International Capital Flows and the Allocation of Credit Across Firms[*]

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Abstract

This paper explores the effect of international capital flows on credit allocation and future firm performance. Employing a novel dataset of euro area firms between 1995 and 2014 for identification purposes, I find that cross-border capital inflows are associated with more lending to the least profitable firms within an industry, reducing the economic performance in the long-run. I further document that this effect is related to agency problems in the financial sector. These results help to explain the difficulties of the empirical literature to identify a clear-cut positive relationship between cross-border capital flows and economic growth.

1   Introduction

The literature on cross-border capital flows identifies a distinct positive relationship between surges in foreign capital and domestic credit booms (e.g., Mendoza and Terrones, 2012; Lane and McQuade, 2014; Dinger and te Kaat, 2016). Ultimately, however, despite sharp increases in credit volumes, countries with capital inflows often do not exhibit higher economic growth rates: whereas some empirical studies find a positive effect of international capital inflows on growth, other research identifies a negative relationship between both variables, especially in the long-run (e.g., Grilli and Milesi-Ferretti, 1995; Edison et al., 2002; Alfaro and Charlton, 2007; Bonfiglioli, 2008; Bussière and Fratzscher, 2008; Kose et al., 2009; Eichengreen et al., 2011; Aizenman et al., 2013). The BIS provides one explanation for this paradox, contending that financial booms (e.g., because of foreign capital inflows) are often associated with a misallocation of resources (Bank for International Settlements, 2015). As a consequence, although credit booms raise economic growth in the short-run, they are also likely to distort the efficiency of credit allocation and, thereby, to reduce the economic performance in the long-run. In this paper, I provide an empirical test of this argument by exploring the effects of international capital flows on the allocation of credit across firms.

The extant literature on the nexus between foreign capital and the efficiency of credit allocation focuses on a shift in credit across industries, e.g., from the (high performing) tradable to the (low performing) non-tradable sector or from business lending to household credit (e.g., Reis, 2013; Benigno and Fornaro, 2014; Benigno et al., 2015; Samarina and Bezemer, 2016), devoting no attention to the possibility that cross-border capital flows may also affect the credit allocation within industries. While there are no studies on the relationship between capital flows and within-industry shifts in *credit*, there are—to the best of my knowledge—two papers that examine the within-industry shifts in *physical capital* associated with capital account liberalizations and consequential surges in cross-border capital flows. Examining the dynamics of firms' dispersion of capital and labor, Gopinath et al. (forthcoming) identify a negative relationship between Spanish capital inflows and the efficiency of capital allocation. In contrast, applying a similar methodology, Larrain and Stumpner (2017) find a positive impact of capital flows on the allocative efficiency in Central and Eastern Europe. These contradictory results underline

the need for further empirical research (i) on the nexus between international capital flows and the within-industry efficiency of credit/capital allocation and (ii) on the causes for the different results of the extant literature.

In contrast to Gopinath et al. (forthcoming) and Larrain and Stumpner (2017), who model changes in *physical capital* allocation, I focus on the effects of cross-border capital flows on the allocative efficiency of *financial* intermediation, i.e., on the *credit* volume dynamics of recipient firms with a low ex-ante profitability relative to their industry peers.[1] By modeling the intermediation of international liquidity to the real sector, I am able to empirically identify the transmission channels from international capital flows to within-industry shifts in credit and capital allocation, allowing me to provide a rationale for the opposing results of the extant literature.

For identification purposes, the use of micro-level data is essential. I therefore compile a firm-level sample that rests on the Worldscope database, provided by Thomson Reuters. It comprises annual balance sheet data of listed European firms during 1995-2014. I match this data with a rich set of macroeconomic variables, including different proxies for international capital flows. The micro-level dimension of the data allows me to explore the within-country and within-industry differences across firms. As a consequence, my estimates are less sensitive to endogeneity concerns: even when omitted variables on the country-level correlate with foreign capital flows, inter-firm differences in the sensitivity with respect to these capital flows should not be affected.

My empirical approach further benefits from using a sample of euro area firms because the intertemporal variation in foreign capital flows in that region was far-reaching and displayed considerable cross-country heterogeneity since 1995, aiding identification of its effects on credit allocation using panel data.[2] An additional advantage of the euro area is that it has stable institutional conditions, particularly that firms in that region operate within a monetary union.[3]

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[1] See Bertrand et al. (2007) and Gropp et al. (2015) for similar regression frameworks.

[2] For instance, in contrast to Gopinath et al. (forthcoming), who only analyze Spanish cross-border capital flows between 1999 and 2012, the pronounced cross-country and time variation in the entire euro area allows me, by including country and time fixed effects, to control for country-specific and time-invariant factors in the regressions.

[3] Relative to the sample of Central and Eastern European firms in Larrain and Stumpner (2017), studying a sample of countries with stable macroeconomic and institutional conditions facilitates identification. For instance, capital account liberalizations and consequential surges in cross-border capital flows in Central and Eastern Europe

Hence, whereas a strand of the empirical finance literature focuses on the exploration of monetary policy as a driver of loan volume dynamics (e.g., Kashyap and Stein, 2000; Jiménez et al., 2014; Ioannidou et al., 2015), I abstract from cross-sectional differences in the stance of monetary policy and examine the variation in lending that is driven alone by foreign capital flows.

My analysis encompasses several steps. In the baseline regressions, I relate surges in international capital flows to firms' credit volume dynamics. For the identification of within-industry shifts in the efficiency of credit allocation, my empirical model focuses on the overproportional credit growth of firms with low returns on assets compared to their industry peers.

Having related cross-border capital flows to firms' credit growth conditional on their ex-ante profitability, I next examine the effects of cross-border capital flows on firms' ex-post performance. In this exercise, I analyze whether ex-ante low performing firms—due to relaxations in credit constraints associated with surges in international capital flows—are able or not to increase their earnings in the future,[4] thus allowing me to identify the detrimental effect of foreign capital flows on credit allocation and the long-run real economic performance on the micro-level.

Finally, I explore the transmission channels from cross-border capital flows to the (in)efficiency of credit allocation. Particularly, I show that surges in capital inflows induce the financial system to search for yield/increase risk-taking, thus raising lending to low performing firms (that have an increased probability of default and hence pay a higher interest rate on their debt). The identification of this channel is predicated on the theoretical literature that relates foreign capital inflows to increased risk-taking. For instance, Martinez-Miera and Repullo (2017) show that cross-border capital inflows can affect lending (in)efficiencies through an increase in the international supply of loanable funds, which leads to a reduction in interest rates, an expansion of loan volumes, and a decline in the monitoring intensity of the financial sector, reducing the quality of loan portfolios and raising the probability of defaults in the financial system.[5]

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were part of a more general process of institutional reforms (e.g., the region prior to the capital account liberalizations had almost no tradition of market institutions so that most banks were state-owned), exacerbating the causal interpretation of the effects of foreign capital flows.

[4]Generally, ex-ante low performing firms, rather than high performing firms, are constrained in their access to credit. Yet, as I will show, this type of firms has the highest debt growth rates following surges in capital inflows, potentially allowing them to invest in profitable projects and, thereby, to raise their future returns on assets.

[5]Alternative theoretical channels, which generate the same empirical predictions with regard to the relationship between capital inflows and credit allocation, depart from the assumption that capital inflows generate excess

These theoretical considerations, combined with the empirical evidence that low profitability is associated with a higher probability of default and that hence low performing firms pay higher interest rates on their debt,[6] suggest that firms' returns on assets also serve as an implicit risk measure in my regressions.

To identify risk-taking as the main transmission mechanism from capital flows to the (in)efficiency of credit allocation, I start introducing additional firm risk proxies in their interactions with foreign capital flows: the tangible asset ratio, the volatility of returns and the capital-to-asset ratio.[7] If risk-taking is the main mediating channel from cross-border capital flows to increased lending to the least profitable firms, I should also find a disproportionate increase in credit allocation to firms that are risky according to these dimensions of firm risk.

As a next step to understand the transmission channels of capital flows, I explore why the financial sector lends disproportionately more to low performing/risky firms. I conjecture that, as these firms pay a higher interest rate on their debt, higher risk-taking allows financial markets to search for yield. I test this hypothesis by estimating the effects of capital flows on firms' credit growth conditional on the ex-ante interest rate spread between low and high performing firms. If higher interest rates of less profitable firms, relative to their high performing industry peers, are the main reason for the increased credit supply to these firms, I expect the credit growth of low performing firms to be increasing in their ex-ante interest rate spread.

Theoretical models that relate international capital flows to the dynamics of credit volumes and risk depart from agency problems in the financial sector. Finally, I therefore strengthen the previous evidence on risk-taking/search for yield as the main mediating channel of cross-border capital flows by examining whether the credit growth of low performing firms is higher when the financial system is more prone to agency problems. Particularly, I explore the role of agency problems along two dimensions: (i) agency problems that increase in the concentration of the

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liquidity. Existing theories then relate excess liquidity to lower interest rates, which induce banks to search for yield (Rajan, 2006), as well as to an aggravation of bank agency problems, leading bank managers to soften lending conditions (Dell'Ariccia and Marquez, 2006; Acharya and Naqvi, 2012).

[6]For instance, estimating a duration model to explain firms' survival time to default, Carling et al. (2007) relate low firm profitability to a higher default probability. See also Altman (1968) for a similar argument. As a consequence, the least profitable firms in my sample pay an average spread of 7.9% on their outstanding debt relative to high performing firms.

[7]As argued by the existing empirical literature (e.g., Ben-Zion and Shalit, 1975; Carling et al., 2007; Duchin and Sosyura, 2014; Paligorova and Santos, 2017), these variables are important drivers of firms' default risk.

financial systems, raising the probability of "Too-big-to-fail"-related implicit bail-out guarantees and (ii) agency problems that rise in the shares of non-performing loans, which—in order to retard loan losses and, ultimately, to prevent insolvency—induce financial intermediaries to roll over bad loans and to gamble for resurrection. Examining the role of agency problems in shaping changes in credit allocation also allows me to identify credit supply as the driving force behind the adverse effects of international capital flows. Based on the assumption that credit supply, unlike credit demand, is contingent on the characteristics of the financial system, I emphasize the relevance of supply side effects in affecting the within-industry shifts in credit allocation by establishing that the impact of international capital flows on lending to low performing firms is conditional on agency problems in the financial sector.

My results are as follows: I find inflows of foreign capital to be associated with increased debt volumes of the least profitable firms within an industry. For instance, a 1-percentage point (henceforth pp) increase in capital inflows over GDP increases the debt growth rates of less profitable firms by 0.87 pp—in contrast to profitable firms for which this effect is not statistically different from zero. I also demonstrate that this effect is robust to several model adjustments, applying various proxies for cross-border capital flows, changing the definition of low and high performing firms and disentangling episodes in which global supply ("push") factors dominate the evolution of cross-border capital flows.[8]

I next establish a negative relationship between cross-border capital flows and future firm performance, which is most pronounced in firms with high credit growth rates. This result suggests that foreign capital is not only allocated overproportionally to firms with a low ex-ante profitability; additionally, firms that obtain the additional funding exhibit a lower future profitability, constituting long-run hazards for the aggregate economic performance.

Finally, I document that my results of more lending to low performing firms are consistent with increased risk-taking/search for yield of the financial sector. First, applying other firm risk proxies, I gauge that the financial sector also lends overproportionally to poorly capitalized firms with high performance volatilities and lower shares of tangible assets. Therefore, whereas the

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[8]The differentiation between episodes of "push" and "pull" driven capital flows is particularly important since supply-driven ("push") inflows of foreign capital are exogenous with respect to credit allocation in the euro area (see Baskaya et al., 2017).

literature that examines the relation between foreign capital and a shift in credit *across* industries (see in particular Reis, 2013) departs from collateral constraints in the financial sector that induce banks to lend to high net worth firms with (potentially) lower profitability levels, I show that international capital flows affect *within-industry* lending inefficiencies through increased risk-taking. Second, I demonstrate that cross-border capital flows raise the credit growth of less profitable firms disproportionately when the ex-ante interest rate of low performing firms, relative to high performing firms, is distinct. This result suggests that the inefficiency of credit allocation following surges in capital flows is driven by the higher interest rate of the least profitable firms relative to their more profitable industry peers. Third, in line with the theoretical literature reviewed above, I corroborate the role of risk-taking as the main transmission channel of cross-border capital flows by documenting that the effect of foreign capital on the efficiency of credit allocation is exacerbated by agency problems in the financial sector. In particular, ex-ante concentrated financial systems with high shares of non-performing loans have higher incentives for increased lending to the least profitable firms—a result that highlights the role of regulation for the allocative efficiency of lending. These results further suggest that cross-country differences in risk-taking incentives—which rise in the degrees of agency problems in the financial sector—are one likely reason for the opposing results of the extant literature on the relationship between cross-border capital flows and changes in the within-industry efficiency of capital allocation (Larrain and Stumpner, 2017; Gopinath et al., forthcoming): only when the extent of agency problems in the financial sector is marked, do cross-border capital flows adversely affect the allocative efficiency of lending and capital allocation.

This paper contributes to the literature in several dimensions. My main contribution lies in the identification of a micro-level result that helps to explain the difficulties of the empirical literature to identify a uniform positive relationship between cross-border capital inflows and aggregate economic growth (e.g., Grilli and Milesi-Ferretti, 1995; Edison et al., 2002; Alfaro and Charlton, 2007; Bonfiglioli, 2008; Bussière and Fratzscher, 2008; Kose et al., 2009; Eichengreen et al., 2011; Aizenman et al., 2013). Notably, I find that cross-border capital flows disproportionately increase lending to low performing firms, reducing their long-run firm-level performance. Thereby, the paper also broadly adds to the nexus between finance and growth

(e.g., Schumpeter, 1934; Gurley and Shaw, 1955; Goldsmith, 1969; McKinnon, 1973; King and Levine, 1993; Rajan and Zingales, 1998; Levine et al., 2000). I further contribute to the literature that investigates the real effects of lending (e.g., Acharya et al., 2014; Cingano et al., 2016; Bentolila et al., forthcoming) and in particular to the literature on the nexus between foreign capital, credit allocation and total factor productivity (e.g., Aoki et al., 2010; Reis, 2013; Benigno and Fornaro, 2014; Benigno et al., 2015; Samarina and Bezemer, 2016; Larrain and Stumpner, 2017; Gopinath et al., forthcoming). Relative to these studies that mostly focus on a shift in credit allocation across industries, I show (i) that international capital flows also affect the allocation of credit within industries and (ii) that risk-taking incentives and agency problems in the financial sector are important mediating channels from cross-border capital flows to within-industry shifts in credit allocation. Thereby, I finally add to the literature on the relationship between foreign capital flows and the incidence of financial crises (e.g., Rancière et al., 2008; Reinhart and Rogoff, 2008; Obstfeld, 2012; Gourinchas and Obstfeld, 2012; Lane and McQuade, 2014; Taylor, 2014). In this regard, my paper is also complementary to Dinger and te Kaat (2016), who show that cross-border capital inflows increase risks in the financial sector both because banks replace securitized assets with typically riskier loans and because the average quality of these loans deteriorates.

This paper is structured as follows. In Section 2, I describe the dataset and introduce the empirical strategy. My baseline results are presented in Section 3. Section 4 examines the relationship between foreign capital flows and future firm performance. In Section 5, I explore the transmission mechanisms from global capital flows to credit allocation. The results of several robustness checks are the focus of Section 6. Section 7 concludes.

2 Data and Methodology

I analyze the impact of cross-border capital flows on credit supply to firms with different ex-ante profitability measures, using an international firm-level dataset. The international dimension of the data allows me to control for variables that vary mostly across countries, but less over time (e.g., the characteristics of the financial system).

For mainly two reasons, I focus on euro area firms in this paper. First, the intertemporal variation in foreign capital flows in that region was far-reaching and displayed considerable cross-country heterogeneity since 1995, aiding identification of its effects on credit allocation using panel data.[9] Second, countries in the euro area have stable institutional conditions; most importantly, firms in that region operate within a monetary union. Thus, whereas the existing empirical research focuses on the exploration of monetary policy as a driver of credit volume dynamics, my setting abstracts from cross-sectional differences in the stance of monetary policy and examines the variation in lending that is driven alone by international capital flows.

2.1 Data

My sample comprises firms in the eleven founding members of the euro area (i.e., firms in Austria, Belgium, Finland, France, Germany, Ireland, Italy, Luxembourg, Netherlands, Portugal and Spain) between the Madrid Summit of 1995—that announced the introduction of the euro—and 2014.[10] [11]

The firm-level data stems from the Worldscope database, provided by Thomson Reuters. It covers all euro area companies that are publicly quoted and a small number of large private companies. Overall, these firms account for about 50% of value added in the euro area (see ECB, 2013).

The focus on publicly quoted firms is beneficial because listed firms benefit disproportionately more from cross-border capital flows through their access to the international bond markets. Further, larger firms typically maintain credit relationships with large banks,[12] which are presumably more affected by international capital flows through an increase in the availability of wholesale funding (e.g., Dinger and te Kaat, 2016; Baskaya et al., 2017). An additional advantage of listed firms is that their quality of accounting data is higher.

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[9]For instance, the pronounced cross-country and time variation allows me, by including country and time fixed effects, to control for country-specific and time-invariant factors in the regressions.

[10]Since 1994, these countries had to meet several convergence criteria and also coordinated their monetary policy stance. As Greece failed to meet the criteria, it entered the euro at a later stage. I thus exclude Greece from my sample. However, my results are also robust to the inclusion of Greek firms.

[11]I only have a limited number of observations for 2014. The results are also robust to the exclusion of 2014.

[12]As small firms are more subject to information asymmetries, they often maintain credit relationships with smaller banks that are headquartered closer to relationship customers, reducing problems related to asymmetric information (Berger and Udell, 2002).

Table 1: The Distribution of Sample Firms over Time

Country	1995	2000	2005	2010	2013
Austria	26	48	57	61	61
Belgium	39	64	90	91	79
Finland	52	95	103	109	109
France	175	388	492	547	518
Germany	246	466	555	578	517
Ireland	11	23	29	31	29
Italy	55	125	180	199	192
Luxembourg	3	11	18	25	25
Netherlands	60	83	87	92	86
Portugal	18	34	41	42	39
Spain	51	81	99	111	97
Σ	736	1418	1751	1886	1752

I correct my sample for implausible observations (e.g., non-positive equity ratios or liabilities) and I exclude firms in the financial industry (including insurance companies).[13] This results in a sample of more than 20,000 firm-year observations, structured in an unbalanced panel of up to 1,886 firms (see Table 1). I match these firm observations with a rich set of macroeconomic variables that are explained in detail in Section 2.3.

2.2 Methodology

I test my main hypothesis that cross-border capital flows disproportionately increase lending to low performing firms by estimating the following regression equation:

$$\Delta DEBT_{ksjt} = \alpha_s + \alpha_j + \alpha_t + \beta * CAPITALINFLOWS_{j,t-1} + \gamma * \qquad (1)$$
$$(CAPITALINFLOWS_{j,t-1} * PROFITABILITY_{k,s,j,t-1}) + \theta * X_{k,s,j,t-1} + \varepsilon_{ksjt},$$

where k indexes firms, s industries, j countries and t time. The dependent variable in this equation is the relative change in debt of firm k, in industry s and country j, at time t.

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[13]Firms in these industries are indicated by the Worldscope general industry codes 4, 5 and 6.

CAPITALINFLOWS$_{j,t-1}$ comprises different measures of international capital inflows over GDP in country j and in year t-1. *PROFITABILITY$_{k,s,j,t-1}$* is an indicator variable, which is equal to one if a firm is profitable (high returns on assets) and zero otherwise.[14] The coefficients of interest are β and γ. The inference about the former determines whether higher capital inflows lead to increased lending to unprofitable firms. The inference about the latter allows me to identify whether capital flows have an impact on the least profitable firms that is statistically different from highly profitable firms.[15] Thus, β measures the effect of capital flows on the debt volumes of firms with a low profitability; $(\beta + \gamma)$ measures the same effect on the credit supply to the most profitable firms.

The use of micro-level data allows me to treat capital inflows as broadly exogenous to firms' credit volume dynamics, since individual firms are too small to affect country-level measures of foreign capital flows. In addition, as equation (1) explores the within-country and within-industry differences between firms based on an interaction between a country and a firm characteristic, my estimates are less sensitive to potential omitted variables that may affect the dynamics of international capital flows, buttressing the causal interpretation of my coefficients. Particularly, even when other (unobserved) variables on the country-level correlate with foreign capital flows, inter-firm differences in the sensitivity with respect to these capital flows should not be affected.

In all of the specifications, the regressors enter with a one-year lag to further minimize endogeneity concerns. I also include industry, country and time fixed effects—α_s, α_j and α_t. I refrain from country-year dummies in my specifications, as they would absorb the overall effect of capital flows (the coefficient β). The coefficient γ, however, is also robust to including country-year fixed effects (results available upon request).

$X_{k,s,j,t-1}$ are different macroeconomic and firm-level controls and the standard errors are clustered at the country-level. I continue providing specifics of the variables in the next section.

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[14]See Section 2.3.2 for the specifics of its calculation.

[15]The strategy of interacting my main regressor with a measure of profitability is based on a specification by Bertrand et al. (2007).

2.3 Variables

2.3.1 Dependent Variable

To explore the effects of external capital flows on the dynamics of credit allocation, I use the relative change in firm debt as the dependent variable. Firm debt is the sum of all interest bearing financial liabilities, in particular bank loans and debt securities. The main advantage of the definition of firm debt is that it is not restricted to bank loans; instead, it also includes the variation in credit allocation through the international bond markets, which is important for an analysis based on listed firms (that also have non-trivial amounts of bond funding on their balance sheets).

2.3.2 Explanatory Variables

The main explanatory variable in my analysis is the share of net cross-border capital inflows over GDP, approximated by the negative of the current account balance.[16] According to national accounting identities, international capital flows close the gap opened by current account deficits, thus providing additional international funding to banks and firms located in countries with external deficits, either via the global interbank market or through the issuance of commercial papers and bonds. In this context, Shin (2012) documents that the current account balance in advanced Europe co-moves with cross-border financial sector flows (rather than equity flows or FDI), thereby affecting the financial conditions in that region. Therefore, following this argument and the recent empirical literature on the relationship between international capital flows and real economic performance (e.g., Prasad et al., 2007; Gourinchas and Jeanne, 2013), I also use the current account as my main variable approximating the amounts of global capital flows that enter the financial systems and induce changes in credit allocation.

The choice of a net flow measure, instead of a gross flow measure, of cross-border capital is also justified from the perspective that the correlation between *gross* debt flows and the average firm-level interest rate in my sample is relatively low (2%-3%). Consequently, gross capital

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[16]For at least two reasons it is unproblematic that the current account balance over GDP is serially correlated: First, the time dimension of my dataset is short. Second, the dependent variable is defined such that it does not exhibit forms of serial correlation. Therefore, I obtain precise standard errors, although my key regressor is not serially uncorrelated (Bertrand et al., 2004).

flows do not necessarily affect financial conditions, as inflows and outflows potentially net each other out. This result is broadly in line with some of the extant international finance literature that emphasizes the role of *net* capital flows for the evolution of credit cycles and risk (e.g., Caballero, 2014; Catão and Milesi-Ferretti, 2014; Hoffmann and Stewen, 2017).

I further employ the sum of net portfolio debt flows and bank credit flows over GDP as a presumably more direct measure of global capital flows into the financial systems in one specification of Section 3.[17] In this specification, I show that the corresponding estimates are not statistically different from those of the current account, pointing to the high correlation between an overall measure of net capital flows and financial sector flows in the euro area (see Shin, 2012).

Consistent with the BIS (2015) that relates credit booms (e.g., due to capital inflows) to a lower allocative efficiency, my hypothesis is that the financial system uses inflows of global liquidity to disproportionately increase lending to the least profitable firms. I thus interact cross-border capital flows with firms' profitability (*PROFITABILITY*). In most of the specifications, I measure profitability as a dummy which is equal to one if a firm's return on assets is larger than the median of returns on assets for the respective industry-year pair, zero else.[18] Calculating the median on the industry-year level is important because this paper aims to examine the within-industry shifts in credit following surges in cross-border capital flows.

As the previously introduced profitability measure might be driven by transitory declines in firms' profitability (rather than a structurally low return on assets),[19] I also present regression results that make use of an alternative calculation of *PROFITABILITY*. In particular, I estimate a specification that defines firms as unprofitable if their returns on assets are in at least 67% of the years in the lowest 10% of the annual, industry-specific distribution. This variation allows me to examine the effects of capital inflows on firms that are permanently low performing and, thus, to identify the long-run lending inefficiencies associated with international capital flows.

In line with the empirical literature on credit volume dynamics and financial sector risks (e.g.,

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[17]Due to extreme outliers in Luxembourg and Ireland that serve as world financial centers, I drop the top and bottom 2% of the distribution of this capital flow measure.

[18]The number of industries according to the Worldscope industry identifier is comparable to the three-digit ISIC and two-digit SIC codes. A similar dis-aggregation of industries is, for instance, also used in the empirical literature on the effects of finance on growth (e.g., Rajan and Zingales, 1998). My results, however, are also robust to a smaller number of industries, e.g., using the one-digit SIC codes (results readily available upon request).

[19]For instance, it is possible that the financial sector merely increases lending to high performing firms that experience short-run declines in profitability, thereby smoothing idiosyncratic firm-specific fluctuations.

Dinger and von Hagen, 2009; Jiménez et al., 2014; Ioannidou et al., 2015), I add the following macroeconomic variables to my model: the real economic growth rate ($GROWTH$), the 10-year sovereign bond yield ($YIELD$) and per capita GDP ($PERCAPITAGDP$). Several additional macroeconomic controls (e.g., inflation, changes in fiscal policy, unemployment, output gap) added preliminary regressions with insignificant coefficients and, for reasons of parsimony, I exclude them from the model. Apart from the set of macro controls, I include the following firm-level covariates that are likely to affect the changes in firm debt: the logarithm of total assets ($SIZE$), the share of liquid assets relative to short-term liabilities ($LIQUIDITY$) and firms' equity ratios ($CAPITAL$). Table A.1 (Appendix) provides further specifics of the data.

2.4   Summary Statistics

This section presents the descriptive statistics for the variables included in my baseline analysis. I particularly focus on the different characteristics of countries with external surpluses (columns (3) and (4)) compared to countries with external deficits (columns (5) and (6)).

In my sample, firm debt is growing moderately with a median rate of 0.74%. Additionally, Table 2 indicates that firms in countries with external deficits have higher debt growth rates (2.45% vs. -0.25%), which is consistent with the literature on capital flows and lending booms (e.g., Mendoza and Terrones, 2012; Lane and McQuade, 2014; Dinger and te Kaat, 2016).

Turning to the summary statistics with regard to the explanatory variables, I find that the average natural logarithm of total assets is equal to 11.99 thousand €, the average liquidity ratio is equal to 0.99% and the average share of equity to total assets is equal to 41.37%. The fact that these firm characteristics are homogeneous between both sub-groups facilitates identification,[20] as my results are unlikely to be driven by differences in unobserved firm attributes in countries with external deficits relative to countries with external surpluses.

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[20]The arithmetic mean for the variable $PROFITABILITY$ for firms in countries with external surpluses equals 0.503, whereas it equals 0.454 for firms in countries with external deficits. Although firms in countries with external surpluses are on average more profitable, this difference is unlikely to be the only driver of my results. In one of the robustness checks, I will further address this issue.

Table 2: Summary Statistics of the Baseline Variables

		entire sample		external surplus		external deficit	
		(1)	(2)	(3)	(4)	(5)	(6)
	Unit	Observations	Median	Observations	Median	Observations	Median
Dependent Variable							
ΔDEBT	%	24567	0.74	13243	-0.25	11324	2.45
Firm-Level Regressors							
SIZE	ln(1000€)	29637	11.99	16402	11.87	13235	12.14
LIQUIDITY	%	28498	0.99	15751	1.01	12747	0.97
CAPITAL	%	29610	41.37	16390	42.44	13220	40.13
PROFITABILITY	0/1	26833	0.00	14932	1.00	11901	0.00
PROFITABILITY (PERMANENT)	0/1	29640	1.00	16405	1.00	13235	1.00
Macroeconomic Regressors							
CAPITAL INFLOWS	%	29640	-0.99	16405	-4.65	13235	1.30
NET DEBT FLOWS	%	28499	0.66	15556	-2.64	12943	3.21
GROWTH	%	29640	1.72	16405	1.86	13235	1.66
YIELD	%	29640	4.22	16405	4.12	13235	4.26
PER CAPITA GDP	1000€	29640	25.47	16405	26.03	13235	24.77

My main measure of net cross-border capital inflows has a median value of -0.99% relative to GDP. The negative sign for this net flow measure implies that the median firm operates in a country with net capital outflows. This result is a consequence of the large number of firms located in countries with external surpluses (see Table 1). The median value for net debt inflows relative to GDP is equal to 0.66%. In addition, countries with external deficits have higher median net debt inflows relative to external surplus countries (-2.64% vs. 3.21%).

Table 2 also demonstrates that countries with net capital outflows (external surpluses) have a higher median per capita GDP, higher economic growth rates and lower 10-year interest rates compared to countries with negative current account balances. These results are driven by observations after 2007 because countries with external deficits suffered most from the financial crisis of 2007-2009 and the sovereign debt crisis of 2009-2011, which had adverse effects on economic growth and led to spiking government interest rates in these countries.

3   Baseline Results

In this section, I present the results of the baseline model, which I described in detail in Section 2.2. In the first column of Table 3, I use the negative of the current account balance over GDP as the proxy for net inflows of foreign capital.

Table 3: The Baseline Results

	baseline model	push factors dominate	capital flows = net debt flows	permanent profitability
	(1) ΔDEBT	(2) ΔDEBT	(3) ΔDEBT	(4) ΔDEBT
CAPITAL INFLOWS	0.874***	1.665***	0.743**	9.326**
	(3.11)	(3.08)	(2.12)	(1.96)
CAPITAL INFLOWS * PROFITABILITY	-0.492**	-1.015**	-0.632*	-8.720*
	(-2.47)	(-2.41)	(-1.89)	(-1.89)
SIZE	-1.522***	0.669	-1.405***	-1.592***
	(-3.96)	(1.10)	(-3.98)	(-4.37)
LIQUIDITY	0.315***	-0.202	0.344***	0.322***
	(3.14)	(-0.97)	(3.42)	(3.01)
CAPITAL	0.806***	0.808***	0.8231***	0.810***
	(15.67)	(13.93)	(16.17)	(15.50)
PROFITABILITY	6.393***	3.794**	6.718***	6.928***
	(5.88)	(2.57)	(5.30)	(6.09)
GROWTH	0.931**	1.507	0.320	0.942**
	(1.99)	(1.50)	(0.83)	(2.03)
YIELD	-1.127	0.795	-1.328***	-1.139
	(-1.28)	(0.71)	(-1.12)	(-1.31)
PER CAPITA GDP	-0.313	1.022	0.695	-0.337
	(-0.39)	(1.39)	(0.44)	(-0.42)
Year FE	Yes	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes
Obs	21761	7906	20491	21761
R^2	0.032	0.049	0.032	0.032

In this table, I present the results of my baseline model that regresses the debt growth rates of firms on net cross-border capital flows interacted with a firm profitability indicator that is equal to 1 if the return on assets of a firm is above the median of the same industry- year pair. All of the regressions include a set of macro and firm-level controls, as described in Section 2, and year, country and industry fixed effects. In column (2), I restrict the sample to episodes in which exogenous push factors dominate the evolution of capital flows. In column (3), I use portfolio debt flows as the measure of global capital inflows. In column (4), I define firms as unprofitable if their return on assets are in at least 2/3 of the years below the 10th percentile of the annual, industry-specific distribution. The t-statistics are shown in parentheses and the standard errors are clustered at the country-level.

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

The results show that cross-border capital inflows increase lending to the least profitable firms within an industry disproportionately, indicated by a significant and negative interaction term in column (1). In economic terms, whereas a 1-pp increase in capital inflows significantly increases the debt growth rates of low performing firms by 0.87 pp, the effect on credit growth of the most profitable firms is equal to 0.38 pp, which is not statistically different from zero.[21] These estimates are unlikely to be subject to endogeneity issues (e.g., potential omitted variables that may affect the dynamics of international capital flows), as this paper explores the within-country and within-industry differences between firms based on an interaction between a country and a firm characteristic (see the discussion in Section 2.2).

Yet, to corroborate the causal interpretation of my results, I next provide an extension to the baseline model, which is based on the implications of the extensive literature on the importance of global push factors, such as the VIX or macroeconomic conditions in the US, for the dynamics of cross-border capital flows (e.g., Calvo et al., 1996; Fratzscher, 2012; Bluedorn et al., 2013; Rey, 2013; Bruno and Shin, 2015), combined with the results of Baskaya et al. (2017), who argue that global push factors are exogenous with respect to credit allocation in Europe. Existing research argues that the domestic risk-free interest rate decreases during episodes of push-driven (supply-driven) international capital flows; instead, interest rates rise, when demand-driven local pull factors affect the dynamics of cross-border capital flows (e.g., Martinez-Miera and Repullo, 2017). Therefore, to corroborate the consistency of my coefficient estimates, the following specification restricts the sample to episodes in which inflows (outflows) of foreign capital were associated with reductions (rises) in the spread of 10-year sovereign bonds. For these periods, based on the argument scheduled above, I can convincingly claim that the dynamics of cross-border capital flows are supply-driven and thus exogenous with respect to credit allocation in the euro area. Column (2) highlights that the effect of international capital flows during these sub-periods is economically more meaningful than the effect identified in column (1): a 1-pp increase in supply-driven cross-border capital flows even raises lending to the least profitable firms by 1.67 pp, compared to an effect of 0.87 in column (1). In unreported estimations, I further document that capital flows have a weaker (and of-

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[21]This is the sum of the coefficients in the first two rows.

ten insignificant) effect on the dynamics of credit allocation during episodes in which demand factors dominate. This result implies that only cross-border capital flows that are followed by a reduction in interest rates (i.e., supply-driven cross-border capital flows) are associated with more lending to low performing firms.

Based on the evidence that the current account co-moves with cross-border financial sector flows in the euro area, thereby affecting the financial conditions and credit allocation in that region (e.g., Shin, 2012), I approximated foreign capital flows by the negative of the current account balance in all of the previous specifications. In the following specification, I use a presumably more direct measure of cross-border financial sector flows—the sum of net portfolio debt flows and bank credit flows relative to GDP (which I call net debt flows). The distinction between overall capital flows and debt flows might be important in the context of the theoretical literature that argues that particularly cross-border debt flows—in contrast to portfolio equity flows or FDI—are associated with an increase in information asymmetries, as they usually do not incorporate levels of ownership, thus exacerbating manager controls (e.g., Neumann, 2003) and reducing the efficiency of credit allocation. The results of column (3) are consistent with this hypothesis: net portfolio debt inflows lead to a disproportionate increase in lending to low performing firms, indicated by a negative interaction term, which is statistically significant at the 10% level. In economic terms, a 1-pp increase in net debt inflows is associated with a significant rise in low performing firms' credit growth rates by 0.74 pp. This effect, however, is not statistically different from the coefficient identified in the regression of column (1), in which I used the current account as the proxy for global capital flows. Therefore, in line with Shin (2012), my estimates point to the high correlation between an overall measure of net capital flows and financial sector flows in the euro area.[22]

In columns (1)-(3), I show that international capital inflows increase credit allocation to less profitable firms, defined as firms with a return on assets below the median of the respective industry-year pair. This calculation of the profitability dummy, however, gives rise to the possibility that the financial sector merely increases lending to high performing firms that experi-

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[22]I thus continue using the negative of the current account as the measure of cross-border capital flows in all of the subsequent regressions. However, the key finding that international capital flows change the efficiency of credit allocation is robust to that choice.

ence transitory declines in profitability, thereby smoothing idiosyncratic firm-specific fluctuations. In column (4), I present regression results that make use of an alternative calculation of *PROFITABILITY*. In particular, I explore the effects of foreign capital on firms that are constantly in the lowest 10% of the industry-specific annual distribution of returns on assets, since increased lending to these firms could be interpreted as a sign of long-run lending inefficiencies. For this analysis, I define the dummy *PROFITABILITY* as equal to zero if a firm's return on assets is in at least 2/3 of years in the lowest 10% of the annual, industry-specific distribution of profitability, one else. Column (4) of Table 3 indicates that the effect of international capital flows is even more pronounced for firms that are constantly least profitable: for these firms, a 1-pp increase in capital inflows is even associated with 9.33-pp higher debt growth rates. Consequently, a financial system that has access to abundant international liquidity does not only lend to high performing firms that are temporarily affected by a decline in profitability. Rather, it structurally reduces the efficiency of credit allocation by funding firms that are permanently low performing.

In most of the specifications of Table 3, consistent with the literature on the effects of monetary policy on bank lending (e.g., Jiménez et al., 2014; Ioannidou et al., 2015), I find higher GDP growth to increase firm debt volumes significantly. From the set of firm-level controls, an increase in firm size, a decrease in the ratio of liquid assets and both lower capital ratios and profitability reduce firms' credit volumes.

To sum up, whereas the existing literature on the nexus between foreign capital and the efficiency of credit allocation focuses on a shift in credit allocation *across* industries (e.g., Reis, 2013; Benigno and Fornaro, 2014; Benigno et al., 2015; Samarina and Bezemer, 2016), Section 3 shows that international capital flows also affect the allocation of credit *within* industries. This change in credit allocation could provide one explanation for the difficulties of the empirical literature to identify a distinct positive relationship between financial liberalization, cross-border capital flows and economic growth: more credit to low performing firms is likely to reduce the economic dynamics in the long-run. I will thus continue examining the detrimental effects of cross-border capital flows on credit allocation by identifying the relation between foreign capital and future firm performance.

4   Changes in Future Firm Performance

In Section 3, I have shown that cross-border capital inflows lead to an increase in credit growth of ex-ante low performing firms. This, however, does not necessarily imply a reduction in the efficiency of credit allocation: as generally ex-ante low performing firms, rather than high performing firms, are constrained in their access to external finance,[23] the additional credit of low performing firms associated with cross-border capital inflows could allow them to invest in profitable projects, thereby potentially raising their future returns on assets. I thus continue examining the effects of foreign capital flows on firms' ex-post performance, estimating the following equation:

$$\Delta PROFITABILITY_{k,s,j,t+2} \quad = \quad \alpha_s + \alpha_j + \alpha_t + \beta * CAPITALINFLOWS_{j,t} + \tag{2}$$
$$\theta * X_{k,s,j,t} + \varepsilon_{ksjt}.$$

Particularly, I model the change in the return on assets of firm k, in industry s and country j, between year t+2 and t as a function of cross-border capital inflows over GDP (the negative of the current account balance), controlling for the set of macroeconomic and firm-level controls presented in Section 2, in addition to industry, country and time fixed effects.[24]

I further hypothesize that the link between foreign capital flows and firms' ex-post performance is stronger for firms with high credit growth. In this regard, I also explore the heterogeneous effects of cross-border capital on the future earnings response of firms with high and low debt growth rates at time t. Following Bertrand et al. (2007), I first compute a measure of residual annual changes in firm debt by regressing the relative one-year change in firm debt on the following set of observable firm characteristics: lagged return on assets, lagged total assets, lagged liquidity and lagged capitalization. I use the residual from this regression as an exogenous measure of firm-level changes in debt that cannot be explained by observable firm characteristics. Then, I split the sample into firms with an above and below median residual change in debt for

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[23]see the literature review in the introduction

[24]I experimented with a longer or shorter time frame for the future earnings response. My results are unaffected.

the respective year.[25]

Column (1) of Table 4 shows that higher inflows of cross-border capital lead to significantly lower future firm performance, as can be gauged from the t-statistic of -1.86 on the variable *CAPITALINFLOWS*. This effect is not only statistically significant, but also economically important: a 1-pp increase in cross-border capital flows reduces the future firm performance by 0.42 pp, which is non-trivial against the background that the median profitability in my sample is equal to 4.74%.

Further, columns (2) and (3) document that the future earnings response is conditional on high credit growth in the past. For firms that have a below-median change in residual debt at time t, cross-border capital flows do not have a significant effect on future returns on assets (column (2)). In contrast, foreign capital has a negative and highly significant impact on the future performance of firms with high debt growth rates: a 1-pp increase in capital inflows for these firms is associated with a reduction in the future returns on assets by 0.7 pp (Table 4, column (3)).

Table 4: Changes in Future Firm Performance

	whole sample	*low debt growth*	*high debt growth*
	(1)	(2)	(3)
	Δ PROFITABILITY	Δ PROFITABILITY	Δ PROFITABILITY
CAPITAL INFLOWS	-0.422*	0.179	-0.701***
	(-1.86)	(1.26)	(-2.97)
Macro Controls	Yes	Yes	Yes
Firm Controls	Yes	Yes	Yes
Year FE	Yes	Yes	Yes
Country FE	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes
Obs	21206	9493	11713
R^2	0.004	0.034	0.007

In this test, I examine the effect of cross- border capital flows on future firm performance, measured by the two-year change in returns on assets. In column (2) and (3), I also divide the sample into a sub-sample of firms with low and high debt growth, respectively. I further include a set of macroeconomic and firm controls, as shown in Section 2, as well as year, country and industry fixed effects. The t-statistics are presented in parentheses and the standard errors are clustered at the country-level.

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

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[25]In unreported specifications, I also repeat this analysis using the observed one-year change in firm debt (without taking out the part that can be explained by observables). This does not change any of my results.

These results emphasize that cross-border capital flows, despite a relaxation of credit constraints, do not induce low performing firms to invest in profitable projects and, thereby, to raise their ex-post performance. Consequently, foreign capital is not only allocated overproportionally to firms with a low profitability; additionally, firms that obtain the additional funding exhibit a lower future profitability, constituting long-run hazards for the aggregate economic performance. This result helps to explain the difficulties of the empirical literature to identify a distinct positive relationship between cross-border capital flows, lending booms and aggregate economic growth.

5   The Transmission Mechanisms from Capital Flows to Credit Allocation

In the previous tests, I have established an empirical link between cross-border capital inflows, increased lending to the least profitable firms within an industry and a deterioration of future firm performance. In this section, I identify risk-taking of the financial sector as the main transmission mechanism from international capital flows to a less efficient credit allocation, allowing me to provide a rationale for the different results of the literature on the relationship between capital account liberalizations, surges in cross-border capital flows and within-industry shifts in physical capital allocation (Larrain and Stumpner, 2017; Gopinath et al., forthcoming).

Introducing different firm risk variables in their interactions with cross-border capital flows, the first set of tests (Section 5.1) shows that surges in capital flows are associated with increased risk-taking of the financial sector. Section 5.1 also documents that the financial system raises credit supply to low performing/risky firms because these firms pay a higher interest rate on their debt, thus allowing financial intermediaries to search for yield. Theoretical models that relate international capital flows to the dynamics of credit volumes and risk are based on agency problems in the financial sector. I therefore continue strengthening the evidence on risk-taking/search for yield as the main mediating channel of cross-border capital flows by examining whether the credit growth of low performing firms is higher when the financial system is more prone to agency problems—problems that rise in the concentration and the non-

performing loans ratio of the financial system (Section 5.2).

5.1 Capital Flows, Search for Yield and Risk-Taking

In Section 5.1, I show that excess liquidity associated with cross-border capital inflows induces the financial system to increase its search for yield/risk-taking, therefore expanding lending to low performing firms (that have a higher probability of default, prompting them to pay a higher interest rate on their debt). The identification of this channel is motivated by the theoretical literature on the relationship between foreign capital inflows and increased risk-taking (e.g., Dell'Ariccia and Marquez, 2006; Rajan, 2006; Acharya and Naqvi, 2012; Martinez-Miera and Repullo, 2017), combined with the empirical evidence that low returns on assets increase firms' incidence to fail.[26] As a consequence of the negative relationship between profitability and the probability of default, profitability also served as an implicit firm risk measure in the previous regressions: low performing firms are generally more constrained in the supply of credit than high performing firms, forcing them to pay higher interest rates on their debt.[27]

5.1.1 Introducing Additional Firm Risk Variables

To establish the role of risk-taking as the main mediating channel from capital flows to the (in)efficiency of credit allocation, I start introducing additional ex-ante firm risk proxies, apart from profitability, interacted with cross-border capital flows over GDP. I hypothesize that foreign capital flows also disproportionately affect the credit volumes of firms that are risky according to these additional dimensions of firm risk. The first firm-level risk measure that I employ is the capital-to-asset ratio. Firms with higher leverage are more prone to asset substitution, undertaking more projects with a higher incidence to fail. Further, in case of failure, these firms have a worse loss-absorbing capacity and are thus more likely to default. Empirically, Ben-Zion and Shalit (1975) and Carling et al. (2007) document the positive relationship between firms'

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[26]For instance, estimating a duration model to explain firms' survival time to default, Carling et al. (2007) relate low firm profitability to a higher default probability. See also Altman (1968) for a similar argument. In a recent empirical study on banks' maturity composition, Paligorova and Santos (2017) argue that profitability is one important dimension of firm risk.

[27]Consistent with this argument, the share of interest expenses over total assets of low performing firms in my sample is equal to 1.5%; in contrast, high performing firms pay an average interest rate of only 1.39%. The difference of 7.9% between both groups is not only economically meaningful, but also significant at the 1% level.

leverage and default risk. As further firm risk proxies, I use the volatility of the returns on assets and the ratio of capital expenditures in total assets. Duchin and Sosyura (2014) argue that firms with higher volatilities and lower fractions of tangible assets have a lower probability to serve their debt, especially once they are affected by adverse macroeconomic or idiosyncratic shocks.[28] Additionally, the recovery of principal and interest, once these firms fall in default, is also subject to greater uncertainty. I use these three variables to calculate firm risk indicators that are equal to one if a firm's volatility in a particular year is larger and its capital-to-asset ratio or tangible assets ratio is lower than the respective median in the same year and industry. To start with, these dummies are sequentially interacted with the amounts of net cross-border capital flows over GDP. Columns (1)-(3) of Table 5 demonstrate that all of the three risk interactions enter the model with positive coefficients. These results indicate that capital inflows lead to a disproportionate increase in credit supply to risky firms, providing empirical evidence for risk-taking as the main channel from international capital flows to within-industry shifts in credit allocation. However, only firm risk measured by the volatility of returns on assets and the share of tangible assets is statistically significant at conventional levels.

The literature on the relation between foreign capital and a shift in credit *across* industries (see in particular Reis, 2013) builds on collateral constraints in the financial sector that induce banks to lend to high collateral/ high net worth firms with (potentially) lower profitability levels. The positively significant interaction between cross-border capital flows and firm risk proxied by low tangible asset ratios (column (3)), however, points to another channel from foreign capital to *within-industry* shifts in credit allocation: cross-border capital flows rather affect the allocation of credit across firms in the same industry through changes in risk-taking.

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[28]See also Paligorova and Santos (2017).

Table 5: Introducing Additional Firm Risk Variables

	(1) ΔDEBT	(2) ΔDEBT	(3) ΔDEBT	(4) ΔDEBT
CAPITAL INFLOWS	0.487	0.343	0.244	0.165
	(1.53)	(1.31)	(0.61)	(0.38)
PROFITABILITY	7.036***	6.732***	5.654***	4.909***
	(6.01)	(6.07)	(4.88)	(4.80)
RISK (LEVERAGE)	2.254			2.681**
	(1.58)			(2.32)
RISK (VOLATILITY)		-3.854*		-4.910**
		(-1.72)		(-2.07)
RISK (TANGIBLE ASSETS)			-3.800***	-3.915***
			(-3.33)	(-3.45)
CAPITAL INFLOWS * PROFITABILITY				-0.429**
				(-2.15)
CAPITAL INFLOWS * RISK (LEVERAGE)	0.276			0.207
	(1.01)			(0.73)
CAPITAL INFLOWS * RISK (VOLATILITY)		0.649**		0.482*
		(2.35)		(1.96)
CAPITAL INFLOWS * RISK (TANGIBLE ASSETS)			0.585*	0.506
			(1.64)	(1.43)
Macro Controls	Yes	Yes	Yes	Yes
Firm Controls	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes
Obs	21761	21756	20956	20953
R^2	0.032	0.032	0.033	0.034

This test examines risk-taking as a transmission channel of foreign capital flows, interacting capital flows with various firm risk dummies that are equal to 1 if the capital-to-asset ratio is lower, the volatility of returns on assets is higher or the share of capital expenditures is lower than the median of the same industry - year pair. The dependent variable is the debt growth rate of firms. I include large sets of macroeconomic and firm controls as described in Section 2 as well as year, country and industry fixed effects. The t-statistics are shown in parentheses and the standard errors are clustered at the country-level.

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

As a next step to identify risk-taking as the main mediating channel from capital flows to credit allocation, I horserace all of the firm risk dummies and the profitability of firms simultaneously in their interactions with capital flows (column (4)). In this regression, all of the three risk interactions remain positive and, in addition, the profitability interaction enters the model with a negative coefficient, which is consistent with higher risk-taking of the financial system. Yet, only firms' profitability and the volatility of returns are statistically significant, indicated by a t-statistic of 1.96 on the volatility interaction and of -2.15 on the profitability interaction. Therefore, firm profitability seems to be the most robust firm-level variable that determines firms' sensitivity to the effects of cross-border capital flows.

5.1.2 Controlling for the Interest Rate Spread of Low Performing Firms

Having documented that surges in cross-border capital flows are associated with increased risk-taking, this section explores why the financial sector allocates disproportionately more credit to low performing/risky firms.

As these firms pay a higher interest rate on their debt (the average spread between low and high performing firms in my sample is equal to 7.9%), consistent with Rajan (2006), I conjecture that higher risk-taking allows financial markets to search for yield. I test this hypothesis by regressing firms' credit growth, separately for the different quintiles of the distribution of the annual ex-ante interest rate spread between low and high performing firms, on the interaction between cross-border capital flows and firms' profitability. If higher interest rates of less profitable firms, relative to high performing firms, are the main reason for the increased credit supply to these firms, I expect the credit growth of low performing firms to be increasing in the ex-ante interest rate spread between both types of firms.

As can be gauged from the significant interaction terms in columns (4) and (5), cross-border capital flows disproportionately raise the credit growth rates of less profitable firms only when the ex-ante interest rate of low performing firms, relative to high performing firms, is distinct.

Table 6: Controlling for the Interest Rate Spread of Low Performing Firms

The spread of low performing firms is in the	1st quintile	2nd quintile	3rd quintile	4th quintile	5th quintile
	(1) ΔDEBT	(2) ΔDEBT	(3) ΔDEBT	(4) ΔDEBT	(5) ΔDEBT
CAPITAL INFLOWS	-0.127	1.538*	-0.330	1.184***	2.712***
	(-0.15)	(1.77)	(-0.37)	(2.69)	(3.43)
CAPITAL INFLOWS * PROFITABILITY	0.323	0.271	-0.123	-1.379*	-0.912***
	(0.70)	(0.36)	(-0.23)	(-1.90)	(-3.76)
Macro Controls	Yes	Yes	Yes	Yes	Yes
Firm Controls	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes
Obs	4529	5986	6438	4027	6111
R^2	0.059	0.047	0.050	0.049	0.024

This test regresses firms' debt growth on net capital flows and their interactions with a firm profitability dummy which is equal to 1 if the firm's return on assets is above the median of the respective industry-year pair. I estimate the regressions separately for the different quintiles of the distribution of the interest rate spread between low and high performing firms. I also add sets of macro and firm-level controls as described in Section 2, as well as year, country and industry dummies. The t-statistics are presented in parentheses and the standard errors are clustered at the country-level.

$^*\ p < 0.10$, $^{**}\ p < 0.05$, $^{***}\ p < 0.01$

In economic terms, whereas the credit growth rate of less profitable firms in columns (1)-(3) is at most statistically significant at the 10% level, cross-border capital inflows are associated with a highly significant increase in low performing firms' debt growth by 1.2-2.7 pp when the interest rate spread of low performing firms is in the top 40% of the distribution (columns (4) and (5)).[29] This result suggests that the inefficiency of credit allocation following surges in capital flows is driven by the higher interest rate of the least profitable firms relative to their more profitable industry peers.

Therefore, Section 5.1.2 also gauges that credit supply is the driving force behind the adverse effects of international capital flows because a high interest rate spread should reduce, rather than increase, low performing firms' credit demand. Section 5.2 will provide further evidence on the relevance of supply side effects in affecting the within-industry shifts in credit allocation. Overall, Section 5.1 documents that increased risk-taking/search for yield of the financial system is the main mediating channel from cross-border capital flows to the efficiency of credit allocation. Thus, my results are also broadly in line with the macroeconomic literature on the relationship between foreign capital flows, financial sector risk and the incidence of crises (e.g.,

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[29]This economic effect relates to the coefficient on *CAPITALINFLOWS*.

Rancière et al., 2008; Reinhart and Rogoff, 2008; Obstfeld, 2012; Gourinchas and Obstfeld, 2012; Lane and McQuade, 2014; Taylor, 2014).

5.2 The Role of Agency Problems

In the previous section, I have empirically established risk-taking/search for yield as the main mediating channel from cross-border capital flows to the efficiency of credit allocation. Theoretical models that relate international capital inflows to the dynamics of credit volumes and risk are based on agency problems in the financial sector (e.g., Dell'Ariccia and Marquez, 2006; Acharya and Naqvi, 2012; Martinez-Miera and Repullo, 2017). Therefore, I further strengthen the evidence on risk-taking as an important channel from cross-border capital flows to credit allocation by examining whether the credit growth of low performing firms is higher when the financial system is more prone to agency problems.

For two reasons, the following analysis focuses on agency problems in the banking sector, rather than exploring agency problems in the entire financial system. First, bank loans are the most important type of funding for firms in a bank-based region like the euro area (e.g., Cecchetti, 1999; Demirgüc-Kunt and Levine, 2001).[30] Second, due to the heterogeneity of the various financial market players, it is difficult to approximate agency problems in the whole financial sector. As a consequence, the theoretical and empirical literature typically focuses on agency problems in the banking sector (e.g., Dell'Ariccia and Marquez, 2006; Acharya and Naqvi, 2012; Jiménez et al., 2014; Dinger and te Kaat, 2016).

Particularly, I examine the interaction of cross-border capital flows and bank agency problems along two dimensions. First, agency problems that increase in the concentration of the banking system, which correlates with the likelihood for pronounced (implicit) bail-out guarantees. Second, agency problems that arise because banks have high amounts of non-performing loans on their balance sheets, which induce them to gamble for resurrection and to roll over loans to less profitable firms (e.g., Peek and Rosengren, 2005; Niinimaki, 2007; Caballero et al., 2008; Watanabe, 2010).

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[30]The importance of bank loans for the financing decisions of (large) firms in the euro area is also confirmed by the recent 2016 survey on the access to finance of enterprises (SAFE), conducted by the ECB and the European Commission.

Examining the role of agency problems in shaping changes in credit allocation also allows me to provide further evidence on the role of credit supply as the driving force behind the adverse effects of international capital flows: since only credit supply—unlike credit demand—is contingent on the preceding dimensions of agency problems, I emphasize the relevance of supply side effects in affecting the within-industry shifts in credit allocation by showing that international capital flows affect firms' debt growth disproportionately more in financial sectors subject to severe agency problems.

I start exploring the agency problems in the banking sector with respect to its average ex-ante concentration. Highly concentrated banking systems are usually characterized by a majority of banks being protected by implicit bail-out guarantees. These guarantees, however, reduce the monitoring incentives of investors and, thus, aggravate the existing agency problems. Consequently, my presumption in the following test is that increased lending to the least profitable firms is exacerbated in concentrated financial systems located in countries with surges in capital flows. I model the contingency on the average financial sector concentration by estimating my baseline regression separately for the sub-sample of ex-ante concentrated and non-concentrated banking systems, defined as those in which the five largest banks have an asset share below or above, respectively, the median of the annual distribution of concentration across countries.

Column (1) and (2) of Table 7 indicate that the effects of foreign capital differ significantly between both sub-samples. In non-concentrated financial systems, inflows of international capital are not significantly associated with higher credit volumes of the least profitable firms. In contrast, my baseline results of higher lending to less profitable firms holds for the sub-sample of ex-ante concentrated financial systems. For this sub-sample, a 1-pp increase in capital inflows increases lending to the least profitable firms by 1.17 pp, which is significant at the 10% level and stresses the role of agency problems in the financial sector in shaping the effect of international capital flows on credit allocation.

Having shown that the concentration of the banking system is an important driver of the sensitivity of credit supply with respect to international capital flows, I next focus on agency problems that rise in the shares of non-performing loans. Financial institutions with high amounts of non-performing loans have incentives to gamble for resurrection and to roll over loans to

less profitable firms (e.g., Peek and Rosengren, 2005; Niinimaki, 2007; Caballero et al., 2008; Watanabe, 2010), allowing them to hide loan losses and, ultimately, to prevent insolvency. As a result, I expect my baseline findings to be most pronounced for financial systems with high ex-ante non-performing loans ratios. Econometrically, I split the sample into the sub-sample of financial systems that have ex-ante shares of non-performing loans that are above and below, respectively, the median of the annual cross-country distribution of this variable.

Column (4) of Table 7 shows that financial systems with high ex-ante shares of loans that are close to default allocate disproportionately more credit to low performing firms: the coefficient of $CAPITALINFLOWS$ for low performing firms is significant and equal to 0.95. The same effect in safer financial systems, characterized by low ex-ante ratios of non-performing loans, is not statistically different from zero, as can be gauged from the t-statistic of 1.28 in column (3).

Table 7: The Role of Agency Problems

	concentration		non-performing loans	
	low	high	low	high
	(1) ΔDEBT	(2) ΔDEBT	(3) ΔDEBT	(4) ΔDEBT
CAPITAL INFLOWS	0.116	1.169*	0.603	0.954*
	(0.17)	(1.73)	(1.28)	(1.76)
CAPITAL INFLOWS * PROFITABILITY	-0.784	-0.915***	0.063	-2.179***
	(-0.89)	(-5.15)	(0.32)	(-8.66)
Macro Controls	Yes	Yes	Yes	Yes
Firm Controls	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes
Obs	8680	9207	11919	8006
R^2	0.036	0.046	0.039	0.045

This test regresses firms' debt growth on capital flows and their interactions with a firm profitability dummy that is equal to 1 if the return on assets of a firm is above the median of the respective industry - year pair. I run the test separately for financial sectors that are characterized by a low vs. a high concentration and a low vs. a high non-performing loan ratio. I also add large sets of macroeconomic and firm controls as described in Section 2, as well as year, country and industry fixed effects. The t-statistics are presented in parentheses and the standard errors are clustered at the country-level.

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

In my baseline analysis, I do not find the effect of international capital flows on credit growth of high performing firms to be statistically different from zero, suggesting that high performing firms are hardly affected by cross-border capital flows. In contrast to this baseline result, column (4) suggests that—when the banking sectors have overproportional shares of non-performing loans—high performing firms exhibit a statistically significant reduction in credit growth rates by 1.23 pp.[31] Therefore, marked agency problems due to high amounts of non-performing loans on banks' balance sheets induce a within-industry substitution of credit from high to low performing firms. This substitution effect is consistent with the notion of gambling for resurrection.

The results of Section 5.2 thus demonstrate that the ex-ante structure and quality of the banking system is an important determinant of efficient credit allocation. Particularly, I show that my baseline findings are exacerbated by agency problems in the financial sector—problems that rise in both the average concentration and share of non-performing loans. Therefore, by minimizing the degrees of agency problems in the financial system, regulation can induce financial institutions to distribute the inflowing international liquidity more efficiently across firms.[32] In addition, this section also provides evidence on the disentanglement of credit supply from credit demand side effects. As credit demand is independent of the financial system's concentration and riskiness, the overproportional effect in concentrated financial sectors with high amounts of non-performing loans underlines the importance of credit supply for the results of this paper.

Overall, the results of Section 5 suggest that cross-country differences in search for yield/risk-taking incentives—which rise in the degrees of agency problems in the financial sector—are one likely reason for the opposing results of the extant literature on the relationship between cross-border capital flows and changes in the within-industry efficiency of capital allocation (Larrain and Stumpner, 2017; Gopinath et al., forthcoming): only when the extent of agency problems in the financial sector is distinct, do cross-border capital flows adversely affect the allocative efficiency of lending and capital allocation.

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[31]I obtain this effect as follows: 0.954-2.179=-1.225

[32]Thereby, this paper also contributes to Prasad et al. (2007), who show that capital inflows in many countries are associated with a decline in economic growth because underdeveloped financial markets only have limited absorptive capacity for foreign resources.

6   Robustness Checks

In Section 6, I present the results of several alternative model specifications that (i) exclude some time periods or countries from the sample and (ii) use a different definition of *PROFITABILITY* . I start eliminating observations during the sovereign debt crisis of 2009-2011. This test is important because the crisis, especially in the European periphery, might have changed the efficiency of credit allocation, potentially affecting the coefficient estimates of the previous regressions. I further present the results of a test that omits observations prior to 2005, as my firm-level dataset has a higher coverage of firms during 2005-2014 (see Table 1) relative to 1995-2004. Attendant results are presented in column (1) and (2) of Table A.2 and underline that the results are robust for both sub-periods. During both episodes, international capital inflows increase credit supply, especially in favor of the least profitable firms within an industry.

The main result of this paper is that inflows of international liquidity are allocated to firms that are most unprofitable. However, a further possible concern regarding my specifications is that the returns on assets approximate other firm-level variables apart from profitability. In the following robustness check, I address this issue by alternatively calculating profitability on the industry-level. The variable *PROFITABILITY* in these tests is therefore coded as one if the median return on assets of all firms in a particular industry is larger than the overall median across my sample, zero otherwise. Defining profitability as a time-invariant dummy on the industry-level yields two specific advantages. First, it is unlikely to be affected by regulatory (e.g., accounting standards) or macroeconomic (e.g., business cycle fluctuations) changes in a particular country. Second, focusing solely on the cross-sectional variation on the industry-level minimizes concerns that changes in the returns on assets merely capture changes in other firm-level variables apart from profitability. Column (3) of Table A.2 confirms my baseline results: I find a 1-pp increase in capital inflows to increase the debt growth rates of firms in low performing industries by 0.93 pp. Moreover, the interaction term is also negative and statistically significant at the 5% level, indicating that the credit growth rates of firms in profitable industries are less affected by capital inflows.

A final concern regarding my baseline analysis is that firms in countries with external deficits are on average less profitable than firms in countries with current account surpluses (see the

summary statistics in Section 2.4), which might potentially affect my results. To overcome this concern, I re-estimate the baseline regressions, excluding firms that operate in countries that are outliers in the distribution of profitability. Omitting firms in Finland, Italy, Luxembourg and the Netherlands is beneficial because the distribution of returns on assets in the remaining set of countries is more homogeneous, also among external surplus and external deficit countries.[33] Column (4) of Table A.2 shows that foreign capital inflows—even excluding some outliers from the sample—lead to increases in lending, especially for the sub-set of low performing firms, confirming that my baseline results are not biased by the higher proportion of unprofitable firms in countries with capital inflows.

All in all, the previous robustness checks confirm that surges in foreign capital inflows increase the allocation of credit to less profitable firms.

7   Concluding Remarks

Using a novel firm-level dataset of over 1800 firms, this paper explores the impact of European cross-border capital flows during 1995-2014 on credit allocation.

I find that surges in international capital inflows increase credit allocation to the least profitable firms within an industry. In particular, higher liquidity in the financial system associated with a 1-pp increase in cross-border capital inflows leads to 0.87 pp higher debt growth rates in less profitable firms, whereas the coefficient in the sub-set of the most profitable firms is not statistically different from zero. I document that this effect is driven by risk-taking/search for yield incentives of the financial sector: low performing firms have a higher probability of default and, hence, need to pay higher interest rates on their debt, allowing financial markets to raise their interest income. Theoretical mechanisms linking foreign capital with risk-taking depart from the assumption of agency problems in the financial sector. I thus strengthen the evidence on risk-taking as the main mediating channel from cross-border capital flows to the efficiency of credit allocation by showing that the credit growth of low performing firms is higher when the financial system is more prone to agency problems, i.e., when the financial system is concen-

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[33]For instance, for this remaining sample, the average profitability of firms located in countries with current account deficits is not statistically different from the corresponding average in external surplus countries.

trated and exhibits high shares of non-performing loans. Therefore, I gauge that financial sector regulation is important for the efficient allocation of global liquidity to the real economy.

Finally, I show that capital inflows are negatively linked with future firm performance, especially in the sub-sample of firms with the highest credit growth rates, constituting a negative long-run impact of foreign capital on firm-level dynamics. In summary, an increase in credit supply following episodes of capital inflows is likely to increase short-term economic growth; however, the decline in future firm performance constrains the economic development in the long-run. This result helps to explain the difficulties of the empirical literature to identify a distinct positive relationship between financial liberalization, cross-border capital flows and aggregate economic growth.

References

[1] Acharya, V. and H. Naqvi: 2012, 'The Seeds of a Crisis: A Theory of Bank Liquidity and Risk-Taking Over the Business Cycle'. *Journal of Financial Economics* **106**(2), 349–366.

[2] Acharya, V. V., T. Eisert, C. Eufinger, and C. Hirsch: 2014, 'Real Effects of the Sovereign Debt Crisis in Europe: Evidence from Syndicated Loans'. *CEPR Discussion Paper* **DP10108**.

[3] Aizenman, J., Y. Jinjarak, and D. Park: 2013, 'Capital Flows and Economic Growth in the Era of Financial Integration and Crisis, 1990-2010'. *Open Economics Review* **24**(3), 371–396.

[4] Alfaro, L. and A. Charlton: 2007, 'International Financial Integration and Entrepreneurial Firm Activity'. *NBER Working Paper* **13118**.

[5] Altman, E. I.: 1968, 'Financial Ratios, Discriminant Analysis and the Prediction of Corporate Bankruptcy'. *Journal of Finance* **23**(4), 589–609.

[6] Aoki, K., G. Benigno, and N. Kiyotaki: 2010, 'Adjusting to Capital Account Liberalization'. *CEP Working Paper* **1014**.

[7] Bank for International Settlements: 2015, '85th Annual Report'. Basel.

[8] Baskaya, Y. S., J. di Giovanni, S. Kalemli-Özcan, and M. F. Ulu: 2017, 'International Spillovers and Local Credit Cycles'. *Barcelona GSE Working Paper* **953**.

[9] Ben-Zion, U. and S. S. Shalit: 1975, 'Size, Leverage, and Dividend Record As Determinants of Equity Risk'. *Journal of Finance* **30**(4), 1015–1026.

[10] Benigno, G., N. Converse, and L. Fornaro: 2015, 'Large Capital Inflows, Sectoral Allocation, and Economic Performance'. *Journal of International Money and Finance* **55**, 60–87.

[11] Benigno, G. and L. Fornaro: 2014, 'The Financial Resource Curse'. *Scandinavian Journal of Economics* **116**(1), 58–86.

[12] Bentolila, S., M. Jansen, and G. Jiménez: forthcoming, 'When Credit Dries Up: Job Losses in the Great Recession'. *Journal of the European Economic Association.*

[13] Berger, A. N. and G. F. Udell: 2002, 'Small Business Credit Availability and Relationship Lending: The Importance of Bank Organisational Structure'. *Economic Journal* **112**(477), 32–53.

[14] Bertrand, M., E. Duflo, and S. Mullainathan: 2004, 'How Much Should We Trust Differences-in-Differences Estimates'. *Quarterly Journal of Economics* **119**(1), 249–275.

[15] Bertrand, M., A. Schoar, and D. Thesmar: 2007, 'Banking Deregulation and Industry Structure: Evidence from the French Banking Reforms of 1985'. *Journal of Finance* **62**(2), 597–628.

[16] Bluedorn, J. C., R. Duttagupta, J. Guajardo, and P. Topalova: 2013, 'Capital Flows are Fickle: Anytime, Anywhere'. *IMF Working Papers* **13/183**.

[17] Bonfiglioli, A.: 2008, 'Financial Integration, Productivity and Capital Accumulation'. *Journal of International Economics* **76**(2), 337–355.

[18] Borio, C. and H. Zhu: 2012, 'Capital Regulation, Risk-Taking and Monetary Policy: A Missing Link in the Transmission Mechanism?'. *Journal of Financial Stability* **8**(4), 236–251.

[19] Bruno, V. and H. S. Shin: 2015, 'Cross-Border Banking and Global Liquidity'. *Review of Economic Studies* **82**(2), 535–564.

[20] Bussière, M. and M. Fratzscher: 2008, 'Financial Openness and Growth: Short-run Gain, Long-run Pain?'. *Review of International Economics* **16**(1), 69–95.

[21] Caballero, J. A.: 2014, 'Do Surges in International Capital Inflows Influence the Likelihood of Banking Crises?'. *Economic Journal* **126**(591), 281–316.

[22] Caballero, R. J., T. Hoshi, and A. K. Kashyap: 2008, 'Zombie Lending and Depressed Restructuring in Japan'. *American Economic Review* **98**(5), 1943–1977.

[23] Calvo, G. A., L. Leiderman, and C. M. Reinhart: 1996, 'Inflows of Capital to Developing Countries in the 1990s: Causes and Effects'. *Journal of Economic Perspectives* **10**(2), 123–139.

[24] Carling, K., T. Jacobson, J. Lindé, and K. Roszbach: 2007, 'Corporate Credit Risk Modeling and the Macroeconomy'. *Journal of Banking and Finance* **31**(3), 845–868.

[25] Catão, L. and G.-M. Milesi-Ferretti: 2014, 'External Liabilities and Crises'. *Journal of International Economics* **94**(1), 18–32.

[26] Cecchetti, S. G.: 1999, 'Legal Structure, Financial Structure, and the Monetary Policy Transmission Mechanism'. *Economic Policy Review of the Federal Reserve Bank of New York* **5**(2), 9–28.

[27] Cingano, F., F. Manaresi, and E. Sette: 2016, 'Does Credit Crunch Investments Down? New Evidence on the Real Effects of the Bank-Lending Channel'. *Review of Financial Studies* **29**(10), 2737–2773.

[28] Dell' Ariccia, G. and R. Marquez: 2006, 'Lending Booms and Lending Standards'. *Journal of Finance* **61**(5), 2511–2546.

[29] Demirgüç-Kunt, A. and R. Levine: 2001, *Bank-Based and Market-Based Financial Systems: Cross-Country Comparisons*. MIT Press, Cambridge, MA. In: Financial Structure and Economic Growth: A Cross-Country Comparison of Banks, Markets, and Development.

[30] Dinger, V. and D. M. te Kaat: 2016, 'Current Account Imbalances and Bank Risk-Taking'. mimeo, University of Osnabrück.

[31] Dinger, V. and J. von Hagen: 2009, 'Does Interbank Borrowing Reduce Bank Risk?'. *Journal of Money, Credit and Banking* **41**(2-3), 491–506.

[32] Duchin, R. and D. Sosyura: 2014, 'Safer Ratios, Riskier Portfolios: Banks' Response to Government Aid'. *Journal of Financial Economics* **113**(1), 1–28.

[33] Edison, H. J., R. Levine, L. Ricci, and T. Slok: 2002, 'International Financial Integration and Growth'. *Journal of International Money and Finance* **21**(6), 749–776.

[34] Eichengreen, B., R. Gullapalli, and U. Panizza: 2011, 'Capital Account Liberalization, Financial Development and Industry Growth: A Synthetic View'. *Journal of International Money and Finance* **30**(6), 1090–1106.

[35] European Central Bank: 2013, 'ECB Monthly Bulletin July 2013'. Frankfurt a. M.

[36] European Central Bank: 2016, 'Survey on the Access to Finance of Enterprises in the Euro Area'. Frankfurt a. M.

[37] Fratzscher, M.: 2012, 'Capital Flows, Push versus Pull Factors and the Global Financial Crisis'. *Journal of International Economics* **88**(2), 341–356.

[38] Goldsmith, R. W.: 1969, *Financial Structure and Development*. Yale University Press, New Haven, CT.

[39] Gopinath, G., S. Kalemi-Özcan, L. Karabarbounis, and C. Villegas-Sanchez: forthcoming, 'Capital Allocation and Productivity in South Europe'. *Quarterly Journal of Economics*.

[40] Gourinchas, P.-O. and O. Jeanne: 2013, 'Capital Flows to Developing Countries: The Allocation Puzzle'. *Review of Economic Studies* **80**(4), 1484–1515.

[41] Gourinchas, P.-O. and M. Obstfeld: 2012, 'Stories of the Twentieth Century for the Twenty-First'. *American Economic Journal: Macroeconomics* **4**(1), 226–265.

[42] Grilli, V. and G. M. Milesi-Ferretti: 1995, 'Economic Effects and Structural Determinants of Capital Controls'. *IMF Staff Papers* **42**(3), 517–551.

[43] Gropp, R., A. Guettler, and V. Saadi: 2015, 'Public Bank Guarantees and Allocative Efficiency'. *IWH Discussion Paper* **7/2015**.

[44] Gurley, J. G. and E. S. Shaw: 1955, 'Financial Aspects of Economic Development'. *American Economic Review* **45**(4), 515–538.

[45] Hoffmann, M. and I. Stewen: 2017, 'Holes in the Dike: the Global Savings Glut, U.S. House Prices and the Long Shadow of Banking Deregulation'. mimeo, University of Mainz.

[46] Ioannidou, V. P., S. Ongena, and J.-L. Peydró: 2015, 'Monetary Policy, Risk- Taking, and Pricing: Evidence from a Quasi-Natural Experiment'. *Review of Finance* **19**(1), 95–144.

[47] Jiménez, G., S. Ongena, J.-L. Peydró, and J. Saurina: 2014, 'Hazardous Times for Monetary Policy: What Do Twenty-Three Million Bank Loans Say about the Effects of Monetary Policy on Credit Risk-Taking?'. *Econometrica* **82**(2), 463–505.

[48] Kashyap, A. K. and J. C. Stein: 2000, 'What Do a Million Observations on Banks Say About the Transmission of Monetary Policy?'. *American Economic Review* **90**(3), 407–428.

[49] King, R. G. and R. Levine: 1993, 'Finance and Growth: Schumpeter Might be Right'. *Quarterly Journal of Economics* **108**(3), 717–737.

[50] Kose, M. A., E. S. Prasad, and M. E. Terrones: 2009, 'Does Openness to International Financial Flows Raise Productivity Growth?'. *Journal of International Money and Finance* **28**(4), 554–580.

[51] Lane, P. R. and P. McQuade: 2014, 'Domestic Credit Growth and International Capital Flows'. *Scandinavian Journal of Economics* **116**(1), 218–252.

[52] Larrain, M. and S. Stumpner: 2017, 'Capital Account Liberalization and Aggregate Productivity: The Role of Firm Capital Allocation'. *Journal of Finance* **72**(4), 1825–1858.

[53] Levine, R., N. Loayza, and T. Beck: 2000, 'Financial Intermediation and Growth: Causality and Causes'. *Journal of Monetary Economics* **46**(1), 31–77.

[54] Martinez-Miera, D. and R. Repullo: 2017, 'Search for Yield'. *Econometrica* **85**(2), 351–378.

[55] McKinnon, R. I.: 1973, *Money and Capital in Economic Development*. Brookings Institution, Washington DC.

[56] Mendoza, E. G. and M. E. Terrones: 2012, 'An Anatomy of Credit Booms and their Demise'. *Journal Economía Chilena* **15**(2), 4–32.

[57] Neumann, R. M.: 2003, 'International Capital Flows Under Asymmetric Information and Costly Monitoring: Implications of Debt and Equity Financing'. *Canadian Journal of Economics* **36**(3), 674–700.

[58] Niinimaki, J. P.: 2007, 'Evergreening in Banking'. *Journal of Financial Stability* **3**(4), 368–393.

[59] Obstfeld, M.: 2012, 'Does the Current Account Still Matter?'. *American Economic Review* **102**(3), 1–23.

[60] Paligorova, T. and J. A. C. Santos: 2017, 'Banks' Exposure to Rollover Risk and the Maturity of Corporate Loans'. *Review of Finance* **21**(4), 1739–1765.

[61] Peek, J. and E. S. Rosengren: 2005, 'Unnatural Selection: Perverse Incentives and the Misallocation of Credit in Japan'. *American Economic Review* **95**(4), 1144–1166.

[62] Prasad, E. S., R. G. Rajan, and A. Subramanian: 2007, 'Foreign Capital and Economic Growth'. *Brookings Papers of Economic Activity* (1), 153–209.

[63] Rajan, R. G.: 2006, 'Has Finance Made the World Riskier?'. *European Financial Management* **12**(4), 499–533.

[64] Rajan, R. G. and L. Zingales: 1998, 'Financial Dependence and Growth'. *American Economic Review* **88**(3), 559–586.

[65] Rancière, R., A. Tornell, and F. Westermann: 2008, 'Systemic Crises and Growth'. *Quarterly Journal of Economics* **123**(1), 359–406.

[66] Reinhart, C. M. and K. S. Rogoff: 2008, 'Is the 2007 US Sub- prime Financial Crisis So Different? An International Historical Comparison'. *American Economic Review* **98**(2), 339–344.

[67] Reis, R.: 2013, 'The Portuguese Slump and Crash and the Euro Crisis'. *Brookings Papers on Economic Activity* **46**, 143–193.

[68] Rey, H.: 2013, 'Dilemma not Trilemma: The Global Financial Cycle and Monetary Policy Independence'. *Federal Reserve Bank of Kansas City Economic Policy Symposium.*

[69] Samarina, A. and D. Bezemer: 2016, 'Do Capital Flows Change Domestic Credit Allocation?'. *Journal of International Money and Finance* **62**(C), 98–121.

[70] Schumpeter, J. A.: 1934, *The Theory of Economic Development.* Harvard University Press, Cambridge, MA.

[71] Shin, H. S.: 2012, 'Global Banking Glut and Loan Risk Premium'. *IMF Economic Review* **60**(2), 155–192.

[72] Taylor, A. M.: 2014, 'External Imbalances and Financial Crises'. In Financial Crises: Causes, Consequences, and Policy Responses. Edited by Stijn Claessens, M. Ayhan Kose, Luc Laeven, and Fabián Valencia. Washington, D.C.: International Monetary Fund.

[73] Watanabe, W.: 2010, 'Does a Large Loss of Bank Capital Cause Evergreening? Evidence from Japan'. *Journal of the Japanese and International Economies* **24**(1), 116–136.

Table A.1: Description of the Variables

Variable	Description	Unit	Source
ΔDEBT	The growth rate of debt	%	Worldscope, own calculations
ΔPROFITABILITY	The two-year change of returns on assets		Worldscope, own calculations
SIZE	ln (total assets)	ln(1000€)	Worldscope, own calculations
LIQUIDITY	liquid assets / short-term debt	%	Worldscope, own calculations
CAPITAL	equity / total assets	%	Worldscope, own calculations
PROFITABILITY	Dummy=1 if a firm's return on assets > median return on assets for respective industry-year pair	0/1	Worldscope, own calculations
PROFITABILITY (PERMANENT)	Dummy=1 if a firm's return on assets in 2/3 of all years > 10th percentile of return on assets for respective industry-year pair	0/1	Worldscope, own calculations
RISK (LEVERAGE)	Dummy=1 if a firm's capitalization ratio < median capitalization for respective industry-year pair	0/1	Worldscope, own calculations
RISK (VOLATILITY)	Dummy=1 if a firm's volatility of returns on assets > median volatility for respective industry-year pair	0/1	Worldscope, own calculations
RISK (TANGIBLE ASSETS)	Dummy=1 if a firm's capital expenditures over assets < median capital expenditures for respective industry-year pair	0/1	Worldscope, own calculations
CAPITAL INFLOWS	(-1) * The current account balance relative to GDP	%	WEO 10/2014[a]
NET DEBT FLOWS	Net portfolio debt flows and other capital flows relative to GDP	%	IFS, own calculations
GROWTH	The growth rate of real GDP	%	WEO 10/2014
YIELD	The 10-year sovereign bond yields	%	ECB, own calculations
PER CAPITA GDP	Per capita GDP (in prices of the year 1995)	1000€	WEO 10/2014, own calculations

[a]World Economic Outlook Database, IMF

Table A.2: Additional Robustness Checks

	(1) ΔDEBT	(2) ΔDEBT	(3) ΔDEBT	(4) ΔDEBT
CAPITAL INFLOWS	0.793*	1.752***	0.932***	0.836***
	(1.84)	(4.65)	(2.65)	(3.96)
CAPITAL INFLOWS * PROFITABILITY	-0.431	-0.827***	-0.623**	-0.466***
	(-1.61)	(-2.64)	(-2.19)	(-2.68)
Macro Controls	Yes	Yes	Yes	Yes
Firm Controls	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes
Obs	17079	12288	23807	16475
R^2	0.039	0.035	0.031	0.034

In this table, I show the outcomes of various robustness tests. In the first column, I exclude the sovereign debt crisis. In column (2), I restrict the sample period to 2005-2014. The profitability dummy in column (3) is calculated time-invariantly on the industry-level. In column (4), I exclude countries that are outliers in the profitability distribution. The main regressors are cross-border capital flows in their interactions with a profitability dummy. The dependent variable is the debt growth rate of firms. I also add a set of macro and firm controls as described in Section 2 as well as year, country and industry fixed effects. The t-statistics are depicted in parentheses and the standard errors are clustered at the country-level.

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$