	0.27
Belgium	Non-fin. credit	–	–	–	47.29	42.18	35.99	40.01
	Bank inflows	–	–	–	–	0.29	2.77	2.23
	Non-bank inflows	–	–	–	–	1.45	1.85	0.83
Bulgaria	Non-fin. credit	–	98.33	89.62	81.31	75.84	65.65	66.20
	Bank inflows	–6.92	–0.33	–0.43	0.17	0.81	1.69	0.42
	Non-bank inflows	0.00	0.00	0.14	1.31	2.52	7.72	3.15
Canada	Non-fin. credit	41.32	38.29	36.81	35.38	31.29	27.88	27.43
	Bank inflows	–0.01	–0.03	–0.06	–0.05	–0.04	–0.01	0.003
	Non-bank inflows	1.08	1.47	3.41	3.22	3.16	1.50	2.73
Chile	Non-fin. credit	52.63	51.40	48.61	47.43	46.64	45.78	44.64
	Bank inflows	–0.80	0.17	–0.35	–0.09	1.63	0.84	1.41
	Non-bank inflows	2.21	3.97	5.55	2.57	–0.12	1.88	3.31
Cyprus	Non-fin. credit	–	–	–	–	–	45.36	48.60
	Bank inflows	–	–	–	1.55	10.75	16.95	25.68
	Non-bank inflows	–	–	–	0.04	–0.17	–0.76	0.88
Czech Republic	Non-fin. credit	–	–	83.85	77.80	58.18	48.91	42.31
	Bank inflows	–	0.70	1.68	–0.16	0.10	0.60	0.05
	Non-bank inflows	–	5.05	3.33	1.34	2.06	0.81	1.34
Denmark	Non-fin. credit	–	–	–	28.17	27.78	27.22	27.12
	Bank inflows	–	–	–	8.32	11.14	7.88	3.50
	Non-bank inflows	0.12	–1.96	–0.12	1.38	0.76	0.81	5.39
Estonia	Non-fin. credit	–	–	–	46.09	36.04	43.37	46.78
	Bank inflows	–	0.40	3.99	0.60	5.76	3.05	–2.05
	Non-bank inflows	–	0.49	4.58	2.67	2.65	6.60	–0.72
Finland	Non-fin. credit	–	–	–	–	38.68	35.66	35.91
	Bank inflows	0.84	–1.80	–0.77	0.18	2.60	4.69	2.44
	Non-bank inflows	2.26	0.69	4.64	9.83	0.42	2.52	0.89
France	Non-fin. credit	–	52.91	49.53	48.23	44.52	41.51	41.67
	Bank inflows	0.002	0.03	0.07	1.75	2.09	3.44	1.61
	Non-bank inflows	1.61	–0.20	1.10	4.32	1.72	2.22	2.39
Germany	Non-fin. credit	62.79	60.35	58.39	56.34	53.48	50.49	49.90
	Bank inflows	0.61	1.25	2.23	3.95	3.06	4.40	1.73
	Non-bank inflows	0.07	–0.02	0.87	0.88	0.47	1.81	0.03
Greece	Non-fin. credit	84.62	82.14	76.64	69.40	56.96	46.99	47.86
	Bank inflows	–	–	–	0.13	0.09	1.34	–0.93
	Non-bank inflows	1.73	2.34	2.59	0.16	0.62	1.66	0.85
Hungary	Non-fin. credit	67.91	70.58	77.97	69.57	46.19	42.68	41.12
	Bank inflows	–	0.27	1.42	1.19	3.35	3.19	–1.21
	Non-bank inflows	–	1.70	2.55	2.18	0.69	1.07	1.47
Israel	Non-fin. credit	–	–	–	68.04	68.10	65.13	60.63
	Bank inflows	–0.02	–0.01	–0.01	–0.01	0.00	0.00	0.00
	Non-bank inflows	0.98	1.57	2.43	2.76	1.69	3.10	0.93
Italy	Non-fin. credit	–	–	57.88	55.78	55.30	54.65	54.40
	Bank inflows	0.12	0.51	0.35	1.35	1.27	3.47	0.67
	Non-bank inflows	2.10	0.29	1.35	1.43	0.89	0.03	0.29
Japan	Non-fin. credit	65.03	64.66	62.68	60.95	55.72	51.24	49.45
	Bank inflows	0.12	0.11	0.26	0.21	0.29	0.31	0.07
	Non-bank inflows	1.40	0.29	0.44	0.94	0.94	1.75	–0.42

Table A.5

Non-financial business loan share, bank and non-bank inflows by country, 3-year periods, continued.

Country	Variable	1990– 1992	1993– 1995	1996– 1998	1999– 2001	2002– 2004	2005– 2007	2008– 2010
Korea	Non-fin. credit	–	–	–	–	–	–	52.15
	Bank inflows	1.08	1.47	–0.65	–0.63	0.55	3.02	–1.04
	Non-bank inflows	0.20	0.59	0.01	–0.64	–0.27	0.06	0.27
Lithuania	Non-fin. credit	–	90.29	85.21	79.25	68.90	54.02	50.45
	Bank inflows	–	0.25	1.07	0.37	2.47	9.80	–2.41
	Non-bank inflows	–	0.89	2.66	0.57	0.98	2.27	–1.65
Latvia	Non-fin. credit	–	–	–	–	–	–	50.38
	Bank inflows	0.00	0.12	1.37	0.75	5.83	19.96	–5.78
	Non-bank inflows	0.30	1.16	1.56	0.73	1.37	5.14	0.03
Malta	Non-fin. credit	–	–	85.21	77.56	63.90	52.91	50.83
	Bank inflows	–	5.11	6.09	6.99	25.47	56.02	–0.51
	Non-bank inflows	–	–0.59	1.26	–1.88	0.05	1.29	0.58
Mexico	Non-fin. credit	–	–	–	50.05	41.28	34.72	38.55
	Bank inflows	1.19	0.30	–0.86	–0.63	–0.48	–0.43	0.26
	Non-bank inflows	1.21	1.20	1.96	1.46	–0.12	1.38	0.69
The Netherlands	Non-fin. credit	55.62	51.90	44.36	37.37	30.44	27.54	29.62
	Bank inflows	0.31	1.57	3.31	6.68	9.14	8.12	3.44
	Non-bank inflows	1.51	0.87	2.07	7.53	3.06	3.47	–1.86
Norway	Non-fin. credit	–	36.52	36.91	37.49	32.78	32.27	35.05
	Bank inflows	0.37	–0.93	2.11	1.49	1.40	4.19	–0.97
	Non-bank inflows	1.59	0.39	2.98	3.06	3.65	7.43	4.28
Poland	Non-fin. credit	–	–	68.94	59.91	53.06	41.34	32.74
	Bank inflows	–0.21	–0.03	0.34	0.19	0.21	0.95	1.02
	Non-bank inflows	0.71	0.30	1.54	1.83	–0.13	0.98	1.39
Portugal	Non-fin. credit	62.95	52.47	41.78	39.40	40.44	36.83	37.18
	Bank inflows	0.77	–0.19	1.89	6.79	5.73	6.06	0.79
	Non-bank inflows	0.52	0.27	1.89	2.02	6.38	4.74	2.35
Romania	Non-fin. credit	–	–	–	–	–	49.23	48.61
	Bank inflows	0.03	0.20	0.30	–0.25	0.95	2.30	0.11
	Non-bank inflows	1.95	1.56	0.37	1.73	1.62	3.56	0.72
Slovakia	Non-fin. credit	–	–	–	–	60.71	55.10	51.12
	Bank inflows	–	0.59	0.90	–2.58	0.61	0.52	1.03
	Non-bank inflows	–	2.99	3.94	0.72	–0.53	0.72	0.62
Slovenia	Non-fin. credit	–	–	–	–	68.50	66.58	65.63
	Bank inflows	–0.07	0.62	–0.23	0.78	2.63	8.34	–0.02
	Non-bank inflows	0.46	0.88	1.48	2.28	2.37	2.12	0.75
Spain	Non-fin. credit	38.98	33.50	30.02	27.52	24.79	23.29	24.38
	Bank inflows	0.77	0.12	0.25	1.71	3.82	5.99	–0.49
	Non-bank inflows	1.49	0.58	0.81	4.24	3.70	10.64	–1.99
Sweden	Non-fin. credit	–	–	42.62	40.50	36.37	32.80	30.74
	Bank inflows	–0.001	–0.001	0.48	2.76	2.49	7.60	5.50
	Non-bank inflows	–0.27	–1.80	–0.02	2.50	–1.48	–0.12	0.03
Switzerland	Non-fin. credit	37.24	35.43	34.62	34.19	28.07	25.48	26.49
	Bank inflows	2.17	3.56	13.14	21.01	4.77	26.56	–28.29
	Non-bank inflows	1.22	1.47	1.42	1.27	0.60	4.62	–0.12
Turkey	Non-fin. credit	–	91.57	92.42	86.12	84.21	66.92	62.93
	Bank inflows	1.05	–0.93	0.88	–0.51	0.47	1.27	0.55
	Non-bank inflows	–0.02	1.02	1.53	1.01	0.60	4.01	0.64
UK	Non-fin. credit	36.61	31.99	25.18	21.10	19.25	20.67	18.64
	Bank inflows	–0.77	0.84	0.70	2.85	2.71	5.08	1.41
	Non-bank inflows	4.75	5.98	8.77	14.86	8.91	12.30	2.19
USA	Non-fin. credit	33.44	31.14	33.16	32.46	24.17	23.15	22.40
	Bank inflows	–	–	–	–	0.002	0.001	0.00
	Non-bank inflows	0.26	0.55	0.97	1.71	2.11	5.07	–1.96

Table A.6

Capital inflows and credit allocation – results for annual data.

	(1)	(2)	(3)	(4)	(5)	(6)
	1990–2010	1990–2007	1990–2010	1990–2007	1990–2010	1990–2007
Total credit _{t-1}	-0.116*** (0.040)	-0.140*** (0.054)	-0.108*** (0.031)	-0.130** (0.053)	-0.101*** (0.033)	-0.128** (0.051)
Total inflows _{t-1}	0.061* (0.032)	0.116* (0.065)				
FDI inflows _{t-1}					0.100 (0.091)	0.163 (0.109)
Bank inflows _{t-1}			0.106** (0.045)	0.168* (0.089)	0.088** (0.040)	0.149* (0.084)
Non-bank inflows _{t-1}			-0.205* (0.109)	-0.226 (0.150)	-0.224** (0.115)	-0.263* (0.146)
GDP per capita	-4.485 (3.555)	-3.775 (3.782)	-5.405* (3.145)	-5.077 (3.371)	-6.088** (3.036)	-4.932 (3.639)
Inflation	0.021** (0.009)	0.021*** (0.008)	0.016** (0.007)	0.018*** (0.006)	0.019*** (0.007)	0.019*** (0.006)
Interest rate	0.064*** (0.021)	0.057*** (0.016)	0.053*** (0.018)	0.050*** (0.013)	0.060*** (0.018)	0.054*** (0.012)
Credit market deregulation	-3.966*** (1.015)	-4.638*** (1.048)	-3.543*** (0.918)	-4.565*** (0.966)	-3.602*** (1.045)	-4.623*** (0.931)
Stock market capitalization	-0.044** (0.020)	-0.039 (0.028)	-0.052** (0.021)	-0.038 (0.029)	-0.047** (0.021)	-0.040 (0.027)
Observations	457	353	457	353	457	353
Countries	35	33	35	33	35	33
Hansen test p-value	0.58	0.41	0.55	0.36	0.62	0.38
AR(1) test p-value	0.77	0.70	0.60	0.41	0.69	0.55
AR(2) test p-value	0.81	0.84	0.46	0.75	0.78	0.87

Notes: The dependent variable is the share of domestic bank credit to non-financial business in all bank credit. The Table reports coefficient estimates with robust standard errors in parentheses. ***p < 0.01, **p < 0.05, *p < 0.1. Constant and country-fixed effects are included in the estimations (not shown). Time dummies are insignificant and therefore not included. AR(1) and AR(2) are the Arellano–Bond tests for first- and second-order serial correlation of residuals, respectively. The Hansen test reports the Hansen over-identification statistic.

are capital inflows into other parts of the private sector, namely, other financial corporations, non-financial corporations, households, and non-profit institutions serving households. For details on classification and definitions of institutional sectors, see IMF (2009), Balance of Payments and International Investment Position Manual. Data on FDI were not available separately by institutional sectors. Therefore, we include total FDI inflows. The IMF Manual does not provide information on the ownership of capital by institutional sectors; hence, in our dataset we cannot distinguish who are the givers of capital. All capital inflows are measured in percentage of nominal GDP, also collected from IMF statistics.

The data for inflation and overnight money market interest rate are compiled from Thomson Reuters Datastream (sources include IMF IFS, OECD, Eurostat, national statistics) and central bank statistics. Stock market capitalization (in % GDP) and GDP per capita are collected from the World Development Indicators database. The real house price change is constructed as the percentage change in nominal house price index (deflated by CPI). The data for nominal house price index come from the BIS Property Price Statistics and Long-term series on nominal residential property prices. The credit market deregulation index from the Fraser Institute's Economic Freedom Indicators consists of three components: ownership of banks (percentage of deposits held in privately owned banks), extension of credit (share of private sector credit in total bank credit), and presence of interest rate controls/negative interest rates. Each component is scaled from 1 to 10; the credit deregulation index is an average of the components.

Non-residential investment is measured as total investment (gross fixed capital formation) minus residential investment (investment for dwellings), in % of nominal GDP. The data sources for investment include: OECD Statistics, National Accounts, Capital formation by activity ISIC rev4; Eurostat,

Table A.7

Capital inflows and credit allocation – results for annual data.

	(1)	(2)	(3)	(4)	(5)	(6)
	1990–2010	1990–2007	1990–2010	1990–2007	1990–2010	1990–2007
Total credit _{t-1}	-0.104*** (0.030)	-0.141*** (0.047)	-0.106*** (0.037)	-0.117** (0.049)	-0.134*** (0.049)	-0.175*** (0.055)
Bank inflows _{t-1}	0.172 (0.312)	0.540 (0.552)	0.164** (0.074)	0.182* (0.100)	0.099** (0.040)	0.191** (0.091)
Non-bank inflows _{t-1}	-0.677 (0.542)	-0.865 (0.617)	-0.236* (0.136)	-0.161 (0.182)	-0.298*** (0.115)	-0.362** (0.141)
Non-residential investment _{t-1}	-0.123 (0.435)	-0.076 (0.539)				
Non-residential investment _{t-1} × Bank inflows _{t-1}	-0.005 (0.018)	-0.021 (0.032)				
Non-residential investment _{t-1} × Non-bank inflows _{t-1}	0.030 (0.034)	0.042 (0.044)				
CA position			1.972 (2.855)	4.813 (3.663)		
CA × bank inflows _{t-1}			-0.116 (0.086)	-0.090 (0.172)		
CA × non-bank inflows _{t-1}			0.159 (0.215)	0.044 (0.276)		
EMU membership					3.031 (2.070)	-1.209 (3.035)
EMU × bank inflows _{t-1}					0.029 (0.106)	0.263 (0.306)
EMU × non-bank inflows _{t-1}					0.116 (0.242)	0.934** (0.475)
GDP per capita	-6.177* (3.718)	-4.025 (3.094)	-7.072** (3.036)	-6.279 (3.910)	-5.576** (2.622)	-3.198 (3.058)
Inflation	0.015* (0.009)	0.019*** (0.006)	0.011* (0.006)	0.013 (0.009)	0.018*** (0.007)	0.019*** (0.006)
Interest rate	0.050** (0.025)	0.053*** (0.013)	0.040*** (0.015)	0.043** (0.019)	0.056*** (0.016)	0.050*** (0.012)
Credit market deregulation	-3.522*** (0.980)	-4.716*** (1.090)	-3.540*** (0.913)	-4.652*** (1.002)	-3.290*** (0.954)	-4.442*** (1.029)
Stock market capitalization	-0.049** (0.020)	-0.035 (0.027)	-0.051*** (0.018)	-0.047 (0.031)	-0.039*** (0.014)	-0.037 (0.023)
Observations	455	351	457	353	457	353
Countries	35	33	35	33	35	33
Hansen test p-value	0.61	0.40	0.58	0.30	0.70	0.48
AR(1) test p-value	0.68	0.71	0.35	0.27	0.54	0.69
AR(2) test p-value	0.62	0.68	0.31	0.68	0.81	0.88

Notes: The dependent variable is the share of domestic bank credit to non-financial business in all bank credit. The Table reports coefficient estimates with robust standard errors in parentheses. ***p < 0.01, **p < 0.05, *p < 0.1. Constant and country-fixed effects are included in the estimations (not shown). Time dummies are insignificant and therefore not included. AR(1) and AR(2) are the Arellano–Bond tests for first- and second-order serial correlation of residuals, respectively. The Hansen test reports the Hansen over-identification statistic.

National Accounts, Gross fixed capital formation by asset type; national statistics.

We create a current account status dummy, which takes the value 1 if a country has a current account surplus in a given period, and 0 if it has a deficit, based on the current account balance data from the IMF BoP statistics. EMU membership dummy takes the value 1 if a country is an EMU member in at least one year during a particular 3-year period, and 0 otherwise.

Appendix. Supplementary material

Supplementary data to this article can be found online at [doi:10.1016/j.jimonfin.2015.12.013](https://doi.org/10.1016/j.jimonfin.2015.12.013).

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