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## International Capital Flows and the Allocation of Credit Across Firms

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# International Capital Flows and the Allocation of Credit Across Firms\*

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## Abstract

Substantial research yields opposing conclusions regarding the effects of international capital flows on economic growth. However, microeconomic channels that help to explain these inconsistencies are to date underexplored. This paper overcomes intricate identification issues by using a comprehensive dataset that covers about 20,000 firm-year observations to study the effects of the exogenous fluctuations in European capital flows on bank lending and the real behavior of firms from 1995-2014. We find that higher capital inflows are associated with more loans to less profitable firms, thereby, impeding the creative economic destruction. Consequently, there is evidence for time-varying implications of foreign capital for economic growth.

*Keywords:* Bank Lending, Capital Flows, Global Imbalances, Open Economy Growth, Creative Destruction

*JEL classification:* F32, F41, F43, G01, G21, O4

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# 1 Introduction

A mature empirical strand of research finds that financial development is associated with economic growth (e.g., King and Levine, 1993; Rajan and Zingales, 1998; Levine et al., 2000). In recent years, however, the positive effect of finance on growth has been questioned and some research claims that there can be too much finance (Arcand et al., 2012). In particular, substantial empirical analyses provide inconsistent conclusions regarding the effects of international financial integration and foreign capital flows on growth (Aizenman et al., 2013; Eichengreen et al., 2011; Alfaro and Charlton, 2007; Kose et al., 2009; Bonfiglioli, 2008; Edison et al., 2002; Grilli and Milesi-Ferretti, 1995). Bussière and Fratzscher (2008) find a time-varying effect of international financial liberalization on economic growth and, thereby, provide a possible explanation for the inconclusive empirical results.

However, because most of the research only has access to data on the country- or industry-level, a microeconomic channel for the time-dependent implications of foreign capital on economic growth has hardly been identified—yet. Precisely, researchers have disregarded the crucial role of banks for the intermediation of global liquidity to the real economy. Dinger and te Kaat (2016) take a first step in this direction and investigate the implications of global capital flows for bank lending behavior. Their approach, however, is based on aggregated bank-level data and, therefore, their analysis can neither explore how the heterogeneity of firms affects bank lending decisions nor study subsequent real economic effects. The present paper bridges this gap by investigating the impact of international capital on the credit constraints of heterogeneous firms and, thereby, on the dynamics of the real economy.

Our main proxy for the net flows of foreign capital is the current account balance (the difference between savings and investments) because it is the broadest and most prominent measure of international capital movements and, also, because it is available for every country in the time series. A deterioration of the current account balance means that a country imports more financial resources or, equivalently, that less capital flows out of the economy. As a result, banks obtain a better access to funding from international investors with potential effects on lending and the real economy.

These effects are also likely to be different from other types of excess bank liquidity (e.g., monetary policy) because of the following reasons, underlined in Dinger and te Kaat (2016): First, the implications of global capital flows for banks go beyond the typical interest rate channel of monetary policy. Instead, fluctuations in current account balances affect bank lending behavior



Figure 1: The evolution of value added in bank dependent industries in countries with capital in- and outflows, respectively, over time.

decisively through a change in the quantities of loanable funds. Second, international capital inflows are regularly associated with a loss of market discipline because distance inhibits the monitoring abilities of international lenders.<sup>1</sup> Third, there is evidence for an asset substitution effect attributable to inflows of global liquidity. In particular, banks in countries with large external deficits are crowded out of the asset markets, such as for (sovereign) bonds, and, hence, replace new investments in these assets with typically riskier loans.

Figure 1 displays the evolution of average value added in bank dependent industries between 1995 and 2012. The graph underlines that bank dependent industries grow overproportionally in countries with capital outflows. In general, the existing literature argues that capital inflows—in contrast to outflows—are associated with an increase in loan volumes (e.g., Dinger and te Kaat, 2016) and, therefore, bank dependent industries should grow overproportionally in countries with current account deficits. A presumable reason why this is not the case and the growth rates of bank dependent industries in countries with external deficits are lower might be that banks misallocate the inflowing liquidity to less profitable firms.

Consistent with this hypothesis, the BIS argues that financial booms (e.g., because of a monetary expansion or foreign capital inflows) usually lead to a misallocation of resources, reducing long-run economic growth (Bank for International Settlements, 2015).

<sup>1</sup>See De Haas and van Horen (2013) for a detailed discussion.

In this paper, we formalize this argument and empirically analyze global capital flows and their time-varying effects on economic growth. Our hypothesis is that banks use an increase in loanable funds—as a key result of a deterioration of the current account balance—to pay out loans to unprofitable firms. From a theoretical perspective, there exist at least two potential channels for this hypothesis. First, inflows of international liquidity are regularly associated with more bank risk-taking. Less profitable firms are *ceteris paribus* closer to insolvency and, therefore, they generally face stronger credit constraints and pay higher interest rates. Consequently, more loans to less profitable firms are a sign of increased bank risk-taking. Second, capital inflows increase the size of the financial system with potential adverse effects on efficient bank lending. As a result of this inefficient bank lending behavior, economic growth in the short-run is raised; however, the creative economic destruction is negatively impacted with adverse long-run effects on the economy.<sup>2</sup>

To test these hypotheses, we compile a sample that mainly rests on the *Worldscope* database, fostered by Thomson Reuters. It comprises annual data on the business activities of euro area firms from 1995-2014. We match this data with a large vector of macroeconomic variables. By this, we are able to study global capital flows and their intermediation to the real economy. In general, the focus on a sample of international firms is beneficial because it also allows us to draw conclusions based on possibly time-invariant characteristics of firms, banking systems and the macroeconomy. Moreover, firms in the euro area, in particular, are an ideal laboratory for the empirical identification of the impact of international capital flows on firms' financing conditions because European current account positions are mainly driven by political signals with regard to the design of the euro area and, hence, they are exogenous with respect to bank lending decisions. Beyond this, studying countries under uniform monetary policy conditions allows us to isolate fluctuations in current account positions from changes in the stance of monetary policy.

Our empirical approach encompasses three steps. First, we determine the correlation between capital flows, loan volumes and the real behavior of firms. Second, we causally explore channels that lead to the effects that we describe in the first step. Third, we analyze the resulting implications for the aggregate industry-level dynamics.

More specifically, our analysis starts with a parsimonious model that empirically explores the correlation between the current account positions and the loan volumes to less profitable en-

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<sup>2</sup>See Schumpeter (1934). Section 2 presents the theory in more detail and derives the testable hypotheses.

trepreneurs. To intensify the impact of international capital flows on creative destruction and the real economy, we next identify the effects of fluctuations in the current account position on the real activities of firms. Precisely, we study the implications of global capital flows for firms' efficient use of labor, their research expenses and their changes in retained earnings. Finally, we are also able to determine whether this change in the real behavior of firms influences future returns on assets. In the next series of regressions, we test whether foreign direct investments and portfolio equity flows have an impact on firms that is distinct from portfolio debt flows and the (residual) other capital flows that comprise, e.g., interbank liquidity flows. This might be the case because, generally, both are deemed the most stable and growth-enhancing types of global capital flows (e.g., Kose et al., 2009; Aizenman et al., 2013).

After having established the correlation between international capital flows, loan volumes and the real behavior of firms, we causally analyze the determinants and channels of these results in the following set of regressions. First, finding—as we do below—that current account deficits are associated with (i) an increase in lending to unprofitable firms and (ii) a subsequent decline in real sector dynamics suggests that global capital flows and the real behavior of firms are linked through a bank lending channel in which banks bail out low performing firms. However, the current account could affect the real behavior of firms through several additional channels. To substantiate a bank lending channel attributable to global capital flows, we test whether our results are particularly relevant for firms operating in bank dependent sectors. In this specification, we rely on the external dependence measure proposed by Rajan and Zingales (1998). Second, we explore the bank supply side effects of international capital flows. The disentanglement of loan supply from loan demand is important for the policy implications of this paper, in particular with regard to the regulation of banks, and, therefore, we strengthen the relative importance of loan supply in an extension of our baseline model in which we include various characteristics of the respective banking systems. In particular, we investigate whether the finding of increased lending to low performing firms and, hence, the consecutive loss of economic efficiency can be mitigated by smaller and better capitalized banking sectors and local banks, facing strong international competition. As loan demand is independent of these characteristics of the banking systems, a significant effect in this analysis stresses that loan supply side effects are crucial. Third, we focus on firms that are—in at least 2/3 of the sample periods—in the upper and lower 10% of the annual, industry-specific distribution of returns on assets, respectively. This extension allows us to determine whether large inflows of foreign capital only

induce banks to grant credit to temporarily unprofitable firms or whether it even induces them to fund constantly the most unprofitable and, therefore, overproportionally risky entrepreneurs. Furthermore, this extension also provides insights into the effects of international capital flows on the steadily most profitable firms and, hence, into the long-run efficiency of bank lending.

In our final empirical specification, we test whether the misallocation of credit that we observe on a microeconomic firm-level also affects the industry-level dynamics and, therefore, aggregate real economic outcomes. For this specification, we investigate whether bank dependent industries grow less in countries with capital inflows. If the increase in lending to less profitable firms following large capital inflows affects the aggregate dynamics of the real economy, we should observe that industries that are most dependent on external finance have lower growth rates in economies with external deficits.

Overall, we find current account deficits to be associated both with (i) increased loan volumes to less profitable firms and (ii) a subsequent decrease in innovation dynamics and future profitability. These effects are additionally particularly pronounced for low performing firms. For instance, a 1-percentage point (henceforth pp) deterioration in the current account position leads less profitable firms to decrease the relative growth of research expenses by 4.76 pp—in contrast to profitable firms that hardly change their research expenditures. These findings suggest that foreign capital flows and the real behavior of firms are principally linked through a bank lending channel. Indeed, we find an overproportional decrease in real sector dynamics for the most bank dependent firms. This result implies that banks seem to bail out low performing entrepreneurs when capital inflows endow them with abundant access to liquidity, thereby, constraining the real activities of firms with adverse implications for the economy as a whole in the long-run. Moreover, these results also suggest that banks generally do not seem to possess the ability to improve real sector efficiency and dynamics. The central role of banks for the intermediation of international capital to the real sector and the subsequent negative effects on the Schumpeterian process of creative destruction is additionally underlined in our tests related to the heterogeneity of various global capital flows. Finding that particularly those capital flows that endow banks with excess liquidity—portfolio debt flows and the other capital flows that include interbank loans—lead to an overproportional increase in lending and an amplified decrease in innovation dynamics underlines that a current account deficit in general is not responsible for a decrease in real economic activities. Rather, our findings call for regulatory interventions within the banking sector. In effect, another extension of the model asserts that a smaller and better capi-

talized banking sector induces financial intermediaries to distribute the inflowing liquidity more efficiently across firms. Similar positive effects can also be found for banking sectors with a higher presence of foreign financial institutions. That the effect of global capital flows on loan volumes is contingent on the structure of the banking systems also underlines that loan supply side effects are crucial because loan demand is independent of these characteristics, calling for regulatory interventions in the banking sector. Increasing the regulation of the financial system might also be particularly beneficial because, in a further extension of the baseline analysis, we find that banks do not only increase lending to firms that are temporarily less profitable, but also to firms that are steadily in the lowest 10% of the distribution of returns on assets. This result stresses the increased risk appetite of banks that have an abundant access to foreign liquidity. Finally, we find that the misallocation of credit that we observe on a microeconomic level also affects industry-level dynamics. In detail, bank dependent industries grow less in countries with large capital inflows. This result suggests that a current account deficit and the related additional funding to low performing firms has adverse effects on the aggregate dynamics of the real economy, constituting a possible negative long-run effect of international capital inflows on economic growth.

The present paper particularly contributes to the existing literature in three dimensions: Our main contribution lies in the identification of a microeconomic channel that explains the time-varying effect of global capital flows and financial liberalization on economic growth (Bussière and Fratzscher, 2008). Consequently, the reason for the inconsistent results of several empirical studies that investigate the relation between financial openness and economic growth might be a varying time dimension in these analyses (e.g., Aizenman et al., 2013; Eichengreen et al., 2011; Alfaro and Charlton, 2007; Kose et al., 2009; Bonfiglioli, 2008; Edison et al., 2002; Grilli and Milesi-Ferretti, 1995). Second, it contributes to a literature that investigates the real effects of bank lending (e.g., Bentolila et al., 2013; Cingano et al., 2013; Acharya et al., 2014). In particular, our paper adds 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). Finding that large inflows of international capital are associated with an increase in bank lending to less profitable firms implies that, at least in the long-run, there can be too much (international) finance (Arcand et al., 2012) that impedes the creative economic destruction. Third, the paper enriches the literature by identifying an additional channel through which foreign capital inflows and financial liberalization increase the probability for future fi-



nancial crises (e.g., Rancière et al., 2008; Reinhart and Rogoff, 2008; Obstfeld, 2012; Taylor, 2012; Gourinchas and Obstfeld, 2012; Lane and McQuade, 2014). Therefore, it can also be seen as complementary to Dinger and te Kaat (2016) who show that current account deficits increase risks in the financial sector both because banks replace new investments in asset markets with typically riskier loans and because the average quality of these loans deteriorates. However, the present paper extends Dinger and te Kaat (2016) by accounting for the heterogeneity across firms. The use of disaggregated firm-level data allows us to explore in more detail which firms benefit overproportionally from increased bank lending following large inflows of global liquidity and, also, to identify subsequent implications for real economic dynamics.<sup>3</sup>

The remainder of the paper proceeds as follows: Section 2 reviews the theoretical literature that allows us to derive our testable hypotheses. The focus of Section 3 lies on the description of our dataset and explains the empirical strategy. The baseline results are presented in Section 4. In Section 5, we present the results of several robustness checks. Section 6 explores possible channels of our main results and in Section 7, we report the effects on industry-level outcomes and, hence, aggregate real economic dynamics. Finally, Section 8 concludes.

## 2 Theory

In this section, we build the theoretical foundation for the empirical analysis that follows by presenting the arguments of key theoretical models that link global capital flows with inefficient bank lending.<sup>4</sup> An influential paper by Dell’Ariccia and Marquez (2006) theoretically models the relation between bank liquidity—as a key result of global capital flows—and bank risk-taking incentives. Their approach is based on the assumption that banks face known and unknown borrowers. As a consequence of these informational asymmetries among banks, adverse selection problems emerge that lead banks to screen potential borrowers. Dell’Ariccia and Marquez (2006) show that the incentives of banks to screen borrowers decline when the proportion of unknown borrowers is sufficiently high. In this case, banks soften lending standards and grant credit to all loan applicants, i.e., they choose a pooling equilibrium in contrast to a separating equilibrium. The authors emphasize that the aggregate credit increases in a pool-

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<sup>3</sup>Igan and Tan (2015) also analyze the effects of foreign capital on loan supply by using disaggregated firm-level data. However, they do not disentangle the effects for profitable and unprofitable firms and, moreover, they do not study the real economic implications of changes in lending behavior.

<sup>4</sup>Compare also Mann (2016) who theoretically models the interaction between global capital flows, financial development and the capital allocation efficiency.

ing equilibrium, whereas the average quality of banks' portfolios deteriorates. In countries, in which the current account balance worsens, banks face a larger proportion of unknown borrowers and, additionally, they have access to cheaper funding. Thus, they tend to prefer the pooling equilibrium, i.e., an equilibrium with lower credit standards, more bank risk-taking and higher aggregate loan volumes. Unprofitable firms are *ceteris paribus* closer to insolvency (e.g., Lepetit and Strobel, 2013) and, therefore, they are constrained in the supply of credit and have to pay higher interest rates on debt.<sup>5</sup> As a result, overproportional lending to such firms—attributable to inflows of foreign capital—can be interpreted as increased bank risk-taking.

Similar theoretical implications of global capital flows are also derived by models that focus on the size of the banking system. For instance, Tobin (1984) and Deidda (2006) show that a large financial sector may have negative effects on economic growth because it withholds resources from productive sectors. Therefore, higher foreign capital inflows could impede the long-run economic development through a growing domestic financial system that channels capital into less profitable investment projects. This hypothesis is consistent with a related strand of research that compares market-based and bank-based financial systems.<sup>6</sup> According to this literature, large banks may have adverse effects on the economy, i.e., because they prefer to protect those firms that they maintain close relationships to (Hellwig, 1991; Rajan, 1992). As a result, sizable banking systems may have negative effects on economic growth because banks regularly grant credit to conversant and not necessarily to the most profitable firms, thereby, impeding the creative destruction of the economy. In contrast, rather market-based financial systems could ease firm financing constraints and, therefore, increase economic prosperity because efficient capital markets aggregate diffuse information signals and transmit them competently to investors (Boot and Thakor, 1997; Allen and Gale, 1999). Finally, this leads to an additional testable hypothesis. The composition of the capital account is likely to play a crucial role in determining the effects of global capital flows on economic growth in the long-run. Following the presented theory, we expect foreign direct investments and portfolio equity flows—as typical patterns of a market-based financial system—to have positive implications for the efficiency of capital allocation and the real behavior of firms. In contrast, portfolio debt flows and other (interbank) capital flows rather endow local banks with excess liquidity and, thereby, induce them to fund the risky and less profitable entrepreneurs. In this sense, financial institutions bail out low performing firms

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<sup>5</sup>For instance, Kharroubi (2015) shows that low-productivity firms can outbid high-productivity firms through higher interest payments, thereby, leading to large foreign capital inflows and a misallocation of capital.

<sup>6</sup>Compare Levine (2002) for a more precise overview.

that restrain economic growth in the long-run.

### 3 Data and Methodology

The present paper identifies a channel that suggests the effect of international capital flows on economic growth to be time-varying. Our hypothesis is that banks use an increase in wholesale funding—as a key result of a deterioration of the current account balance—to pay out loans to less profitable firms. From a theoretical perspective, this might be the case both (i) because inflows of international liquidity generally increase bank risk-taking and more bank lending to unprofitable entrepreneurs—that are *ceteris paribus* closer to insolvency (e.g., Lepetit and Strobel, 2013)—are a sign of more bank risks and, additionally, (ii) because capital inflows increase the size of the financial system with potential adverse effects on efficient bank lending behavior. As a result of this bank lending behavior, growth is reinforced in the short-run; however, it is averted in the long-run because of obvious adverse effects on both the creative economic destruction and real economic dynamics. For the analysis of this hypothesis, the use of disaggregated firm-level data is essential because it allows us to account for heterogeneous firms in the bank lending channel and to identify subsequent changes in firms' real economic dynamics. Therefore, our paper is one of the first that analyzes the impact of international capital on economic growth and that does not exclusively rely on aggregated country- or industry-level data. More specifically, focusing on firms in the euro area facilitates identification for several reasons. First, European capital flows and the current account balances exhibit distinct fluctuations that are decisively influenced by political decisions with regard to the design of the European Economic and Monetary Union (henceforth EMU) and, thus, they are exogenous with regard to bank lending (compare Section 3.5). Second, European financial systems are characterized by large and active banking sectors.<sup>7</sup> The fact that banks are the main provider of credit in Europe alleviates the identification of changes in bank loan supply attributable to international capital flows and, as a result, allows us to explore the real effects associated with bank lending decisions. Third, firms and banks in the euro area operate under uniform monetary policy conditions. Therefore, we are able to investigate the effects of capital flows on bank lending while the stance of monetary policy is constant in the cross-section.

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<sup>7</sup>Compare Demirgüç-Kunt and Levine (2001) for a cross-country study of several bank-based and market-based financial systems.

### 3.1 Data

Our sample comprises firms that operate in one of the eleven founding members of the euro area, i.e., firms in Austria, Belgium, Finland, France, Germany, Ireland, Italy, Luxembourg, Netherlands, Portugal and Spain.<sup>8</sup> Our dataset spans the time from the Madrid Summit in 1995, where the introduction of a single currency in Europe was announced, until 2014.<sup>9</sup> The focus on an international sample of firms, compared with the focus on a credit register in a single country, is advantageous for the following analysis because it also allows us to control for variables that vary mostly across countries but less over time (e.g., the regulation and competitiveness of the banking system).

We obtain our firm-level data from the Worldscope database, fostered by Thomson Reuters. It covers all euro area companies that are publicly quoted and a small number of large private companies. The lack of a substantial number of private firms does not spur our analysis because the identified effects are rather underestimated by this sample choice. As private firms only have scarce access to external finance and, hence, they are even more dependent on bank loans, the inclusion of such firms would even have raised the effects of global liquidity increases on the real economy.<sup>10</sup> Therefore, our estimates serve as a lower bound on the real effects of fluctuations in current account positions. Beyond this, the focus on publicly quoted firms is beneficial because the quality of accounting data is generally higher for these firms. An additional advantage of the Worldscope database is that it provides an industry identifier for every firm which is (in the number of industries) comparable to the 2-digit Standard Industry Classification (SIC). This industry identifier is important for the subsequent analyses, e.g., because it allows us to include industry dummies to control for heterogeneity across industries. We correct our sample for implausible observations (e.g., non-positive equity ratios or liabilities). Furthermore, we exclude firms of the financial industry (including insurance companies).<sup>11</sup> This leaves us with more than 20,000 firm-year observations. We match these firm observations with a comprehensive vector of macroeconomic variables that are drawn from several sources, including the World Economic Outlook Database (October 2014), the International Financial Statistics,<sup>12</sup> the

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<sup>8</sup>We decided to exclude Greek firms from our sample because of the unreliable data accuracy in Greece. However, our results are also robust to the inclusion of Greek firms.

<sup>9</sup>We only have a limited number of observations for 2014. Our results are, however, robust to the exclusion of 2014.

<sup>10</sup>Compare Bertrand et al. (2007) who stress an economically and statistically stronger effect of a banking deregulation on private compared with public firms.

<sup>11</sup>Firms in these industries are indicated by the Worldscope general industry codes 4, 5 and 6.

<sup>12</sup>Both databases are published by the International Monetary Fund (IMF).

European Central Bank (ECB), the Deutsche Bundesbank, the World Bank and the Organisation for Economic Co-operation and Development (OECD). As a result, we obtain an extensive dataset that allows us to study the effects of global capital flows on firms' financing conditions and their real activities very accurately.

### 3.2 Methodology

Theory suggests that a deterioration of the current account balance may have adverse effects on economic growth in the long-run because banks channel the inflowing liquidity to risky and less profitable entrepreneurs and, as a result, impede the Schumpeterian process of creative destruction. To identify this channel, we estimate the following baseline regression equation:

$$\begin{aligned} loans_{kt} = & \alpha_s + \alpha_j + \alpha_t + \beta * ca_{j,t-1} + \gamma * (ca_{j,t-1} * roa_{k,t-1}) \\ & + \theta * X_{k,j,t-1} + (\alpha_k + \varepsilon_{kt}), \end{aligned} \quad (1)$$

where  $k$  indexes firms,  $s$  industries,  $t$  time and  $j$  countries. Our dependent variables in this equation are the relative change in debt and the respective relative interest expenses of firm  $k$  at time  $t$ .  $CA_{j,t-1}$  is the current account balance over GDP in country  $j$  in year  $t$  and  $ROA_{k,t-1}$  is a dummy that splits our sample into profitable (high returns on assets) and less profitable (low returns on assets) firms.<sup>13</sup> The central coefficients are  $\beta$  and  $\gamma$ . The inference about the former determines whether decreases in the current account balance lead banks to grant more low-interest loans to unprofitable firms, i.e., firms with a low return on assets. The inference about the latter allows us to identify whether capital flows have an impact on the least profitable firms that is distinct from highly profitable firms.<sup>14</sup> Summing up,  $\beta$  measures the effect of capital flows on loan volumes to firms with a low profitability and  $(\beta + \gamma)$  measures the same effect for loans to the most profitable firms. In all of these specifications, all our regressors enter with a one-year lag to minimize endogeneity concerns.

In a further set of regressions, we investigate in how far global capital flows defer the Schum-

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<sup>13</sup>For at least two reasons it is unproblematic that the current account balance over GDP is serially correlated: First, the time dimension of our dataset is short. Second, our dependent variables are defined such that they do not exhibit forms of serial correlation. Therefore, we obtain precise standard errors, although our key regressor is not serially uncorrelated (Bertrand et al., 2004).

<sup>14</sup>The strategy of interacting our main regressor with a measure of profitability is based on a specification by Bertrand et al. (2007).

peterian process of creative destruction. Therefore, we run the following regressions:

$$\begin{aligned} realactivity_{kt} = & \alpha_s + \alpha_j + \alpha_t + \beta * ca_{j,t-2} + \gamma * (ca_{j,t-2} * roa_{k,t-2}) \\ & + \theta * X_{k,j,t-2} + (\alpha_k + \varepsilon_{kt}), \end{aligned} \quad (2)$$

where the vector *realactivity* comprises various proxies for the innovative real behavior of firms, i.e., the efficiency of labor input, expenses for research and development, changes in reinvestment behavior and changes in profitability (see Section 3.3 for a detailed description). The interpretation of the coefficients is analog to equation (1). For the regressions in (2), our regressors enter with a two-year lag to account for the fact that international capital inflows and an easing of credit standards affects the real behavior of firms only with a delay.<sup>15</sup>

Moreover, we account for the heterogeneity of the various types of capital flows and, hence, replace the current account position with FDI, equity flows, debt flows and residual other capital flows in some specifications of Section 4.3.<sup>16</sup>

In all of our analyses, we additionally incorporate industry, country and time fixed effects,  $\alpha_s$ ,  $\alpha_j$  and  $\alpha_t$ . Our results for the interaction term also remain robust to the incorporation of country-year fixed effects. However, as we would lose the coefficients that describe the aggregate effect of capital flows, we refrain from country-year dummies in our specifications.  $X_{k,j,t-1/t-2}$  are macroeconomic and firm-level controls that are not absorbed by the set of fixed effects. The vector also contains all of the macroeconomic variables in their interactions with *roa*. The variables will be explained in detail in section 3.3. Our standard errors are clustered at the country-level.

### 3.3 Variables

#### 3.3.1 Dependent Variables

The purpose of our empirical analysis is twofold. First, we explore the effects of external capital flows on loan volumes of (the least profitable) firms. Therefore, we make use of the relative change in firm debt and the interest expenses relative to the total amount of debt<sup>17</sup> as our dependent variables. The use of firm debt as our measure of bank loans granted to firms is

<sup>15</sup>Our results remain qualitatively comparable for other lag specifications.

<sup>16</sup>These regressors are subsumed in the vector *CA* of the equations (1) and (2).

<sup>17</sup>We take the natural logarithm of this fraction because the distribution of interest expenses on debt is extremely skewed across firms.

to some extents controversial because it includes all interest bearing financial obligations (e.g., bonds as well) and is not restricted to bank loans. However, the euro area is a bank-based financial system and, therefore, bank loans are the main source of funding for most firms (e.g., Cecchetti, 1999). Beyond this, the correlation between firm debt and bank loans is usually very high because non-bank debt regularly varies little over time (e.g., Bertrand et al., 2007). This leads us to the conclusion that firm debt is an appropriate proxy for bank loans in our setting. Second, we investigate whether this additional funding leads firms to delay their innovative activities. To obtain a broad understanding of the real behavior of firms and how it is affected by changes in current account positions, we incorporate a large set of outcome variables. The variable *labor – efficiency* is calculated as the total number of employees relative to (-100) € of net income and measures the efficient use of labor input in the production process.<sup>18</sup> *Research* is the change in expenses for research and development relative to sales and measures the amount of money that firms spend for creating new products. Ceteris paribus, we expect firms with higher innovation dynamics to increase *labor – efficiency* and *research*. We also include a measure for retained earnings (*reinvestments*), defined as the reduction in dividend yields, because we assume firms with distinct plans for increased real activities to pay out less dividends. This allows them to have more free resources for the implementations of these plans. As a last dependent variable related to the real behavior of firms, we make use of the relative change in the returns on assets. This variable, *roa – change*, measures whether real firm-level activities are successful and, hence, lead to an improved profitability.<sup>19</sup>

### 3.3.2 Regressors

Our key regressor is the current account balance over GDP (*ca*). A country with a current account deficit invests more than it saves and, as a result, imports financial resources. We rely on the current account as our main proxy for the net flows of foreign capital into an economy because it is the broadest and most prominent measure of international capital movements and, also, because it is available for every country in the time series. Negative values for *ca* represent net inflows of foreign capital. To obtain a broader understanding of the heterogeneity of various types of capital flows and their implications for the real economy, we additionally include foreign direct investments (*fdi*), portfolio equity flows (*equityflows*), portfolio debt flows

<sup>18</sup>For scaling reasons, we multiply this variable with (-1) such that higher values represent a higher labor efficiency.

<sup>19</sup>The dependent variables are defined such that they do not exhibit distinct forms of serial correlation.

(*debtflows*) and the residual other flows (*otherflows*) that comprise, e.g., interbank loans in some of our specifications.<sup>20</sup> In general, equity flows and foreign direct investments are deemed the most stable and growth-enhancing types of global capital flows and we expect them to have a different impact for the real economy compared with capital flows in general.<sup>21</sup> For all of these variables, negative values indicate net capital inflows.

Fluctuations in international capital flows are predominantly determined exogenously, in particular for European countries (see section 3.5). However, to overcome remaining endogeneity concerns, we include additional macroeconomic control variables that are likely to affect domestic banks and firms and may be (weakly) correlated with the current account position.

First, the economic growth rate as a possible determinant of bank lending decisions and the real behavior of firms (*growth*). Second, we control for the impact of changes in interest rates and include the change in the respective 10-year sovereign bond yield as an additional explanatory variable (*bondyield*). Beyond this, changes in the institutional circumstances and in the legal framework may have an impact both on capital flows and the real behavior of firms and, therefore, be a potential reason for omitted variable bias. As a solution, we include per capita GDP (*percapitagdp*) as a regressor that proxies the institutional quality of the respective country (e.g., Dinger and von Hagen, 2009). We also added additional macroeconomic controls (e.g., inflation, changes in fiscal policy, unemployment, output gap) but they were mostly insignificant and, for reasons of parsimony, we exclude them from our models.

Apart from the vector of macro controls, the following large set of firm-level control variables enters our model: the logarithm of total assets (*size*), the share of liquid assets relative to short-term liabilities (*liquidity*) and the firm equity ratios (*capital*). Since theory suggests that banks use an influx of global liquidity to pay out loans to the least profitable firms, we also include firms' profitability (*roa*) in our models. We measure profitability as a dummy which is equal to 1 if a firm's return on assets is larger than the median of returns on assets for the respective industry-year pair.<sup>22</sup> Calculating the median on the industry-year level is important because of obvious industry-specific differences in profitability. Interacting our measures of capital flows with this profitability dummy allows us—consistent with theory—to account for non-linearities in the effect of external capital on the most vs. the least profitable firms within a specific industry. In all of the regressions related to equation (2), we also add the relative change in loan

<sup>20</sup>For these regressions, we exclude the top and bottom 2.5% of observations because of extreme outliers in Ireland and Luxembourg that serve as international financial centers.

<sup>21</sup>Compare, for instance, Kose et al. (2009) and Aizenman et al. (2013).

<sup>22</sup>Our results are robust to various other performance measures.



volumes as an additional regressor. To clarify our identification strategy, we additionally allow all of the macroeconomic variables to interact with this profitability dummy. Table A.1 (Appendix) provides more detailed descriptions of all of the variables.

### 3.4 Summary Statistics

This section presents the descriptive statistics for our baseline variables, as described in Section 3.3. We lay special focus on the different characteristics for countries with external surpluses (columns 3 and 4) compared with countries with external deficits (columns 5 and 6).

Firm debt is growing moderately with a median rate of 0.74% and the interest expenses of firms relative to total debt are equal to 1.77% (in logs). Therefore, the average interest rate for our sample equals approximately 5.9%. Firms in countries with external deficits have higher loan growth rates and pay lower interest rates on debt. This is a first indication, underlining that international capital inflows may ease firms' credit constraints. Whereas firms have a median labor efficiency of -6.46 (6.46 employees per 100€ of net income), they hardly change their reinvestment behavior (i.e., their dividend yields) over time. Beyond this, firms in our sample expand their expenses for research and development over time. However, their profitability (measured by the variable *roa – change*) decreases. It is very striking that firms in countries with external deficits have overproportionally declining returns on assets. In general, we obtain an enormous dispersion of all of our firm-level variables. This underlines that there is a strong heterogeneity across firms within a country. Turning to the summary statistics with regard to our explanatory variables, we find that the average 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%. There is no distinct difference in these firm characteristics for countries with capital in- relative to countries with capital outflows.<sup>23</sup> This homogeneity of firm characteristics across countries facilitates identification because our results are unlikely to be driven alone by differences in unobserved firm attributes in countries with external deficits relative to countries with external surpluses.

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<sup>23</sup>The arithmetic mean for the variable *roa* for firms in countries with external surpluses equals 0.503, whereas it equals 0.454 for firms in countries with external deficits. Although in general firms in countries with external surpluses are slightly more profitable, this difference is unlikely to be the only driver of our results. In our robustness checks, we will further address this issue.

Table 1: Summary Statistics

	Observations	Median	Observations	Median	Observations	Median
	<i>(entire sample)</i>		<i>(external surplus)</i>		<i>(external deficit)</i>	
Dependent Variables: Bank Lending						
debt	24567	0.74	13243	-0.25	11324	2.45
interest rate	26550	1.77	14369	1.85	12181	1.67
Dependent Variables: The Real Behavior of Firms						
labor_efficiency	25542	-6.46	14191	-6.69	11351	-6.13
research	7866	0.03	4943	0.03	2923	0.03
reinvestments	22360	0.00	12366	0.00	9994	0.00
roa_change	24094	-0.82	13318	0.51	10776	-2.38
Firm-Level Regressors						
size	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
roa	26833	0.00	14932	1.00	11901	0.00
Macroeconomic Regressors						
ca	29640	0.99	16405	4.65	13235	-1.30
fdi	27840	1.13	14899	1.13	12941	1.14
equityflows	27652	0.48	15143	0.48	12509	0.51
debtflows	28031	-1.23	15323	-0.75	12708	-2.18
otherflows	28201	0.46	15427	1.30	12774	-1.58
growth	29640	1.72	16405	1.86	13235	1.66
bondyield	27042	-5.86	14986	-5.86	12056	-2.93
percapitagdp	29640	25.47	16405	26.03	13235	24.77

The current account balance has a median value of 0.99% relative to GDP and the median foreign direct investments, equity flows, debt flows and other flows are equal to 1.13%, 0.48%, -1.23% and 0.46%, respectively. The positive sign for most of the capital flow measures implies that the median firm operates in a country with capital outflows. This result is attributable to the large number of German firms, a typical country with external surpluses (compare Table 2). Countries with positive current account balances have a higher median per capita GDP, higher economic growth rates and stronger declines in interest rates compared with countries with negative current account balances. These results are driven by observations after 2007 because countries with external deficits suffered most from the financial and the sovereign debt crisis with adverse effects on the economy and the level of interest rates.

Table 2: The Distribution of Sample Firms over Time

<b>Country</b>	<b>1995</b>	<b>2000</b>	<b>2005</b>	<b>2010</b>	<b>2013</b>
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

## 3.5 Identification

### 3.5.1 Identification Strategy

To identify the effects of intra-European capital flows on loan volumes and the real behavior of firms, it is crucial that changes in international capital flows are determined exogenously. Since a single firm is unlikely to determine capital flows on the country-level, we are convinced that reverse causality cannot be an issue. Moreover, a resulting bias would underestimate our estimates because pronounced bank lending to low performing firms rather reduces—and not increases—the amounts of capital inflows.

Beyond this, omitted variables are not likely to bias our analysis for several reasons: First, the correlation between the current account balance and real income is low and, hence, domestic business cycle fluctuations do not seem to be the decisive determinant of international capital flows (Uribe and Schmitt-Grohé, 2015). Second, there exists an extensive literature that shows that capital flows in the long-run are rather influenced by international push factors—compared with regional pull factors (Calvo et al., 1996; Bluedorn et al., 2013; Bruno and Shin, 2013; Rey, 2015).<sup>24</sup> Finally, intra-European capital flows are strongly affected by political decisions with regard to the design of the EMU. In particular, we argue that the political signals that investments in the European periphery would be as safe as investments in the core were interpreted by international investors as a de facto invalidity of the no-bailout clause of the EMU. These signals led to tremendous intra-European capital flows that are evidently exogenous with respect to domestic bank lending behavior. These flows have further been perpetuated since the onset of the financial crisis in 2007/2008 because public capital flows and public guarantees for

<sup>24</sup>See Dinger and te Kaat (2016) for a more detailed discussion.

private capital reserved the large current account deficits of the European periphery.<sup>25</sup>

To clarify the identification, we also comprise a large vector of macroeconomic and firm-level control variables. In addition, we horserace our key regressor—the current account in its interaction with the profitability of a firm—with corresponding interactions of other important macroeconomic variables.

Loan volumes are apparently affected by loan demand and loan supply; however, for the policy implications, in particular with regard to the regulation of the banking system, it is crucial to disentangle loan supply from loan demand. To show that the increase in loans to unprofitable firms is strongly driven by changes in loan supply, we examine in Section 6 whether our findings of increased lending to less profitable firms are amplified in large and undercapitalized banking sectors that operate under strong global competition. Whereas loan demand is unlikely to be affected by these characteristics of the banking systems, loan supply is expected to increase because in particular undercapitalized and large banking systems that are flush with global liquidity should increase lending to unprofitable firms. Therefore, a significant effect in this analysis underlines that loan supply side effects are crucial and allows us to identify changes in bank lending behavior.

### **3.5.2 Challenges to our Identification Strategy**

The identification of our research question is challenging and there might be particular threats to the interpretation of our key coefficients. We will address these issues in our sensitivity analysis of Section 5.

First, interacting the current account position with a firm-level profitability dummy does not ensure that this dummy does not capture other time-varying firm-level effects apart from relative differences in the returns on assets. We address this concern in a robustness check by calculating the profitability dummy time-invariantly on the industry-level. This strategy ensures that the profitability dummy is not affected by other time-variant firm-level variables.

Second, our use of firm debt as a proxy for bank loans is to some extent controversial because it also includes other interest bearing financial obligations (e.g., bonds). We overcome this concern in the robustness section and show that firm debt is an appropriate measure of bank loans (i) by controlling for the change in outstanding bond amounts on the international capital mar-

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<sup>25</sup>This was achieved through various instruments: the European Financial Stability Facility, EFSF, the European Stability Mechanism, ESM, loans paid out by the IMF, TARGET 2 balances that measure the amount of money that banks borrow from their national central banks and which is used to finance current account deficits, the Securities Markets Programme, SMP, and the Outright Monetary Transactions, OMT.

kets, (ii) by studying the effects of capital flows only on short-term debt (bank loans are usually of shorter maturities) and (iii) by restricting the sample to smaller firms that do not have access to other sources of external finance apart from bank loans.

Third, calculating the profitability dummy on the firm-level leads to a slightly higher proportion of unprofitable firms in countries with external deficits relative to countries with external surpluses, potentially leading to a bias in our baseline results. We overcome this issue in a sensitivity test by repeating our analysis, dropping firms in Italy, Finland, Luxembourg and the Netherlands. In the remaining countries, the distributions of returns on assets are more alike and, as a result, we obtain a more homogeneous sample. Therefore, the results based on this smaller sample are certainly not affected by relative differences in returns on assets.

## 4 Baseline Results

In Section 4, we present the results of our baseline model that establishes the correlation between international capital flows and both bank loan volumes and the real behavior of firms. In Section 6, we continue by exploring channels that causally explain these main correlations.

### 4.1 Global Capital Flows and Lending

In this section, we identify the implications of international capital flows for the existing credit constraints of (low performing) firms. In a first step, we estimate equation (1). However, we refrain from the interaction terms in columns (1) - (2) of Table 3. As a consequence, the key coefficient  $\beta$  measures the effect of the current account position on the loan volumes in general. We obtain a significant negative coefficient in the first column and a highly significant positive coefficient in column (2) of Table 3. This means that a 1-pp decline in the current account position or 1 pp higher capital inflows, equivalently, lead banks to increase the loan growth rates of firms by 0.65 pp and to reduce the interest rates on these loans by 1.6%. These results obviously advocate that global capital inflows ease the credit constraints of firms.<sup>26</sup>

In a next step, we allow these effects to be heterogeneous across firms. In particular, we verify whether variations in current account positions affect unprofitable firms overproportionally. For this reason, we enable the current account to interact with a profitability dummy in columns (3) and (4).

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<sup>26</sup>Igan and Tan (2015) find a qualitatively similar result.

Table 3: The Current Account and Bank Lending

	no interactions		with interactions		subset of unprofitable firms		subset of profitable firms	
	(1) debt	(2) interest rate	(3) debt	(4) interest rate	(5) debt	(6) interest rate	(7) debt	(8) interest rate
ca	-0.653** (-2.53)	0.016*** (3.49)	-0.892** (-2.52)	0.015*** (3.60)	-0.826** (-2.16)	0.015*** (2.93)	-0.246 (-0.71)	0.018*** (2.96)
ca*roa			0.501 (1.40)	0.002 (0.41)				
size	-1.002*** (-2.94)	-0.057*** (-4.73)	-0.966*** (-3.07)	-0.057*** (-4.83)	-1.075** (-2.30)	-0.063*** (-6.86)	-0.927** (-2.31)	-0.044*** (-3.07)
liquidity	0.220** (2.05)	0.000 (0.17)	0.225** (2.07)	0.000 (0.17)	0.168 (0.67)	0.002*** (3.80)	0.300 (1.36)	-0.004* (-1.71)
capital	0.726*** (13.80)	-0.002*** (-3.75)	0.726*** (13.98)	-0.002*** (-3.68)	0.856*** (12.26)	-0.003*** (-5.71)	0.596*** (9.41)	0.001 (0.67)
roa	7.258*** (6.81)	-0.006 (-0.68)	2.937 (0.50)	0.078 (1.46)				
growth	1.583** (2.57)	-0.020** (-2.34)	0.833 (1.21)	-0.018** (-2.03)	1.183 (1.44)	-0.015 (-1.56)	1.790* (1.70)	-0.027*** (-2.79)
bondyield	0.027 (0.60)	0.000 (0.27)	0.011 (0.15)	0.000 (0.19)	0.139 (1.55)	-0.001 (-1.32)	-0.074* (-1.75)	0.001 (0.84)
percapitagdp	-0.054 (-0.05)	0.012** (1.97)	-0.029 (-0.03)	0.014** (2.30)	1.049 (0.89)	0.013 (1.07)	-0.404 (-0.34)	0.012 (1.19)
growth*roa			1.335 (1.37)	-0.003 (-0.36)				
bondyield*roa			0.017 (0.17)	0.000 (0.33)				
percapitagdp*roa			0.075 (0.37)	-0.003* (-1.74)				
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Obs	20279	20274	20279	20274	10405	10392	9874	9882
R-squared	0.032	0.112	0.033	0.112	0.041	0.149	0.030	0.096

Table 3 displays the results for our baseline model that establishes the correlation between capital flows and the growth rates of loans (columns 1, 3, 5 and 7) and the related interest expenses of firms (columns 2, 4, 6 and 8). The main regressor in the first two columns is the current account position over GDP and besides, in columns 3 and 4, an interaction with a roa dummy that equals 1 if the return on assets is larger than the median for the respective industry-year pair. In columns 5 - 8, we split the sample into profitable and unprofitable firms instead of interacting the current account with profitability. We also include a vector of macro and firm-level controls and we add time, industry and country dummies. The t-statistics are shown in parentheses. Standard errors are clustered at the country-level.

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

The results demonstrate that at least the results of column (1) are primarily driven by the least profitable firms. Whereas a 1-pp decline in the current account balance increases loan growth for low performing firms by 0.89 pp, the effect on the most profitable firms is only equal to 0.39 pp.<sup>27</sup> These results also remain robust when splitting the sample into profitable and unprofitable firms instead of including the interaction term (columns (5) - (8)).<sup>28</sup>

Turning to the results related to the vector of control variables, we only identify significant effects for a subset of the included regressors. Particularly, an increase in firm size reduces loan volumes and interest rates and better capitalized firms have higher loan growth rates and pay lower interest rates on debt. Furthermore, higher economic growth rates lead to more bank loans and lower interest rates. In sum, section 4.1 shows that inflows of global liquidity induce local banks to ease credit constraints. This effect is primarily driven by increased lending to low performing firms, suggesting a misallocation of credit following large current account deficits. Unprofitable firms are in general more risky because they are *ceteris paribus* closer to insolvency (e.g., Lepetit and Strobel, 2013). Therefore, an increase in lending to these firms can additionally be seen as a sign of an increase in bank risk-taking. This result is also consistent with Rancière et al. (2008) who show that financial liberalization promotes excessive risk-taking and leads to greater incidence of crises.

## 4.2 The Real Behavior of Firms

Having shown that large external deficits (i.e., international capital inflows) improve (less profitable) firms' access to external finance, we next investigate the effects of these capital flows on the real behavior of firms. Table 4 shows the results for this analysis. In columns (1) - (4), we refrain from the interactions and present the impact of capital inflows on the real behavior of firms in general. In columns (5) - (8), we again account for the heterogeneity of firms. We find that a current account deficit is significantly associated with less incentives to optimize labor input, lower expenses for research and development and a reduction in retained earnings. Consequently, firms seem to reduce their innovative activities as a result of global capital inflows. When including the interaction terms, we find higher capital inflows to lead to a less efficient labor input, lower research expenses and lower reinvestment rates for the subset of unprofitable firms. Following this change in the real behavior, we also find unprofitable firms in countries

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<sup>27</sup>This is the sum of the coefficients in the first two rows.

<sup>28</sup>In the following baseline specifications, we do not split our sample, but only include interaction terms. The results, however, are qualitatively and quantitatively similar for both methods.

with external deficits to have falling returns on assets.<sup>29</sup> Therefore, the efficiency of firms decreases and, as a result, profitability drops significantly. The interaction term consisting of the current account position and the profitability dummy is always significant with the expected signs. This leads to the conclusion that especially low performing firms cause the identified effects. For instance, a 1-pp drop in the current account position leads to 35.37 pp lower changes in returns on assets for the subset of unprofitable firms whereas for the subset of the most profitable entrepreneurs this profitability measure even increases by 42.03 pp.<sup>30</sup> Given that the median return on asset for our sample equals 4.75% and given that the median change in returns on assets is equal to -0.82%, a coefficient of 35.37 means economically that unprofitable firms' median profitability declines from 4.75% to 3.03% following a 1-pp decline in current account positions. Consequently, those firms that benefit the most from increased bank lending attributable to global capital flows seem to reduce innovation dynamics most sharply. This result also suggests that banks do not seem to be very successful in improving innovation dynamics of the real sector.

The liquidity endowment of a firm is the main firm-level control that affects entrepreneurial real behavior significantly. In particular, firms with higher liquidity ratios implement more innovative activities and, as a result, seem to be the drivers of economic dynamics. GDP growth and the change in 10-year sovereign bond yields are the only macroeconomic controls that affect firms substantially. Higher growth rates lead to higher research expenses and to less reinvestments. Moreover, lower sovereign interest rates are associated with a more inefficient labor input of firms and higher expenditures for research and development. However, these effects can hardly be identified for the interaction terms. Therefore, the current account balance is the only variable that affects entrepreneurial activity significantly and that has an overproportional impact on the subset of the least profitable firms. All in all, we observe that—for the subset of unprofitable firms—global capital flows lead both (i) to an increase in loan volumes and (ii) to reductions in innovation dynamics. Hence, the results of Section 4.1 and 4.2 give rise to a probable link between capital flows, bank lending and the real behavior of firms. Theoretical arguments suggest that global inflows of capital lead banks to lower their credit standards especially for less profitable firms, thereby, bailing them out and reducing the incentives for innovation. In Section 6, in an extension of this baseline model, we will investigate this probable link in more detail.

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<sup>29</sup>These coefficients are in the first row.

<sup>30</sup>This is the sum of the first two rows in column (8).



Table 4: The Current Account and the Real Behavior of Firms

	no interactions				with interactions			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	labor_efficiency	research	reinvestments	roa_change	labor_efficiency	research	reinvestments	roa_change
ca	1.732** (2.29)	2.721*** (3.37)	0.021* (1.89)	-3.411 (-0.32)	2.868** (2.20)	4.760*** (3.28)	0.038** (2.52)	35.370*** (3.51)
ca*roa					-2.284* (-1.83)	-4.225** (-2.43)	-0.034** (-2.51)	-77.397** (-2.51)
size	1.176 (1.29)	2.215 (0.73)	-0.008 (-0.51)	51.622*** (4.49)	1.172 (1.29)	2.037 (0.67)	-0.008 (-0.52)	53.312*** (4.07)
liquidity	0.578*** (3.23)	-10.388 (-0.94)	0.021*** (3.93)	13.704*** (3.04)	0.567*** (3.27)	-9.938 (-0.92)	0.021*** (3.79)	13.761*** (3.04)
capital	-0.002 (-0.02)	0.150 (0.76)	-0.003 (-0.89)	-11.596** (-2.29)	-0.004 (-0.05)	0.133 (0.71)	-0.003 (-0.90)	-11.636** (-2.27)
roa	8.993 (1.31)	0.816 (0.06)	-0.451*** (-13.35)	54.712 (0.52)	-6.701 (-0.39)	-3.296 (-0.15)	-0.780*** (-2.72)	-1008.260** (-2.16)
debt	-0.023*** (-5.47)	-0.016 (-0.50)	0.000 (1.09)	-0.150 (-0.87)	-0.023*** (-5.44)	-0.018 (-0.59)	0.000 (1.08)	-0.147 (-0.88)
growth	-1.070 (-1.35)	4.493** (2.06)	-0.106*** (-2.64)	56.392 (1.07)	-1.446 (-1.24)	6.959*** (2.64)	-0.099** (-2.43)	-10.521 (-0.31)
bondyield	0.362* (1.68)	-0.359 (-1.22)	-0.002 (-0.32)	7.864 (1.36)	0.599** (2.13)	-0.912*** (-3.37)	0.004 (0.69)	8.305 (1.62)
percapitagdp	-0.188 (-0.21)	4.666 (1.56)	-0.002 (-0.08)	10.024 (0.50)	-0.476 (-0.44)	2.712 (0.89)	-0.009 (-0.28)	-13.254 (-0.50)
growth*roa					0.835 (0.86)	-3.812 (-1.00)	-0.013 (-0.47)	129.400 (1.20)
bondyield*roa					-0.454* (-1.76)	1.038 (1.51)	-0.013** (-2.09)	-1.315 (-0.48)
percapitagdp*roa					0.616 (0.82)	0.909 (0.86)	0.014 (1.06)	38.258** (2.05)
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Obs	17766	6449	16882	17968	17766	6449	16882	17968
R-squared	0.006	0.012	0.026	0.008	0.006	0.013	0.026	0.009

The table displays the results for our baseline model that establishes the correlation between capital flows and the real behavior of firms. The dependent variables are - (100)\* employees to netincome (columns 1 and 5), the change in research expenses over sales (column 2 and 6), (-1) \* the change in dividend yields (columns 3 and 7) and the changes in profitability (columns 4 and 8). The key regressor is the current account balance over GDP and its interaction with a profitability dummy, being equal to one if the return on assets is above the median for the respective industry-year pair. We additionally include a vector of macro and firm-level controls and we add time, industry and country dummies. The t-statistics are shown in parentheses and the standard errors are clustered at the country-level.

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

### 4.3 The Heterogeneity of Capital Flows

In this section, we explore whether the heterogeneity of capital flows (foreign direct investments, portfolio equity flows, portfolio debt flows and residual other flows) influences bank loan volumes and the real economy differently.

In general, foreign direct investments and equity flows are deemed the most stable and growth-enhancing types of global capital flows (e.g., Kose et al., 2009; Aizenman et al., 2013) and, therefore, we expect them to have positive implications for firms' innovative activities. In contrast, debt flows and other capital flows that comprise interbank lending, endow banks with excess liquidity and are likely to lead to an inefficient bank lending behavior and subsequent reductions in firm dynamics.

We test this hypothesis by estimating the equations (1) and (2). However, we replace the current account balance in this analysis with net foreign direct investments, net equity flows, net debt flows and the residual other capital flows relative to GDP.

Table 5 illustrates that in particular debt inflows and other (interbank) capital inflows are driving our results. Both lead to overproportionally many loans to unprofitable firms and, subsequently, to a less efficient labor input, higher dividend yields (less reinvestments) and declines in research expenses and profitability. Neither FDI nor portfolio equity flows have such a constantly negative influence on bank lending and real sector dynamics. However, they also do not induce firms to innovate significantly. For instance, they also lead firms to have a less efficient labor input and, finally, are to some extent associated with a lower profitability.

Summing up, there is substantial evidence that net debt flows and other (interbank) capital flows are driving the reduction in capital allocation efficiency and the declining real economic dynamics, associated with current account deficits. This result underlines the central role of banks for the adverse effects on the real economy in the long-run because particularly these types of capital flows endow the banking system with excess liquidity.

In contrast, foreign direct investments and net equity flows hardly affect lending and the real behavior of firms. Consequently, in contrast to international capital flows, in general, and debt and other capital flows, in particular, foreign direct investments and portfolio equity flows do not constantly reduce firms' innovative real activities and, therefore, they are not a major impediment to dynamics of the real economy as a whole.

Table 5: The Heterogeneity of Capital Flows

	(1) debt	(2) interest rate	(3) labor_efficiency	(4) research	(5) reinvestments	(6) roa_change
fdi	-0.057 (-0.11)	0.008 (1.17)	5.815* (1.85)	-1.453 (-0.81)	0.014 (0.26)	-1.894 (-0.06)
fdi*roa	0.127 (0.40)	0.008 (1.16)	-4.705* (-1.80)	2.882* (1.77)	-0.018 (-0.48)	22.288 (0.35)
equityflows	0.356 (0.84)	0.011* (1.89)	6.159*** (2.67)	0.316 (0.21)	-0.004 (-0.14)	52.887** (2.00)
equityflows*roa	0.150 (0.36)	0.002 (0.29)	-6.752*** (-2.68)	1.170 (0.69)	-0.075** (-2.45)	-0.803 (-0.01)
debtflows	-0.678** (-2.32)	0.016*** (3.82)	4.258** (2.00)	1.047 (1.03)	0.049*** (2.71)	42.545** (2.49)
debtflows*roa	0.661 (1.61)	0.001 (0.23)	-2.795 (-1.35)	0.290 (0.29)	-0.047*** (-3.63)	-123.396** (-2.54)
otherflows	-0.803*** (-3.08)	0.015*** (3.93)	3.885** (2.14)	7.282*** (2.70)	0.036 (1.58)	36.546** (2.51)
otherflows*roa	0.336 (1.48)	0.002 (0.38)	-2.571 (-1.62)	-7.195** (-2.47)	-0.039 (-1.60)	-82.646*** (-4.05)
size	-0.830*** (-2.62)	-0.057*** (-4.38)	0.991 (0.94)	2.559 (0.77)	-0.010 (-0.54)	56.734*** (4.30)
liquidity	0.203 (1.58)	-0.000 (-0.48)	0.615*** (3.86)	-9.530 (-0.81)	0.017*** (3.19)	14.502*** (3.29)
capital	0.687*** (13.34)	-0.002*** (-4.53)	-0.026 (-0.24)	0.016 (0.16)	-0.002 (-0.50)	-11.728** (-2.37)
roa	-5.177 (-0.86)	0.129** (2.56)	-16.565 (-0.58)	-41.656 (-0.94)	-0.942* (-1.70)	-1540.521*** (-3.99)
growth	0.646 (0.78)	-0.025*** (-4.42)	-3.199* (-1.66)	9.327*** (6.72)	-0.100** (-1.96)	9.520 (0.22)
bondyield	0.081 (1.15)	-0.001 (-1.17)	0.987** (2.01)	-1.222* (-1.71)	-0.003 (-0.21)	14.587 (1.44)
percapitagdp	1.557 (1.44)	0.006 (0.48)	0.527 (0.22)	0.310 (0.07)	0.037 (0.37)	-28.147 (-0.56)
growth*roa	0.934 (1.01)	0.002 (0.29)	1.935 (1.14)	-7.652** (-2.32)	-0.029 (-0.94)	173.944 (1.32)
bondyield*roa	0.062 (0.56)	-0.000 (-0.04)	-0.660** (-2.02)	1.297* (1.92)	-0.009 (-1.57)	-2.040 (-0.91)
percapitagdp*roa	0.481** (2.47)	-0.006*** (-3.48)	1.134 (0.86)	2.771 (1.41)	0.023 (0.97)	49.193*** (4.43)
debt			-0.025*** (-4.94)	-0.017 (-0.42)	0.000 (0.82)	0.168* (1.74)
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes
Obs	18055	18051	15783	5832	15025	15972
R-squared	0.033	0.118	0.007	0.013	0.024	0.010

*In these regressions, we investigate the heterogeneity of several capital flows and their effects on loan volumes and the real behavior of firms. Precisely, we replace the current account by foreign direct investments (fdi), portfolio equity flows, debt flows and all other capital flows and interact them with a roa dummy, being equal to one if the return on assets is above the median for the respective industry-year pair. The dependent variables are (1) the growth rate of debt, (2) related interest expenses, (3) (-100)\* employees over netincome, (4) relative changes in expenses for research, (5) (-1)\* changes in dividend yields and (6) changes in profitability. The regressions include a vector of macroeconomic and bank controls and we add time, industry and country dummies. The t-statistics are shown in parentheses and we cluster standard errors at the country-level.*

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

## 5 Sensitivity Analysis

The key finding of our baseline analysis is that banks regularly misallocate international liquidity inflows by granting overproportionally many loans to less profitable firms and that, subsequently, these firms reduce their innovative activities most sharply. However, a possible concern regarding our specifications is that the returns on assets approximate other firm-level variables apart from profitability.

In Section 5, we address this issue by alternatively calculating profitability on the industry-level in the following set of regressions. The variable *roa* in these tests is therefore coded as 1 if the median return on assets of all firms in a particular industry is larger than the overall median across our sample, 0 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. Table A.2 generally confirms our results distinctly. We find a 1-pp decline in the current account balances to increase loan growth rates by 0.81 pp and to reduce the relative interest expenses by 1.4% (for firms in low performing industries). Consequently, the economic importance of global capital flows for bank lending hardly changes. Moreover, the interaction term in column (1) is also highly statistically significant, indicating that loan growth rates of firms in profitable industries are less affected by capital inflows. Related to the variables that proxy firms' real activities, we find large inflows of capital to be associated with an inefficient labor input, lower research expenses, higher dividend yields (a reduction in retained earnings) and lower returns on assets. For the vector of real activity variables, the interaction terms are also often significant with the expected signs. Therefore, Table A.2 stresses that less profitable firms obtain better access to external finance following large inflows of foreign capital and that this implicit bailout induces them to reduce innovation activities with subsequent adverse effects on the real economy in the long-run.

In our analysis, we argue that firm debt is an appropriate proxy for bank loans because the financial systems in the euro area are bank-based (Cecchetti, 1999) and, also, because usually non-bank debt varies little over time such that the correlation between bank loans and firm debt is very pronounced (Bertrand et al., 2007). Furthermore, we show that those capital flows that endow banks with excess liquidity—e.g., the (residual) other capital flows that also comprise

interbank loans—are relevant for our findings (Section 4.3). This would not be the case if firm debt primarily represented other liabilities apart from bank loans. However, we additionally implement several modifications of our baseline model to stress this argument. First, we include the relative change in outstanding bonds of non-financial corporations as an additional macroeconomic control. This variable controls for changes in firm debt that can be explained alone through firms’ changes in debt funding on the international capital markets. Second, we do not investigate the effects of capital flows on debt in general, but only have a look at short-term debt (maturity below one year) because bank loans are regularly of shorter maturities. Third, we exclude the largest 5% of firms for the respective year from our sample. In general, smaller firms are more dependent on bank funding because they hardly have access to other types of external finance and, therefore, bank debt represents the largest part of their liability side. Table A.3 stresses that the use of firm debt as our proxy for bank loans is abundantly appropriate. Our results of increased lending to unprofitable firms following inflows of foreign capital neither changes its significance nor its economic meaningfulness, when correcting for the issues of bonds on the international capital markets (columns (1) and (2)), when only looking at debt with shorter maturities (column (3)) or when excluding the largest firms from our sample (columns (4) and (5)). This implies that the increase in firm debt following capital inflows can indeed exclusively be explained through changes in bank loan volumes. In column (3), it becomes obvious that the statistical significance and economic importance even increase for short-term relative to total debt. This result implies that our baseline results that focus on total debt as the measure of bank loans rather serve as a lower bound on the effects of international capital flows on banks’ capital allocation efficiency.

A further concern regarding our baseline model is that firms in countries with external deficits are slightly less profitable compared with firms in countries with current account surpluses. This difference might potentially affect our results. To overcome this concern, we repeat our baseline analysis; however, we drop those firms from our sample that operate in countries that are outliers in the distributions of profitability. Excluding firms from Finland, Italy, Luxembourg and the Netherlands is beneficial because the distributions of returns on assets in the remaining countries are very similar. Table A.4 shows that foreign capital inflows—even excluding some outliers from our sample—lead to increases in lending and reductions in innovation dynamics for the subset of low performing firms, confirming that our 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 current account deficits lead banks to soften credit constraints for less profitable firms with subsequent adverse effects on their innovation dynamics. This clearly seems to constrain economic efficiency and, thereby, growth of the economy in the long-run.

## 6 Channels

In Section 4, we document a positive relationship between foreign capital inflows and (i) increased loan volumes of less profitable firms and (ii) a subsequent decline in innovation dynamics. In Section 6, we causally explore the channels that help to explain these findings.

### 6.1 The Bank Lending Channel

In a first of these channels, we explore whether the real behavior of firms is primarily affected by changes in credit constraints attributable to inflows of international liquidity. Finding—as we do in Section 4—that large current account deficits reduce innovation dynamics on the firm-level does not prove that global capital flows decrease real economic activities mainly through a bank lending channel that bails out low performing firms because the current account could affect the real behavior of firms through several additional channels. This is why we employ suitable empirical designs to substantiate such a bank lending channel in the following test.

In particular, we investigate whether a current account deficit negatively impacts real economic activities of those firms that are most dependent on external finance.

In the empirical literature, external dependence is usually measured on the industry-level. In the following set of regressions, we proxy an industry’s dependence on the banking sector by the difference of capital expenditures and cash flows divided by capital expenditures. It measures the fraction of capital expenditures that is not funded by internal cash flows. This share is regularly applied as a proxy for bank dependence in the empirical literature (e.g., Rajan and Zingales, 1998).<sup>31</sup>

We calculate this fraction only for 2004, 2005 and 2006. This is particularly beneficial because due to an expansionary monetary policy, high economic growth rates and low degrees of market discipline,<sup>32</sup> firms in these years were hardly facing any financing (supply) restrictions. This

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<sup>31</sup>Opposed to Rajan and Zingales (1998), we restrict cash flows to operational revenues because the firms in our sample often do not report changes in payables and receivables.

<sup>32</sup>See, e.g., Dinger and te Kaat (2016).

implies that a dependence measure based alone on data for 2004-2006 mainly captures differences in the demand for external finance (and not its supply) because there existed few frictions and market imperfections. In this sense, the idea behind our strategy is closely related to Rajan and Zingales (1998). The crucial identifying assumption of this measure is that the relative demand for external finance in 2004, 2005 and 2006 matches the relative demand in all of the other years in our sample.

In the following regressions, we repeat our analysis of equation (2) separately for bank dependent and bank independent firms. Bank dependent firms are defined as firms in industries whose difference of capital expenditures and cash flows over capital expenditures for 2004-2006 is on average larger than the sample average for these years.

In columns (1) - (4) of Table 6, we report the results for bank independent firms. In columns (5) - (8), we display the results for firms that rely overproportionally on external finance.<sup>33</sup>

We do not obtain any significant effect of larger capital inflows on the real behavior of unprofitable firms that are bank independent. Also, the interaction term is constantly insignificant in columns (1) - (4).

In contrast, current account deficits lead to a significantly less efficient labor input, lower expenses for research and development, higher dividend yields (a reduction in retained earnings) and lower returns on assets for the subset of less profitable, bank dependent firms.

The coefficients related to *ca* and *ca \* roa* in columns (5) - (8) are always significant with the expected signs. This implies that the negative effects of international capital inflows on the real behavior of firms are always most pronounced for unprofitable firms in bank dependent industries. For instance, a 1-pp reduction in the current account balance is associated with a less efficient labor input of 4.17 employees per 100€ of net income for unprofitable, bank dependent firms. The same effect for non-bank dependent, unprofitable firms is only equal to 0.205. This difference of almost 4 employees per 100€ of income is very large given that the median labor efficiency in our sample is equal to -6.46. This finding underlines that the implications of international liquidity inflows for bank dependent firms are not only significant, but also economically meaningful.

Similarly, low performing, bank dependent firms decrease the relative change in research expenses by 6.48 pp following a 1-pp decline in current account balances. The same effect for non-bank dependent, less profitable firms equals only 0.09 pp and the more profitable, bank

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<sup>33</sup>In these regressions, for reasons of lucidity, we split our sample into bank dependent and independent firms instead of including triple interaction terms. The results are unaffected by this strategy.

dependent firms decrease the growth rate of their expenses for research and development by only 0.54 pp.<sup>34</sup>

Therefore, the findings of this section strongly advocate that neither unprofitable nor the most bank dependent firms alone are driving our results, but rather the combination of both. These firms are those that benefit overproportionally from capital inflows and a subsequent easing of credit constraints (compare Section 4.1), implying that the current account position has an impact on firms' innovation dynamics primarily through changes in the lending behavior of local banks.

Table 6: Real Activities and the Bank Lending Channel

	<i>subset of bank independent firms</i>				<i>subset of bank dependent firms</i>			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	labor_efficiency	research	reinvestments	roa_change	labor_efficiency	research	reinvestments	roa_change
ca	0.205 (0.38)	0.093 (1.44)	0.039 (0.84)	21.423 (0.79)	4.171** (2.20)	6.484*** (3.57)	0.042*** (5.35)	48.767** (2.24)
ca*roa	0.216 (0.36)	0.007 (0.11)	-0.028 (-0.75)	-45.483 (-1.51)	-3.483** (-2.19)	-5.947*** (-2.88)	-0.038*** (-4.52)	-94.178** (-2.31)
size	-4.486* (-1.91)	-0.477*** (-5.26)	-0.019 (-0.43)	73.376* (1.67)	3.065*** (3.66)	2.883 (0.72)	-0.005 (-0.29)	48.181** (2.31)
liquidity	0.011 (0.03)	-0.523 (-1.22)	0.139 (0.99)	49.484 (1.13)	0.690*** (6.74)	-13.283 (-1.06)	0.011 (0.53)	10.503** (2.16)
capital	-0.111 (-0.86)	0.011 (0.50)	0.001 (0.43)	-11.449 (-1.46)	0.069 (0.51)	0.053 (0.13)	-0.009*** (-3.18)	-13.110 (-1.33)
roa	28.876* (1.65)	0.523 (1.40)	-0.854 (-0.87)	-971.617 (-1.56)	-17.702 (-0.83)	2.996 (0.10)	-0.911*** (-4.70)	-1034.201** (-2.15)
debt	-0.034* (-1.74)	0.001 (1.03)	-0.001 (-0.92)	-0.136 (-0.55)	-0.016 (-1.12)	-0.032 (-0.60)	0.001*** (4.00)	-0.094 (-0.32)
growth	-1.785 (-0.69)	-0.060 (-0.81)	-0.116* (-1.74)	-35.405 (-1.45)	-1.197 (-0.81)	10.159*** (2.74)	-0.088** (-2.09)	4.959 (0.12)
bondyield	-0.599* (-1.70)	-0.005 (-0.31)	0.001 (0.06)	-9.140 (-1.48)	1.149** (2.41)	-1.428*** (-3.24)	0.007 (1.64)	14.588* (1.82)
percapitagdp	1.950 (1.00)	0.224*** (2.73)	0.057 (0.63)	-86.583 (-1.22)	-1.357 (-1.05)	3.079 (0.69)	-0.030 (-1.57)	15.490 (0.60)
growth*roa	-2.095 (-1.29)	0.084** (2.31)	-0.026 (-0.54)	-19.172 (-0.48)	2.192** (2.22)	-5.715 (-1.00)	-0.010 (-0.49)	198.668 (1.30)
bondyield*roa	0.303 (0.86)	0.000 (0.01)	-0.011 (-0.56)	0.184 (0.03)	-0.805* (-1.86)	1.523 (1.52)	-0.014*** (-2.73)	-0.872 (-0.21)
percapitagdp*roa	-1.005 (-1.51)	-0.019 (-1.19)	0.018 (0.42)	53.462* (1.79)	1.149 (1.25)	0.996 (0.73)	0.015** (2.22)	30.753** (2.11)
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Obs	5660	1894	5581	5739	12103	4555	11298	12226
R-squared	0.013	0.029	0.019	0.016	0.006	0.015	0.072	0.007

*In these regressions, we investigate if the reduction in innovation dynamics following capital inflows are overproportional in bank dependent firms. Bank dependent firms are in industries in which the average difference of capital expenditures and cashflows relative to capital expenditures for 2004-2006 is larger than the sample average. The dependent variables are as in Table 3. The regressions also include a huge set of macro and firm-level controls and we incorporate time, industry and country dummies. The t-statistics are reported in parentheses and we cluster standard errors at the country-level.*

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

<sup>34</sup>This is the sum of the first two coefficients in column (6).



Overall, the results of Table 6 confirm that the findings of Section 4 are to large extents driven by low performing firms in bank dependent industries. Therefore, in general, declines in current account balances negatively affect the real behavior of firms through a bank lending channel. This result also implies that banks do not seem to possess very elevated abilities of improving real sector dynamics.

## 6.2 Loan Supply vs. Loan Demand

Having shown that large external deficits lead local banks to soften credit constraints and, thereby, to bail out less profitable firms, reducing the efficiency of the real economy, calls for regulatory interventions to constrain these incentives of the banking sector. Thus, Section 6.2 presents possible regulatory approaches that may enforce banks to grant more loans to profitable firms with the consequence that economic efficiency is improved and bank risk-taking is minimized.

Moreover, we address the issue of loan supply vs. loan demand in the following analysis. In our baseline analysis, we cannot perfectly disentangle loan supply from loan demand. The subsequent empirical design allows us to show that loan supply side effects are crucial for our results. For these purposes, we add three additional variables on the country-level to our model. First, the size of the banking sector proxied by the ratio of domestic credit to the private sector over GDP. Second, the average capital ratio of the banking system. Third, a proxy for the global competition within a banking system that we measure by the share of foreign banks relative to all banks.<sup>35</sup> Repeatedly, we replace these variables by dummies that are defined such that countries with large and poorly capitalized banking sectors and countries with many foreign banks are coded with 0. More precisely, these dummies take the value of 0 if the size of the banking sector in a particular country is larger, its capitalization is weaker and the presence of foreign financial institutions is higher compared with the respective median of these variables in our sample.

In the following regressions, we closely stick to equation (1) and additionally enable these dummy variables to interact with the current account position and the profitability of firms. This specification allows us to determine whether our findings of increased lending to less profitable firms are even amplified in large and poorly capitalized banking sectors, operating under strong global competition.

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<sup>35</sup>We obtain these variables from the World Bank's Global Financial Development database.

A further advantage of this analysis is that loan demand is unlikely to change with these characteristics of the banking systems. In contrast, loan supply is expected to increase because in particular undercapitalized and large banks that have access to global liquidity should increase lending to unprofitable firms. Therefore, a significant effect in this analysis also confirms that loan supply side effects are driving our results.

Table 7 displays the results for this extension of our baseline analysis. The coefficients in the first row measure the effect of international capital flows on bank lending to unprofitable firms when the banking system is overproportionally large (columns (1) and (2)) or poorly capitalized (columns (3) and (4)) and when local banks face strong international competition (columns (5) and (6)).

The results suggest that credit constraints of less profitable firms are eased in particular when they operate in a country with a large banking sector. Precisely, a 1-pp decline in the current account position increases the growth rate of credit for less profitable firms in countries with a sizable banking sector by 0.93 pp. Analogously, these firms also need to pay lower interest rates on their debt. In contrast, Table 7 also shows that current account deficits in smaller banking systems do not exert such a negative influence on efficient bank lending behavior. In particular, a 1-pp decline in the current account balance in this case only leads to an increase in loan growth rates by 0.04 pp.<sup>36</sup>

That the effect of foreign capital on efficient bank lending behavior is contingent on the structure of the financial system is additionally underlined by the triple interactions. In particular, we only find the most profitable firms to obtain more low-interest loans when they operate in a country with external deficits and small and a well capitalized banking system.

This result also strengthens the importance of loan supply side effects for the findings of the present paper because loan demand unlike loan supply does not depend on these characteristics of the banking systems.

In a subsequent step, we horserace the size, capital endowment and international integration of the banking systems in their interactions with the current account and *roa* simultaneously. Due to the likely correlation among these variables, this analysis ensures that the results of the columns (1) - (6) are not driven by mutual interdependence.

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<sup>36</sup>This is the sum of the coefficients in the first two rows of column (1).

Table 7: Loan Supply vs. Loan Demand

	(1) debt	(2) interest rate	(3) debt	(4) interest rate	(5) debt	(6) interest rate	(7) debt	(8) interest rate
ca	-0.926*** (-2.80)	0.020*** (3.43)	-0.603 (-1.15)	0.005 (0.77)	-0.886 (-1.40)	0.004 (0.37)	-0.870** (-2.28)	0.012 (1.28)
ca*size_bankingsystem	0.889** (2.43)	-0.018*** (-3.42)					0.876* (1.76)	-0.032*** (-4.60)
ca*capital_bankingsystem			-0.842 (-1.10)	0.025*** (3.48)			-1.454* (-1.66)	0.035*** (3.15)
ca*share_foreign					0.076 (0.08)	0.016 (0.72)	3.364*** (2.98)	-0.042** (-2.33)
ca*roa*size_bankingsystem	-1.620*** (-2.92)	0.011* (1.76)					-1.680*** (-3.13)	0.012* (1.82)
ca*roa*capital_bankingsystem			-0.851** (-2.18)	0.019*** (3.94)			-1.651*** (-4.90)	0.028*** (6.08)
ca*roa*share_foreign					-0.466 (-0.53)	0.015** (2.17)	-0.909 (-0.91)	-0.003 (-0.37)
ca*roa	1.010*** (3.12)	-0.003 (-0.85)	1.268*** (4.58)	-0.012*** (-3.06)	0.898** (2.31)	-0.003 (-0.46)	2.351*** (9.32)	-0.023*** (-4.41)
roa*size_bankingsystem	5.107* (1.73)	0.009 (0.39)					4.797 (1.64)	0.007 (0.28)
roa*capital_bankingsystem			3.321 (1.33)	0.000 (0.01)			7.797*** (3.07)	-0.076*** (-2.90)
roa*share_foreign					1.776 (1.29)	0.011 (0.43)	-3.135 (-1.30)	0.018 (0.53)
size_bankingsystem	-3.655** (-2.47)	0.012 (0.39)					-11.297*** (-3.35)	0.112*** (3.11)
capital_bankingsystem			1.689 (0.75)	0.002 (0.10)			-1.083 (-0.45)	0.038 (1.06)
share_foreign					-12.753*** (-3.31)	0.049 (0.84)	-9.562* (-1.94)	0.057 (0.92)
size	-1.160*** (-3.44)	-0.056*** (-4.50)	-0.681** (-1.99)	-0.059*** (-4.51)	-1.003*** (-2.74)	-0.057*** (-5.68)	-0.875** (-2.10)	-0.062*** (-5.34)
liquidity	0.137 (1.19)	0.000 (0.90)	0.237 (1.58)	0.001 (0.89)	0.123 (0.72)	-0.002 (-1.07)	0.099 (0.32)	-0.001 (-0.41)
capital	0.744*** (12.05)	-0.002*** (-4.06)	0.559*** (7.48)	-0.001** (-2.55)	0.789*** (12.61)	-0.002*** (-3.62)	0.633*** (7.11)	-0.001 (-1.37)
roa	5.273*** (6.02)	-0.023 (-1.63)	3.710*** (3.21)	0.011 (0.64)	5.884*** (4.14)	-0.017 (-0.84)	1.620 (1.16)	0.022 (0.85)
growth	1.397* (1.94)	-0.015* (-1.72)	1.808*** (2.86)	-0.009 (-1.07)	1.455 (1.47)	-0.018 (-1.26)	1.754* (1.70)	-0.011 (-0.76)
bondyield	-0.042 (-0.44)	0.000 (0.01)	0.050 (0.51)	-0.001 (-1.21)	-0.233 (-1.25)	-0.004 (-0.99)	-0.582*** (-2.86)	-0.000 (-0.02)
percapitagdp	-0.313 (-0.24)	0.012* (1.81)	0.794 (0.66)	-0.022 (-1.64)	0.292 (0.23)	0.011 (1.55)	1.470 (0.95)	-0.025 (-1.35)
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Obs	18516	18529	14690	14710	15788	15812	10199	10248
R-squared	0.035	0.112	0.033	0.123	0.040	0.113	0.047	0.133

In these regressions, we analyze the determinants of the banking system that promote inefficient bank lending to low performing firms. We introduce three additional dummy variables to our model, i.e., the relative size of the banking system ( $size\_bankingsystem=0$  for large systems), the capital endowments ( $capital\_bankingsystem=0$  for poorly capitalized banking systems) and the share of foreign banks ( $share\_foreign=0$  for strong presence of foreign intermediaries). The dependent variables are the changes in debt and interest expenses relative to debt. All of the regressions include a large set of macroeconomic and firm-level controls. We also add time, industry and country dummies. The t-statistics are reported in parentheses and we cluster standard errors at the country-level.

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

The columns (7) and (8) of Table 7 show that the size and capitalization of the banking system are the driving forces behind our results. Interestingly, the coefficients for  $ca * share_{foreign}$  are statistically significant in columns (7) and (8) and the coefficients for the correspondent triple interactions are insignificant. This means that external deficits lead local banks that operate under strong international competition to increase lending and to lower the respective interest rates. However, they do not increase lending overproportionally for low performing firms, implying that the presence of foreign financial institutions is no additional obstacle to efficient bank lending behavior. This is likely to be the case because the presence of foreign banks in general promotes competition, brings better skills, technologies or management techniques and helps fostering institutional development.<sup>37</sup>

In summary, finding that the results of this paper are to large extents contingent on the structure of the financial systems, strengthens the importance of loan supply side effects because loan demand does not vary with the banking system's capitalization, size or degree of international competition. Furthermore, the previous test advocates that every regulatory approach that successfully reduces the size and the undercapitalization of the banking system and that increases the presence of foreign banks might help to induce banks to distribute the inflowing international liquidity—as a result of current account deficits—more efficiently across firms. Such public interventions might, therefore, also be beneficial for an increase in the long-run dynamics of the economy. In this sense, this paper also contributes to Prasad et al. (2007) who show that large inflows of capital are associated with a decline in economic growth because underdeveloped financial markets only have limited absorptive capacity for foreign resources. Similarly, our analysis suggests that a mature, well capitalized and small banking system might be a prerequisite for international capital flows to have positive implications for the real economy in the long-run. Moreover, our results also provide further empirical evidence for Arcand et al. (2012) by showing that large inflows of capital lead banks to inefficient lending (with subsequent adverse effects on real economic dynamics) when the financial system is already overproportionally sizable. Therefore, there might indeed exist a threshold of financial development from which more finance impedes economic growth. In particular, our analysis advocates that there can be too much (international) finance.

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<sup>37</sup>See Giannetti and Ongena (2009). Levine (2001) also gives a detailed overview.

### 6.3 The Effects on Persistently Low Performing Firms

In this paper, we show that international capital inflows induce banks to grant more credit to unprofitable firms. Although returns on assets mainly capture differences in profitability, we argue that this finding is also a sign of increased bank risk-taking because unprofitable firms are ceteris paribus closer to insolvency (e.g., Lepetit and Strobel, 2013). This implies that they face stronger credit constraints and, therefore, have to pay higher interest rates on debt.<sup>38</sup>

However, profitability in the previous analyses is calculated time-variantly and, therefore, it might be that banks merely increase lending to safe firms that are temporarily affected by a decline in profitability. In this section, we explore the long-run effects of foreign capital on firms that are constantly in the top and bottom 10%, respectively, of the industry-specific annual distribution of returns on assets.

Table 8: The Effects on Persistently Low Performing Firms

<i>roa_permanent=1 for firms that are mostly in the</i>	<i>top 10% of the profitability distribution</i>	<i>bottom 10% of the profitability distribution</i>		
	(1)	(2)	(3)	(4)
	debt	interest rate	debt	interest rate
ca	-0.568** (-2.55)	0.015*** (3.35)	-0.547** (-2.29)	0.015*** (3.26)
ca*roa_permanent	-1.678 (-0.83)	-0.020 (-0.39)	-3.860*** (-4.50)	0.048 (0.52)
roa_permanent	13.703 (0.23)	0.641 (0.40)	139.049** (2.53)	-1.911 (-0.90)
size	-0.782* (-1.67)	-0.064*** (-4.57)	-0.771** (-2.16)	-0.062*** (-4.81)
liquidity	0.292*** (3.63)	0.001 (0.68)	0.273*** (3.20)	0.001 (0.98)
capital	0.908*** (18.03)	-0.002*** (-3.96)	0.902*** (18.10)	-0.002*** (-3.81)
growth	1.526*** (3.04)	-0.018** (-2.14)	1.575*** (3.16)	-0.018** (-2.07)
bondyield	0.071 (1.30)	-0.000 (-0.04)	0.068 (1.29)	-0.000 (-0.05)
percapitagdp	-0.008 (-0.01)	0.011** (2.22)	-0.027 (-0.03)	0.011** (2.12)
growth*roa_permanent	2.410 (1.27)	0.049 (0.60)	-1.090 (-0.13)	0.049 (1.34)
percapitagdp*roa_permanent	-0.961 (-0.36)	-0.032 (-0.44)	-4.811** (-2.46)	0.071 (0.82)
bondyield*roa_permanent	-0.315 (-0.59)	-0.008 (-0.92)	0.535 (0.32)	-0.023 (-1.06)
Year FE	Yes	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes
Obs	21816	21605	21816	21605
R-squared	0.032	0.110	0.032	0.110

*In these regressions, we test whether foreign capital induces banks to ease credit constraints of firms that are only temporarily less profitable or whether banks also grant more loans to constantly less profitable firms. Our central regressor is the current account position over GDP and its interaction with a dummy which is equal to one if a firm's return on assets is in at least 67% of the years in the upper 10% of the annual, industry-specific profitability distribution (columns 1 and 2) or in the lower respective distribution (columns 3 and 4). The dependent variables are as in Table 3. The regressions include a set of macro and firm controls and we add time, industry and country dummies. The t-statistics are reported in parentheses and we cluster standard errors at the country-level.*

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

<sup>38</sup>For instance, Kharroubi (2015) shows that low-productivity firms can outbid high-productivity firms through higher interest payments, thereby, leading to large foreign capital inflows and a misallocation of capital.

The distinction between a temporary and a long-run decline in profitability is important because it is not necessarily a bad sign when banks lend to firms that are temporarily hit by a reduction in profitability. For instance, it might be that such a bank lending behavior merely smooths idiosyncratic firm-specific fluctuations. In contrast, increased lending to firms that are permanently in the bottom 10% of the profitability distribution can be interpreted as a sign of long-run lending inefficiencies and a shift in the risk appetite of financial institutions.

For this analysis, we define the dummy *roa – permanent*, being equal to 1 if a firm's return on assets is in at least 2/3 of years in the top 10% of the annual, industry-specific distribution of profitability (columns (1) and (2)) or in the bottom 10% of this distribution (columns (3) and (4)) and enable the current account to interact with these dummies.

Table 8 shows that the effect of current account deficits on bank lending is also overproportional in firms that are constantly most unprofitable. This is the case because the interaction term of column (3) is negatively significant. Economically, whereas the principal effect of a 1-pp decline in current account positions is equal to 0.55 pp, firms that are steadily low performing have 4.41 pp higher loan growth rates.<sup>39</sup>

In contrast, the interaction term in the first two columns is insignificant, implying that firms that are mostly in the top 10% of the profitability distribution do not obtain more credit compared with other firms. These results advocate that banks that have an abundant access to international liquidity do not only compensate a temporary decline in profitability of firms, but that they also fund firms that are constantly most unprofitable. As a result, they structurally impede the creative economic destruction by funding firms that are low performing. Moreover, this result also stresses the increased risk appetite of banks in countries with large international capital inflows because firms that are constantly in the bottom 10% of the industry-specific profitability distribution are evidently closer to insolvency and, therefore, overproportionally risky.

## 7 Industry-Level Dynamics

In the previous analyses, we stress that international capital inflows induce banks to ease credit constraints of the most unprofitable firms. However, it remains unclear how the observed misallocation of credit affects industry-level outcomes and, therefore, aggregate real economic dynamics. To provide answers to the aggregate effects of current account deficits, we compile an

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<sup>39</sup>This is the sum of the first two rows of column (3).

additional dataset that rests on the Industrial Statistics Database.<sup>40</sup> The UNIDO database provides data on value added for 23 manufacturing industries based on the third revision of ISIC. For the eleven countries in our sample, we match this data (i) with the current account balances to measure the intensity of capital flows into the economies and (ii) with the bank dependence measure, introduced in Section 5.1 that we aggregate to a lower number of industries in the UNIDO database. If the overproportional lending to low performing firms associated with substantial international capital inflows and the related misallocation of capital leads to a reduction in aggregate macroeconomic dynamics, we should observe that industries that rely most on external finance grow less in countries with external deficits.

To test this hypothesis, we estimate the following equation for the eleven euro area countries in our sample:

$$\begin{aligned} valueadded - industry_{ij,97-07} = & \beta * ca_{j,97} + \theta * bankdependence - industry_{i,97} + \quad (3) \\ & \gamma * (ca_{j,97} * bankdependence - industry_{i,97}) + \epsilon_{ij}. \end{aligned}$$

We define the dependent variable as the ten-year difference in the logarithm of value added. In our framework, calculating this difference over the period 1997-2007 is advantageous for mainly two reasons. First, it allows us to circumvent any cross-industry disruptions that arose during the financial crisis. Second, starting in 2008, the number of observations in the UNIDO database declines decisively.

Our key regressor is the interaction of the current account balance of each country in 1997 and the measure for the dependence on external finance—as presented in Section 5.1 and adjusted to the lower number of industries in the UNIDO database.

In column (1) of Table 9, we estimate equation (3) without including any fixed effects. In columns (2) and (3), we saturate the model by adding industry and country dummies. Overall, Table 9 provides a positive and significant coefficient on the interaction term in two of three specifications, implying that industries that are most dependent on bank loans grow less in countries with large current account deficits. Economically, an industry at the 75th percentile of bank dependence grows by 0.72 pp less than an industry at the 25th percentile when the current account balance declines by 1 pp.

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<sup>40</sup>It is fostered by the United Nations Industrial Development Organization.

In general, international capital inflows should increase industry growth because they induce banks to increase lending. However, because banks misallocate the inflowing liquidity, we find that industries grow less in countries with capital inflows. As a result, Section 7 provides evidence that the change in bank lending behavior attributable to capital flows does not only affect firms on a disaggregated level, but that the change in the composition of lending also has potential adverse effects on the aggregate industry dynamics. In summary, current account deficits can have negative effects on economic growth in the long-run because capital is allocated to less profitable firms.

Table 9: Industry-Level Dynamics

	(1) valueadded_industry	(2) valueadded_industry	(3) valueadded_industry
ca*bankdependence_industry	0.077 (1.33)	0.086* (2.22)	0.088** (2.41)
ca	-2.371** (-2.95)	-2.619*** (-3.62)	
bankdependence_industry	-0.664** (-2.34)		
Country FE	No	No	Yes
Industry FE	No	Yes	Yes
Obs	234	234	234
R-squared	0.058	0.285	0.324

In this test, we explore whether the misallocation of credit that we observe on a microeconomic level also translates to a change in industry-level dynamics. The dependent variable is the log change in value added of the specific industry-country pair from 1997 to 2007. The main regressor of interest is the interaction between an industry's dependence on external finance and a country's current account balance in 1997. In some specifications, we also incorporate industry and country dummies. The standard errors are clustered at the country-level. The t-statistics are shown in parentheses.

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

## 8 Concluding Remarks

This paper explores the impact of intra-European capital flows between 1995 and 2014 on efficient bank lending behavior and on the real behavior of firms. Therefore, our paper is one of the first that studies the effects of global capital flows on the financial and real sector and that does not exclusively rely on country- or industry-level data but that makes use of microeconomic techniques on a disaggregated level.

Overall, we find that larger current account deficits (i.e., higher general inflows of capital) induce banks to grant more loans to less profitable firms. In particular, a 1-pp decline in the current account balance leads to 0.89 pp higher loan growth rates for less profitable firms, whereas a



significant effect for the subset of the most profitable firms is hardly existent. Less profitable firms are in general more risky and, hence, they are constrained in the supply of credit, paying higher interest rates on debt. Consequently, an increase in bank lending to low performing firms can also be interpreted as a sign of more bank risk-taking.

Beyond this, we find firms that receive this additional funding to increase dividend yields, to have less incentives to optimize labor input and to reduce the expenses for research and development. As a consequence, these firms also face declining returns on assets. In summary, our results show that large inflows of capital may lead to an inefficient allocation of credit across firms and to a reduction in industry-level dynamics, suggesting a lack of banks' ability to boost real sector outcomes. This result advocates that there can be too much (international) finance that impedes the Schumpeterian process of creative destruction.<sup>41</sup>

All in all, an increase in bank lending following large external deficits is likely to boost short-term economic growth; however, the decline in real sector dynamics constrains the economic development in the long-run. As a result, we find evidence for time-varying implications of capital flows for the real economy. This time-dependency is a probable reason for the inconclusive results of an empirical literature that studies the effects of financial liberalizations and global capital flows on economic growth (e.g., Aizenman et al., 2013; Eichengreen et al., 2011; Alfaro and Charlton, 2007; Kose et al., 2009; Bonfiglioli, 2008; Edison et al., 2002; Grilli and Milesi-Ferretti, 1995).

These findings give also rise to an academic debate about possible restrictions on external balances (e.g., Gros, 2010; Goodhart and Tsomocos, 2010). Instead of restricting current account positions, our analysis of Section 6.2 rather provides evidence for regulatory approaches that might be necessary to induce banks to allocate the inflowing liquidity more efficiently across firms. In particular, we show that, in a country with substantial current account deficits, the incentives of banks to grant credit to the least profitable firms are increasing in the size of the banking system and decreasing in its capital endowment. Therefore, the claim of higher capital requirements in the banking sector (e.g., Admati et al., 2012) that is also likely to have adverse effects on the size of the banking system could induce higher efficiency in bank lending and, hence, increase economic growth in the long-run. In our opinion, such a regulatory approach is superior to general restrictions on international capital flows.

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<sup>41</sup>Compare Arcand et al. (2012) for a discussion of this possible negative nexus between finance and growth.

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Table A.1: Description of the Variables

Variable	Description	Unit	Source
debt	The growth rate of debt	%	Worldscope, own calculations
short-term debt	The growth rate of short-term debt (maturity below one year)	%	Worldscope, own calculations
interest rate	In (interest expenses on debt / total debt)	ln(x%) <sup>a</sup>	Worldscope, own calculations
labor_efficiency	-(100)*Employees / Net Income	-	Worldscope, own calculations
research	(Research expenses - Research expenses <sub>t-1</sub> ) / Sales <sub>t-1</sub>	%	Worldscope, own calculations
reinvestments	(-1)*(Dividendyield - Dividendyield <sub>t-1</sub> )	-	Worldscope, own calculations
roa_change	The growth rate of the return 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
roa	Dummy=1 if a firm's return on assets > median return on assets for respective industry-year pair	0/1	Worldscope, own calculations
roa_persistent	Dummy=1 if a firm's profitability is in 2/3 of the years larger/smaller than the median for the respective industry-year pair	0/1	Worldscope, own calculations
ca	The current account balance relative to GDP	%	WEO 10/2014 <sup>b</sup>
fdi	Net foreign direct investments relative to GDP	%	OECD, own calculations
equityflows	Net portfolio equity flows relative to GDP	%	IFS, own calculations
debtflows	Net portfolio debt flows relative to GDP	%	IFS, own calculations
otherflows	(ca-fdi-equityflows-debtflows) / GDP <sup>c</sup>	%	IFS, own calculations
growth	The growth rate of real GDP	%	WEO 10/2014
bondyield	The relative change in 10-year sovereign bond yields	%	ECB, own calculations
percagdp	Per capita GDP (in prices of the year 1995)	1000€	WEO 10/2014, own calculations
size_bankingsystem	Dummy=1 if a country's domestic credit to the private sector over GDP > sample median	0/1	Global Financial Development database, own calculations <sup>d</sup>
capital_bankingsystem	Dummy=1 if a country's average capitalization of the banking sector > sample median	0/1	Global Financial Development database, own calculations
share_foreign	Dummy=1 if a country's share of foreign banks > sample median	0/1	Global Financial Development database, own calculations
bondissues	The growth rate of outstanding debt on the capital markets from non-financial firms	%	BIS Debt Securities Statistics, own calculations
valueadded_industry	The log change in value added between 1997 and 2007 of each industry-country pair	%	UNIDO Database, own calculations <sup>e</sup>
bankdependence_industry	An industry's mean of (capex-cashflows) / capex for 2004 -2006 (ISIC revision 3)	-	UNIDO Database, own calculations
bankdependence	Dummy=1 if an industry's mean of (capex-cashflows) / capex for 2004 -2006 > sample mean	0/1	Worldscope, own calculations

<sup>a</sup>We take logs of this ratio because the distribution of interest expenses on debt is extremely skewed across firms<sup>b</sup>World Economic Outlook Database, IMF<sup>c</sup>For all of the capital flow variables, negative values represent net inflows<sup>d</sup>World Bank<sup>e</sup>United Nations Industrial Development Organization

Table A.2: Robustness Check (1): Profitability on the Industry-Level

	(1) debt	(2) interest rate	(3) labor_efficiency	(4) research	(5) reinvestments	(6) roa_change
ca	-0.805*** (-3.71)	0.014* (1.89)	2.447*** (4.95)	6.831*** (4.40)	0.060* (1.83)	43.388** (2.14)
ca*roa	0.397*** (2.73)	0.003 (0.60)	-1.677 (-1.40)	-6.747*** (-4.25)	-0.037 (-1.45)	-83.244* (-1.78)
size	-0.783* (-1.68)	-0.064*** (-4.69)	1.211 (1.24)	2.044 (0.65)	-0.024 (-1.28)	52.241*** (4.50)
liquidity	0.294*** (3.75)	0.001 (0.69)	0.512*** (3.26)	-11.195 (-1.19)	0.013*** (2.88)	11.905*** (3.53)
capital	0.903*** (18.05)	-0.002*** (-4.23)	0.052 (0.70)	0.233 (1.45)	-0.005 (-1.60)	-10.877** (-2.09)
growth	1.943*** (3.06)	-0.018** (-2.18)	-1.616 (-1.20)	4.764** (2.15)	-0.066** (-2.10)	3.272 (0.11)
bondyield	0.078 (1.32)	0.000 (0.02)	0.528*** (2.64)	-1.087*** (-4.45)	0.010 (1.31)	6.034 (0.99)
percapitagdp	-0.205 (-0.19)	0.009* (1.81)	0.188 (0.25)	2.017 (0.67)	-0.004 (-0.13)	-0.983 (-0.05)
growth*roa	-0.645 (-1.06)	0.001 (0.14)	1.511 (1.01)	-0.728 (-0.62)	-0.036* (-1.70)	95.574 (1.06)
bondyield*roa	-0.011 (-0.11)	-0.000 (-0.25)	-0.280** (-2.49)	1.165* (1.72)	-0.014** (-2.05)	3.777 (1.09)
percapitagdp*roa	0.318 (1.07)	0.002 (0.67)	0.165 (0.27)	2.317 (1.38)	0.014 (1.33)	23.966 (1.27)
debt			-0.025*** (-6.65)	-0.013 (-0.43)	0.001 (1.17)	-0.221 (-1.19)
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes
Obs	21816	21605	18654	6622	17942	18490
R-squared	0.032	0.109	0.006	0.013	0.015	0.009

*In these robustness regressions, we calculate roa as a time-invariant dummy on the industry-level. Therefore, it is unlikely to be affected by regulatory or macroeconomic changes on the country-level. The dependent variables are (1) the debt growth rates (2) the relative interest expenses, (3) (-100)\*employees over netincome, (4) changes in research expenses over sales, (5) (-1)\*changes in dividend yields and (6) the relative changes in profitabilities. The main regressors are the current account position over GDP (ca) and its interaction with roa calculated time-invariantly (ca\*roa). These regressions include a set of macro and firm controls and we add time, industry and country dummies. T - statistics are shown in parentheses and we cluster standard errors at the country-level.*

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



Table A.3: Robustness Check (2): Firm Debt as a Proxy for Bank Loans

	(1) debt	(2) interest rate	(3) short-term debt	(4) debt	(5) interest rate
ca	-0.783** (-2.36)	0.014*** (3.51)	-1.219*** (-3.54)	-0.763** (-2.33)	0.018*** (3.83)
ca*roa	0.447 (1.24)	0.002 (0.36)	0.973** (2.45)	0.454 (1.42)	0.003 (0.58)
bondissues	-0.039 (-1.17)	0.000 (0.87)			
size	-0.870*** (-3.03)	-0.059*** (-4.99)	-0.255 (-1.33)	-1.302*** (-3.26)	-0.055*** (-4.56)
liquidity	0.253** (2.22)	0.000 (0.22)	1.748* (1.93)	0.219** (2.07)	0.000 (0.21)
capital	0.727*** (14.62)	-0.002*** (-3.76)	0.463*** (4.48)	0.721*** (13.97)	-0.002*** (-3.74)
roa	2.613 (0.37)	0.074 (1.24)	17.676*** (2.68)	4.314 (0.72)	0.068 (1.33)
growth	0.627 (0.75)	-0.015 (-1.54)	1.502 (1.38)	0.801 (1.07)	-0.018** (-2.12)
bondyield	0.067 (0.86)	-0.000 (-0.21)	-0.004 (-0.03)	0.010 (0.13)	-0.000 (-0.05)
percapitagdp	1.856 (1.27)	0.001 (0.13)	1.023 (1.35)	0.129 (0.14)	0.011 (1.53)
growth*roa	0.921 (0.99)	0.001 (0.14)	0.530 (0.44)	1.423 (1.47)	-0.004 (-0.46)
bondyield*roa	0.030 (0.28)	0.000 (0.16)	0.153 (1.31)	-0.012 (-0.12)	0.000 (0.40)
percapitagdp*roa	0.115 (0.47)	-0.003 (-1.56)	-0.478* (-1.72)	0.023 (0.11)	-0.003 (-1.57)
Year FE	Yes	Yes	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes
Obs	19929	19929	19523	18876	18877
R-squared	0.033	0.114	0.024	0.033	0.108

*In these regressions, we investigate whether firm debt is an appropriate proxy for bank loans. In columns (1) and (2), we correct for changes in outstanding bonds. In column (3), we only study the effects on short-term debt and in columns (4) and (5), we exclude the largest firms from our sample. The dependent variables are (1) and (4) the growth rates of debt, (2) and (5) the relative interest expenses and (3) debt changes with maturities below one year. The main regressors are the current account over GDP (ca) and its interaction with profitability, being equal to 1 if the return on assets is above the median of the respective industry-year pair (ca \* roa). The regressions include a set of macro and firm controls and we incorporate time, industry and country dummies. T-statistics are shown in parentheses. We cluster standard errors at the country-level.*

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

Table A.4: Robustness Check (3): Some Countries Dropped from the Sample

	(1) debt	(2) interest rate	(3) labor_efficiency	(4) research	(5) reinvestments	(6) roa_change
ca	-0.898*** (-3.49)	0.013*** (2.85)	2.055 (1.57)	5.506*** (3.82)	0.040* (1.73)	6.885 (0.29)
ca*roa	0.566* (1.91)	0.002 (0.52)	-0.702 (-0.74)	-4.096*** (-2.89)	-0.036* (-1.75)	-13.501 (-0.41)
size	-1.061*** (-5.39)	-0.060*** (-4.39)	1.569 (1.51)	2.660 (0.69)	-0.011 (-0.63)	65.343*** (5.13)
liquidity	0.310*** (2.84)	-0.000 (-0.63)	0.653*** (5.47)	-11.724 (-0.93)	0.021*** (3.78)	16.322*** (4.40)
capital	0.673*** (24.97)	-0.002*** (-3.07)	-0.060 (-0.57)	-0.034 (-0.16)	-0.002 (-0.52)	-14.172** (-2.16)
roa	2.560 (0.35)	0.086 (1.03)	37.100** (2.01)	-18.783 (-0.33)	-1.125* (-1.94)	-373.066 (-0.54)
growth	1.103 (1.62)	-0.025*** (-3.66)	-2.339*** (-3.21)	8.237*** (3.13)	-0.116* (-1.90)	2.150 (0.09)
bondyield	0.020 (0.21)	-0.001 (-0.35)	0.590* (1.84)	-1.147*** (-4.49)	-0.003 (-0.34)	16.863* (1.78)
percapitagdp	0.387 (0.44)	0.005 (0.30)	0.902 (0.32)	5.712 (1.42)	-0.065* (-1.67)	75.953** (2.29)
growth*roa	1.597 (1.02)	-0.001 (-0.05)	0.660 (0.38)	-5.484 (-1.06)	-0.000 (-0.00)	221.057** (2.12)
bondyield*roa	0.041 (0.41)	-0.000 (-0.23)	-0.578* (-1.81)	1.151 (1.36)	-0.016** (-2.33)	1.762 (0.22)
percapitagdp*roa	0.155 (0.64)	-0.004 (-1.28)	-1.113 (-1.24)	1.731 (0.74)	0.027 (1.09)	-1.895 (-0.06)
debt			-0.025*** (-3.92)	-0.027 (-0.80)	0.000 (0.55)	-0.241* (-1.93)
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes
Obs	15348	15339	13392	4765	12822	13560
R-squared	0.036	0.109	0.007	0.013	0.017	0.011

*In these robustness checks, we drop those 4 countries from our sample whose distribution of profitability differs from the remaining sample (Finland, Italy, Luxembourg and the Netherlands). The dependent variables are (1) debt growth (2) the relative interest expenses, (3) (-100) \* employees over netincome, (4) changes in research expenses over sales, (5) (-1) \* the change in dividend yields and (6) the relative changes in profitability. The main regressors are the current account balance to GDP (ca) and its interaction with roa, being equal to 1 if the return on assets is larger than the median of the respective industry-year pair (ca\*roa). The regressions include a set of macro and firm-level controls and we add time, industry and country fixed effects. T-statistics are shown in parentheses and we cluster standard errors at the country-level.*

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