

# Does Financial Structure Shape Industry Structure? Evidence from Timing of Bank Liberalization\*

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March, 2014

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\*Acknowledgements: The authors are from Bonn University and Deutsche Bundesbank (Behn), Bonn University (Haselmann), University of Chicago and NBER (Seru), and London Business School and CEPR (Vig). We would like to thank Christian Bayer, Reint Gropp, Martin Hellwig, Raj Iyer, Tomasz Michalski, David Thesmar, Paul Wachtel and seminar participants at Bonn University, Bundesbank, CAF-FIC-SIFR Conference Stockholm, Columbia Business School, European Economic Association, German Economic Association, HEC Paris, SMYE Conference Mannheim, and ZEW Mannheim for very helpful comments. We thank Abdul Abiad for making the data on the liberalization events available to us. All remaining errors are ours.

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## Abstract

This paper argues that the nature of financial structure (supply of financing) impacts the industry structure through its influence on the allocation of credit to firms within industries. We exploit the variation in the efficiency of the domestic banking sector at the time of liberalization across 26 developing economies to identify large changes in the nature of the supply of financing in an economy due to entry of foreign banks. Foreign, relatively arm's length, capital largely crowds out domestic lending in markets with relatively inefficient banks after liberalization. In contrast, there is an increase in the aggregate supply of credit in countries with relatively efficient domestic banks following such an event. We use this changed mix of financing across economies and show that the nature of the supply of financing significantly impacts the allocation of credit. There is a higher growth rate and lower growth volatility for industry sectors in markets with relatively more efficient domestic banks following liberalization. These results are driven by more credit flowing to industries that are reliant on external financing and more credit flowing to smaller firms within industries in economies with more efficient domestic banks at the time of liberalization. In contrast, industry growth is lower and growth volatility is higher in countries with relatively inefficient domestic banks following liberalization. Particularly small firms are harmed in these countries. Thus, the timing of liberalization of credit markets interacts with the efficiency of the incumbent domestic banking sector, and the changed nature of the supply of financing it induces has implications on the allocation of credit and economic growth.

**Keywords:** financial market opening, foreign banks, integration of banking markets

**JEL Classification:** G14, G15, G21, F36, O16

# I Introduction

It has been well accepted that financial systems can influence the allocation of credit and shape an economy's growth path.<sup>1</sup> What is not as well understood is how the nature of credit provision affects this allocation process.<sup>2</sup> One reason for our lack of understanding is the inherent difficulty in identifying significant changes in the nature of credit provision within an economy. This paper exploits variation in the efficiency of the domestic banking sector at the time of liberalization to identify large changes in the nature of credit provision, which have a significant impact on the allocation of credit in the liberalizing countries. These changes in credit allocation shape countries' industry structure by influencing the financial structure of firms—ultimately affecting growth paths of industries in the economy.

We draw insights from the industrial organization and trade literature and argue that foreign bank entry will interact differentially with the domestic banking sector, depending on the efficiency of the domestic banking sector at the time of liberalization.<sup>3</sup> The rationale is simple: Foreign bank entry induces competitive pressure, which is likely to be better absorbed by domestic banks that operate close to the efficiency frontier. These banks are likely to invest and innovate in response to the competitive threat—for example by improving their technology and processes—while such a change might be harder for banks further away from the frontier. Consequently, we would expect considerably larger changes in the nature of credit provision in countries that liberalize when most domestic banks are far away from the efficiency frontier as compared with countries that liberalize when most domestic banks are able to compete with foreign entrants. Specifically, the market share of foreign banks should dramatically increase in countries with a weak domestic banking sector, while the effect should be more moderate

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<sup>1</sup>One potential channel is that lenders and intermediaries screen out bad projects (Bagehot 1873, Schumpeter 1912, Diamond 1984, Boyd and Prescott 1986). Another theory argues that pressures from external financiers encourage managers to pursue value-maximizing investment policies (Jensen 1986). See also Wurgler (2000).

<sup>2</sup>This issue is best illustrated by the recent vociferous debate surrounding the bailout of banks. Proponents argue that the allocation of credit would be hampered if old banks were replaced by new ones since old banks have relationships with firms—especially smaller entrepreneurial firms—which could not simply be substituted by new credit providers. Critics argue that new banks would be able to allocate credit as well as their older counterparts.

<sup>3</sup>A recent and growing trade literature documents effects of a reduction in trade barriers on product and labor markets. Aghion et al. (2003, 2008) document a heterogeneous response of firms' efficiency and productivity following the elimination of entrance barriers to foreign firms. They argue that technologically advanced firms often gain in efficiency following foreign entrance since they are more likely to respond to the threat of entry by investing in new technologies. However, firms that are far from the frontier are adversely affected by the entrance threat. Consequently, opening of product markets amplifies initial differences in productivity. This theoretical argument is supported by empirical findings. Aghion et al. (2003) (for India), Aghion and Bessonova (2006) (for Russia) and Aghion et al. (2009) (for the UK) find that a removal of restrictions on foreign firm entry has a more positive effect on the economic performance for domestic firms and industries that are initially closer to the technology frontier. In a related paper, Sabirianova et al. (2005) show that the more foreign firms enter a market, the higher the productivity gap between foreign and domestic firms. In a theoretical paper, Lehner and Schnitzer (2008) study how spillover effects from foreign bank entry depend on competition in the domestic banking sector. They find that an increase in the number of banks is more likely to have positive welfare effects the more competitive the domestic banking sector.

in countries with a better developed domestic sector.

There are several reasons why one would expect that changes in the nature of credit provision have an impact on the allocation of credit within the economy. First, if foreign banks are more efficient in providing capital, they would intermediate capital to sectors in the economy that could have been rationed out by inefficient domestic banks. Moreover, it is also possible that the arm's length nature of foreign bank financing plays a role. In particular, domestic banks might be better at screening soft information borrowers (e.g., local entrepreneurial firms; see Berger et al. 2001 and Mian 2006), while foreign banks may have comparative advantages in screening hard information borrowers (e.g., larger firms). This could potentially shape the allocation of credit to firms within an industry and across industries.

Using information from Abiad and Mody (2005) and Bekaert and Harvey (2004) on liberalization events in 26 emerging markets, this paper examines how the removal of entry barriers for foreign banks affects the nature of credit provision, and how this effect depends on the efficiency of the domestic banking sector at the time of liberalization. We obtain a comprehensive data set from Bureau van Dijk's Bankscope data base, covering banking sectors for our sample countries for the period from 1995 to 2007. Using bank-level data, we find that, following liberalization, banks operating close to the efficiency frontier increase their lending relative to banks further away from the frontier, where bank efficiency is based on the bank's profitability, the cost-to-income ratio, or the non-performing loans ratio prior to the event.

We aggregate the bank efficiency variable on the country level to obtain our key measure, the share of efficient domestic banks at liberalization. We use this measure to split our sample countries into those with a lower than median and those with a higher than median share of efficient domestic banks at liberalization. Aggregating the Bankscope data on the country level, we find an increase in the aggregate supply of credit and a moderate increase in the market share of foreign banks in countries with relatively efficient domestic banks. In contrast, in markets with relatively inefficient banks, foreign lending crowds out domestic lending, resulting in an aggregate loan supply that is lower than before.

We proceed by showing that this differential change in the nature of credit provision across economies shapes the financial structure of firms and countries' overall industry structure. In particular, we find that smaller firms are negatively affected in countries with less efficient domestic banks at the time of liberalization. This result can be rationalized easily: Since smaller firms are likely to be the ones where soft information is relatively important, they are particularly harmed by the decline in domestic lending in these economies after banking markets are opened up. In contrast, small firms are better off in economies with an efficient domestic banking sector at the time of liberalization.<sup>4</sup> In addition, at the industry level, we find that those

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<sup>4</sup>Beck et al. (2008) argue that small firms are relatively opaque and hence benefit more from the reduction of informational problems that comes along with more efficient financial intermediation.

industries that are more reliant on external finance benefit from liberalization, irrespective of domestic banks' inherent efficiency. Thus, changes in the nature of credit provision shape the structure of financing within an industry and across industries.

Finally, we also evaluate how changes in the nature of credit provision affect economic growth. We find that, following liberalization, there is a higher growth rate and lower growth volatility for industry sectors in markets with relatively more efficient domestic banks. The growth effect is driven by industries with a large share of small and medium enterprises. In markets with relatively efficient domestic banks such industries accelerate in growth following liberalization, while we find the opposite for markets with relatively inefficient banks.

It is important for our analysis that the events in our sample countries are exogenous in the sense that they are not systematically related to countries' future growth prospects or the occurrence of banking sector crises. We are confident that endogeneity is not an issue for three reasons: First, we use within-country, cross-sectional variation at the bank level, at the industry level, and at the firm level, and document differential effects of liberalization on banks, industries, and firms within the same country. Hence, our identification strategy mitigates endogeneity concerns. Second, we study the dynamic effects of liberalization in our sample countries and find that key variables change after, not before the event. Finally, political processes and external pressures applied by the IMF or the World Bank in many of our sample countries also help to mitigate concerns regarding endogeneity.

As mentioned before, we assess the robustness of our results by using various definitions for initial banking sector efficiency. Further, as the entry mode chosen by foreign banks could be another important determinant of the outcome of banking sector liberalization, we show that the efficiency effect is present both in countries where foreign banks entered mostly via greenfield investments and in countries where they entered by taking over domestic banks. As we show that the reaction of remaining domestic banks depends on their initial efficiency, the selection of banks that were taken over could be an issue. We show that this selection does not depend on banks' initial efficiency, hence mitigating this concern. Finally, we control for other events that might affect lending in our sample countries, like changes in creditor rights or current account liberalization.

Our results underscore the importance of domestic institutions in fostering growth. The main message that comes out from our results is that domestic institutions need to be developed to a reasonable degree for financial liberalization to have a positive impact. In other words, we highlight the importance of the timing of liberalization by showing that it has a direct effect on the structure of lending within an economy, and that this has real effects on growth and industry structure.

The remainder of the paper is organized as follows: In Section II we describe the bank liberalization reforms in emerging markets that constitute our event as well as our underlying

data sources. Section III illustrates the consequences of our event for loan supply and financial structure (foreign vs. domestic banks) in our sample countries. We investigate how the documented changes in financial structure affect economic outcomes and industry structure in Section IV and confirm our results on the firm-level in Section V. In Section VI we provide some additional robustness checks, before we conclude in Section VII.

## II Liberalization reforms and data

### II.A The event: Bank liberalization reforms across the world

During the last two decades many emerging markets throughout the world have opened their banking sectors to foreigners as part of a broader process of financial liberalization.<sup>5</sup> The Washington Consensus—actively promoted by the IMF and the World Bank—pushed for the elimination of all entry barriers and state involvement (World Bank 2002). This view is based on the classical Shaw (1973) – McKinnon (1973) framework in which the opening of financial markets increases the efficiency of financial intermediation. Moreover, foreign banks are expected to import capital, to stimulate competition, to introduce new technologies, and to import better supervision and regulation from their home countries (Levine 1996). In line with this view, many countries removed entry barriers and consequently saw a sharp increase in foreign bank ownership.<sup>6</sup>

Nevertheless, there is disagreement about the appropriate market opening strategy. Some policy makers fear financial fragility following liberalization since several countries experienced banking sector crises shortly after the financial sector was deregulated (Demirguc-Kunt and Detragiache 1999, Kaminsky and Reinhart 1999 or Weller 2001). The debate about the advantages and risks of liberalization resulted in different market opening strategies between different emerging markets. Some countries opted for the removal of all entry barriers for foreign banks as suggested by, e.g., Sachs and Warner (1996).<sup>7</sup> In Hungary, for example, the majority of the banking sector was basically sold overnight to foreign-owned banks (Kiraly et al. 2000). Other countries were more reluctant to open their markets. In these countries, foreign entrance and operations remain restricted by government regulations.<sup>8</sup>

We collect information on banking market opening policies for a large sample of emerging market economies that had not yet fully liberalized their banking markets at the onset of our

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<sup>5</sup>See, e.g., Williamson and Mahar (1998), Kaminsky and Schmukler (2008) or Abiad et al. (2010) for a documentation of liberalization reforms across the world in recent decades.

<sup>6</sup>Claessens et al. (2008) document for a sample of 103 developing countries an increase in foreign ownership from 23% in 1995 to 38% in 2006.

<sup>7</sup>Sachs and Warner (1996) argue that high product market competition through liberalization fosters allocative efficiency which in turn promotes economic growth.

<sup>8</sup>For reviews about experiences with the removal of entry barriers see Barros et al. (2005) and Coricelli (2001).

sample period in 1995. Abiad and Mody (2005) provide an indicator described below that codes changes in entry restrictions for foreign banks. The Abiad and Mody (2005) database provides information on countries from several regions, but does not include Eastern European economies. These countries are, however, of special interest, since they opened their banking markets during the 1990s in the quest to join the European Union. Therefore, we construct the Abiad and Mody (2005) indicator on foreign entrance restrictions for these countries based on data from the Bekaert and Harvey (2004) database on important financial, economic and political events in emerging markets. Specifically, Abiad and Mody (2005) construct an index that is concerned with restrictions on foreign bank entry that,<sup>9</sup>

- is coded as 0 when no entry of foreign banks is allowed or tight restrictions on the opening of new foreign banks are in place;
- is coded as 1 when foreign bank entry is allowed, but nonresidents must hold less than 50 percent equity share;
- is coded as 2 when the majority of share of equity ownership of domestic banks by nonresidents is allowed or equal treatment is ensured for both foreign banks and domestic banks or an unlimited number of branching is allowed for foreign banks.

Overall, we obtain information on the market opening strategies of 26 emerging economies.<sup>10</sup> We use central bank sources in order to double check information on all liberalization reforms.<sup>11</sup> Of these 26 countries, 22 reduced restrictions on foreign bank entry during our sample period. The remaining four countries did not reduce restrictions and remain only partially liberalized during our whole sample period. Countries are located in Central and Eastern Europe, Asia, Latin America and Africa.

An overview of our sample countries and their respective reform years can be found in Panel A of Table 1. The table also contains a short description of the reforms themselves. Many countries eliminated limitations on foreign ownership in the banking sector, while others like Indonesia or Taiwan also made it easier for foreign banks to open branches. Some countries like Guatemala or Costa Rica took a more gradual approach and liberalized only partly. All

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<sup>9</sup>Abiad and Mody (2005) use information on seven different dimensions of financial sector policy to calculate an index of financial reform. The subindex on entry barriers incorporates information on four dimensions: restrictions on foreign bank entry, restrictions on domestic bank entry, restrictions on branching, and restrictions on banking activities. The first of these dimensions exactly matches our variable of interest, hence we take over the coding of our event variable from this sub-subindex.

<sup>10</sup>We include all countries not yet fully liberalized at the onset of our sample period in 1995 for which we are able to obtain the coding of the event variable. For 17 of our 26 sample countries liberalization information is taken from the Abiad and Mody (2005) database and for the remaining 9 countries from the Bekaert and Harvey (2004) database.

<sup>11</sup>Overall, the quality of the two databases is very good. We make only two minor corrections: In Mexico, restrictions on foreign bank entry were removed in 1997, two years earlier than reported in the Abiad/Mody database (Hernández-Murillo 2007). For Bulgaria, the event definition is not unambiguously clear from the two databases. We consult a paper by Miller and Petranov (2001) to obtain the correct date of liberalization.

in all, we have a diverse set of reforms that captures the different facets of bank liberalization. In Figure 1 the development of the foreign market share aligned around the respective reform year of our sample countries is plotted.<sup>12</sup> Many countries were already partially liberalized at the onset of our sample period, so that the average market share of foreign banks five years before liberalization was about 18 %.<sup>13</sup> However, foreign bank operations were still restricted and highly regulated in these countries. The figure shows that the foreign market share rose to about 50 % five years after liberalization, which illustrates that liberalization had a significant impact in our sample countries.

## II.B Bank data

We obtain bank balance sheet data and time series information on bank ownership from Bureau van Dijk's Bankscope database. This database contains detailed information on up to 30,000 banks and goes back until the early 1990's. A problem with the database is that each version covers only the most recent years. To gather data on the earlier years, we merge information from the 2011 internet version of the database with data from older CD-ROM versions. In this way, we obtain a consistent dataset for the entire sample period from 1995 to 2007. The years 1993 and 1994 are excluded due to very thin data availability. To avoid a possible distortion of results due to other forces being at work during the global financial crisis, we also exclude the years 2008 and 2009. Careful revision of the data is necessary to avoid double counting and the inclusion of irrelevant data. We eliminate unconsolidated statements whenever both unconsolidated and consolidated statements are available for a certain bank. Moreover, we eliminate all statements of non-bank financial institutions, such as clearing institutions, central banks or securities firms.

In large parts of the paper we distinguish between domestic and foreign lending. Hence, we need to identify ownership of our sample banks. Bankscope includes detailed information on ownership, giving both name and nationality of a bank's shareholders as well as their respective shares in the bank. Banks are coded as foreign if at least 50 % of their assets are foreign owned. Unfortunately, even with different versions of the Bankscope database, ownership information is only available for the years 2000 to 2007. Hence, for the years 1995 to 1999, we consult the banks' or central banks' websites in order to check whether there was a takeover.

Our sample provides information on 842 distinct foreign and domestic banks. We aggregate loans from all banks within a given market in order to calculate country level loan supply in a given year. In the bank level regressions our focus is on domestic banks. Among the 842 banks,

<sup>12</sup>The foreign market share is defined as the share of total bank assets owned by foreign banks within the respective country.

<sup>13</sup>Foreign bank presence prior to liberalization can also be explained by historical reasons in some of our sample countries. For example, in Mexico, foreign banks were allowed to enter before restrictions were put in place in 1982. These restrictions were removed again in the 1990s (see Hernández-Murillo 2007).



our sample contains 542 distinct domestic banks with 4,604 bank-year observations.<sup>14</sup> Panel B of Table 1 contains descriptive statistics of the domestic bank balance sheet information by country. It reports the number of banks per country as well as mean values for bank assets, loans, ROA, market share, a solvency measure (equity by total assets) and a liquidity measure (liquid assets by total assets). The number of domestic banks per country ranges from six in Ghana, Lithuania and Slovakia up 78 in Brazil. Importantly, the sample is not dominated by a single country: India, the country with the most bank-year observations, makes up approximately 15 % of the overall sample. Within the sample, domestic banks from Korea, Taiwan or Singapore are the largest on average, while somewhat surprisingly, African banks are the most profitable ones.

## II.C Efficiency classification of banking markets and macroeconomic data

As outlined in the introduction, we want to analyze how differences in the efficiency of domestic banking markets affect outcomes of banking sector liberalization. In order to determine the efficiency of a banking sector we would ideally want to know how efficient banks screen and monitor investment projects. Since this information is empirically not observable, we present several accounting based measures.

As a starting point, we focus on banks' profitability. We calculate the fraction of domestic banks (weighted by total assets) in a given market whose ROA is in the top quartile of all sample banks in the year before the respective market is liberalized.<sup>15</sup> For the four countries that did not experience a liberalization event during our sample period the measure displays the share of efficient domestic banks at the onset of our sample period in 1995.<sup>16</sup> The first column of Table 1, Panel C displays for each sample country the resulting share of efficient banks at liberalization (*Initial ROA*). There is considerable variation in this measure across our sample countries. In Eastern Europe, the Czech Republic opened its banking sector while there were basically no profitable domestic banks. In Poland a fraction of 7 percent of total banking assets was managed by relatively efficient banks. Most Asian countries opened their banking markets while having a rather inefficient domestic banking sector. Among the countries that did not open their markets, only Brazil has a considerable fraction of profitable domestic banks. Since we conduct sample splits based on the *Initial ROA* measure, we define a dummy that takes the value of one if *Initial ROA* is above the median and zero otherwise. The respective classification is displayed in column 2.

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<sup>14</sup>Besides foreign banks, we exclude also banks that were taken over by foreign banks from the bank level analysis. If foreign entrants selected these banks based on their efficiency this could create a potential bias to our analysis. However, we show in Section VI that this is not the case.

<sup>15</sup>We have used alternative cut-offs for the definition of the initial efficiency variable. Our results are robust to these changes.

<sup>16</sup>Zimbabwe is the only sample country that had two events. We consistently code the first event as the liberalization event. Results are unaffected by this decision.

Alternatively, we use the cost to income ratio (*Initial cost to income ratio*) and the non-performing loans ratio (*Initial NPL ratio*) to obtain a measure for banking efficiency. We obtain data for the aggregate banking sectors of every sample country in the year before liberalization from the World Bank World Development Indicators.<sup>17</sup> The coding of these two indicators is displayed in columns 3 and 4. Throughout the main part of the paper we consistently apply the measure *Initial ROA*. In Section VI, we verify that our most important findings are robust to the two alternative definitions of banking sector efficiency (*Initial cost to income ratio* and *Initial NPL ratio*).

The last three columns of Table 1, Panel C, report macro controls obtained from the World Bank World Development Indicators. We control for banking market concentration by including the Herfindahl index of each banks' market share in a given banking market (Herfindahl index), the logarithm of the inflation rate (log(inflation)) and the annual GDP growth rate (GDP growth).

## II.D Industry data

To investigate whether the effects of bank liberalization are transmitted to the real economy, data on industry output is collected from UNIDO's INDSTAT4 (2011) database. This database contains time series information on 127 countries for the period 1990-2008. The measure of industry output reported in the UNIDO database is based on the census concept and covers only activities of an industrial nature.<sup>18</sup> The data is originally stored in national currency valued at current prices. In order to make data from different countries comparable, it is converted into current U.S. dollars using the average period exchange rates as given in the International Financial Statistics (IFS). Following Rajan and Zingales (1998), the analysis is confined to manufacturing sectors (U.S. SIC 2000-3999) in order to reduce the dependence on country-specific factors like natural resources. The UNIDO dataset is classified by ISIC Rev. 3 codes. Using three-digit industry codes as the level of analysis, a panel of up to 47 industries per country-year is obtained. The basic industry specification includes 10,520 country-industry-year observations for 1,132 distinct country-industries.

In Section IV, we examine whether industries that differ in certain characteristics are heterogeneously affected by liberalization. Industry measures for external dependence and the share of small and medium enterprises (SMEs) are obtained from papers by Rajan and Zingales (1998) and Beck et al. (2008), respectively.<sup>19</sup>

<sup>17</sup>Series GFDD.EI.07, defined as operating expenses as a share of the sum of net interest revenue and other operating income, and series GFDD.SI.02, defined as the ratio of defaulting loans (payments of interest and principal past due by 90 days or more) to total gross loans.

<sup>18</sup>For details on the INDSTAT data see UNIDO Statistics Unit (2011).

<sup>19</sup>For this the three-digit ISIC Rev. 3 codes used in the UNIDO (2011) dataset are matched to three-digit ISIC Rev. 2 codes used in these earlier papers. ISIC Rev. 3 codes are generally finer than ISIC Rev. 2 codes so that in some cases several of the sectors in this paper have the same value for the respective measure. The United

Rajan and Zingales (1998) measure a firm’s dependence on external finance as capital expenditures minus cash flow from operations divided by capital expenditures and aggregate data for U.S.-based publicly listed companies of the 1980’s into an industry index. They argue that industries differ in their use of external finance for technological reasons that are persistent across countries. The U.S. is taken as a benchmark economy as its capital markets are among the most advanced in the world and hence there are relatively few frictions, market imperfections or policy distortions. Moreover, data for publicly traded companies is used as these are relatively large companies that are financially not constrained. Therefore the amount of external finance they use is a relatively pure measure of the demand for external finance. As Rajan and Zingales (1998) point out, the identifying assumption that technological differences persist across countries does not require that industries have the same value for external financial dependence in every country, but that the ranking among them remains relatively stable across countries. Panel D of Table 1 shows that there is considerable variation in the amount of external finance that industries need in order to fund their operations. Sectors with the highest dependence on external finance are Plastic Products and Office/Accounting/Computing Machinery. On the contrary, Tobacco and Leather sectors seem to rely mostly on internal funding.

The share of small and medium enterprises within an industry is obtained from Beck et al. (2008) and calculated as the industry’s share of total employment by firms with less than 20 employees. The paper rests on the same identifying assumptions as Rajan and Zingales (1998) and also uses the U.S. as a benchmark economy to measure an industry’s technological share of small firms. Beck et al. (2008) emphasize that even if there are policy distortions and market imperfections in the U.S., the approximation remains valid as long as these distortions do not systematically distort the ranking of industries. Again, Panel D of Table 1 shows considerable variation between industries. While Wood products and Printing and Publishing are industries with relatively high shares of SMEs, there are few small firms in the Tobacco or the Basic Chemicals industry.

## II.E Firm data

Unfortunately, no database contains detailed information on firms from all our sample countries for the period from 1995 to 2007. Nevertheless, we would like to use firm level data in order to support our argumentation and present evidence on the mechanism behind our industry results. As a compromise, we use Bureau van Dijk’s Amadeus database to obtain data on a subsample of countries, the Eastern European countries. The database contains balance sheet and other financial information on public and private firms from 43 European countries.

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Nations Statistics Division provides tables with correspondences between different sector classifications on its website. As a consistent matching of ISIC Rev. 3 sectors 331 Medical instruments, 332 Optical instruments and 333 Watches and clocks is not possible, these sectors are excluded from the analysis.

Similar to the industry level, we focus on the manufacturing sector and include only firms from U.S. SIC sectors 2000-3999. Our basic firm-level regressions contains 30,489 observations for 7,228 distinct firms from eight Eastern European countries.

Panel E of Table 1 provides a description for the Amadeus data. It covers the period from 1995 to 2004 and is hence well-balanced around the years 1999 and 2000, in which most Eastern European countries liberalized their banking sectors. Dependent variables in the regressions are a firm's total debt and the ratio of total debt to total assets. Firms from all countries are comparable in size (as measured by total assets or sales), tangibility (defined as fixed assets over total assets) and profitability (defined as EBIT over total assets). The last three columns show the average values of three dummy variables: The first one takes a value of one if the average firm size (as measured by total assets) prior to liberalization is lower than median, the second one takes a value of one if the average firm age (in years) prior to liberalization is lower than median, and the third one takes a value of one if the firm operates in an industry with a higher than median value of external dependence according to Rajan and Zingales (1998). Importantly, each dummy varies significantly within each country, so that differences between firms of different external dependence, different size, or different age cannot be attributed to differences between countries.<sup>20</sup>

### III Loan supply and financial structure

One important motive to open banking sectors is that policy makers expect an inflow of new capital through foreign banks. Foreign banks that enter emerging markets are generally multinational institutions that do not rely on domestic deposits to fund their loans. From this perspective, liberalization should result in an improved access to international capital markets and, therefore, an increase of aggregate loan supply (Beim and Calomiris 2001). However, this argument neglects potential reactions by domestic banks' to the increase in competition. We argue that only banks that operate relatively efficient are able to adapt to the new situation, for example by improving their technology and processes to counter the competitive threat. As these banks are able to compete with foreign entrants, efficiency gains and improved access to international capital markets might induce them to increase their loan supply. Banks that operate relatively inefficient, on the other hand, may fail to adapt to the new competitive environment, are likely to lose market shares and could even be driven out of the market. In this case, foreign lending would simply be a substitute for domestic lending and one would not expect a positive effect on aggregate lending within the economy. Similarly, one might expect no positive effect on aggregate lending if foreign banks enter the market by taking over domestic banks.

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<sup>20</sup>In Hungary, the liberalization event was relatively early in 1996. Amadeus does not contain information on Hungarian firms in 1995, so that we are unable to define the dummy variables for initial size and initial age.

The effect of opening the banking sector on lending in the economy might even be negative. For instance, foreign banks may be unable or unwilling to take over all of the domestic banks' customers. Literature suggests that foreign banks—who are mostly large and multinational enterprises—prefer lending to large and transparent companies that are able to provide hard information (see, e.g., Stein 2002, Berger et al. 2005, or Mian 2006). Financing to smaller companies that rely on soft information might suffer from liberalization, if domestic banks previously acting as relationship lenders are replaced by foreign entrants.<sup>21</sup>

Thus, the effect of liberalization on aggregate loan volume is a priori not obvious. The overall effect should depend on two factors: The efficiency of the domestic banking sector at the time of liberalization and the relative importance of the SME sector that depends on external financing.

### III.A Bank level evidence on loan supply

We start by documenting the reaction of individual domestic banks to liberalization. In particular, we investigate the effect of liberalization on the loan supply of these banks. We estimate the following equation:

$$\log(loans)_{ijt} = \alpha_i + \alpha_{jt} + \phi' B_{it} + \delta \cdot (initial\ ROA_i \cdot event_{jt}) + \epsilon_{ijt} \quad (1)$$

where  $i$  indexes the individual bank,  $j$  country and  $t$  time;  $\alpha_i$  are bank fixed effects and  $\alpha_{jt}$  are year-country interactions that control for year-specific shocks to certain banking markets; bank control variables are denoted by  $B_{it}$  and include the bank's market share, the ratio of equity to assets and the ratio of liquid to total assets; each bank's efficiency in the year before liberalization is measured by the bank's ROA in that year (*initial ROA*). Alternatively, we classify banks as efficient if their ROA is among the top quartile of all our sample banks (foreign and domestic) in the year before the respective liberalization event and interact the resulting dummy variable (*d(efficient bank)*) with the event variable. Finally,  $\epsilon_{ijt}$  is a random error term. To allow for correlation between observations from the same country, standard errors in all our regressions are clustered at the country level.

Results are reported in Table 2. We start with including only the event variable in Equation (1). The coefficient  $\delta_1$  is negative, but not significant (column 1). In column 2 we include the interaction between initial ROA and liberalization, which enters with a positive sign and is significant at the 1%-level. The more efficiently a domestic bank operates prior to liber-

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<sup>21</sup>In a theoretical model, Detragiache et al. (2008) show that foreign bank entry may worsen welfare if domestic banks are better at monitoring soft information customers. In the empirical part of the paper they find support for this prediction and show that there is a negative correlation between foreign bank penetration and the depth of the private credit market in poor countries. Their findings are consistent with the above argument: Foreign bank entry may increase total lending and welfare within a country, but this is not guaranteed and crucially depends on the efficiency of the domestic banking sector at liberalization.

alization, the more it increases its loan supply following the event. In column 3 we use the dummy  $d(\text{efficient bank})$  instead of the bank’s initial ROA. The negative coefficient for the event variable means that the average inefficient domestic bank decreased its loan supply following liberalization, while the positive sign for the larger interaction term indicates that the average efficient domestic bank increased its loan supply. These statistically significant effects are also economically meaningful: Inefficient domestic banks decreased their lending by 29.5 % on average, while efficient banks increased their loan supply by 64.2 % following the event. The result is robust to the inclusion of country-specific trends in column 4, year-country interactions in column 5, and time-varying bank control variables in column 6. Further robustness checks are provided in Section VI.

These bank level results suggest that the timing of liberalization has an important effect on the loan supply of domestic banks. Initially efficient domestic banks increase their lending relative to domestic banks that were inefficient at liberalization. This result is important as it suggests that the initial efficiency of domestic banks is a crucial determinant of post-liberalization financial structure.<sup>22</sup>

### III.B Country level evidence on loan supply

We now test how liberalization affects aggregate, domestic and foreign loan supply and how this outcome depends on the average initial efficiency of domestic banks prior to the event. To do so, we use the country-level measure of banking sector efficiency defined in Section II.C (see also Table 1, Panel C). Specifically, we calculate the fraction of banks (weighted by total assets) in a given market with an ROA is in the top quartile of all sample banks (domestic as well we foreign owned) in the year before liberalization and divide our sample into countries where this fraction is lower than the median and countries where it is higher than the median (see variable  $d(\text{initial ROA})$  in Panel C of Table 1). For each subsample, we estimate:

$$\log(\text{loansupply})_{jt} = \alpha_j + \alpha_t + \psi'_k C_{jt} + \delta \cdot \text{event}_{jt} + \epsilon_{jt} \quad (2)$$

where  $j$  indexes country and  $t$  time. The dependent variable is the logarithm of either aggregate, domestic or foreign loan supply;  $C_{jt}$  is a vector of macro controls and includes GDP growth, the logarithm of inflation, and the Hirschman-Herfindahl Index to control for competition within the banking sector;  $\text{event}_{jt}$  is the liberalization variable. Country and time fixed effects account for unobserved heterogeneity and are denoted by  $\alpha_j$  and  $\alpha_t$ , respectively, and  $\epsilon_{jt}$  is a random error term. As in the bank level regressions, standard errors are clustered at

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<sup>22</sup>The focus in this section is on the reaction of domestic banks, i.e., we do not account for the reaction of foreign banks and banks that were taken over by foreign banks. If banks that were taken over by foreign entrants were selected based on their efficiency this could create a potential bias to our analysis. We address this issue in Section VI. Furthermore, we look at aggregate outcomes in the next two sections, hence also incorporating lending by foreign banks and banks that were taken over by foreign banks.

the country level.

The results from the regressions are reported in Table 3. We start by investigating the effect of liberalization on aggregate loan supply and include all our sample countries in column 1. Panel A shows that on average there was no significant increase in aggregate loan supply after the market opening. This finding is remarkable: Foreign banks are expected to bring fresh capital into emerging markets, which should translate into an increase in aggregate loan supply. The insignificant coefficient for liberalization suggests that in many cases foreign lending just substitutes domestic lending. Interesting heterogeneities emerge when we divide our sample countries into those with a lower and those with a higher than median share of efficient domestic banks at liberalization. For countries with relatively inefficient domestic banks, the coefficient for liberalization is significantly negative (Panel A, column 2), while countries with relatively efficient domestic banks see the expected increase in the aggregate supply of credit (Panel A, column 3, the p-value is 0.16).

Panels B and C of Table 3 illustrate the underlying cause of this finding. As expected, all countries experience significant increases in foreign lending following the event (Table 3, Panel B). This is illustrated in Figure 2, which shows the development of foreign banks' loan supply around liberalization reforms in our sample countries. However, the increase in foreign lending translates into an even larger decrease in domestic lending in countries with relatively inefficient domestic banks at liberalization (Panel C, column 2). Domestic lending in countries with relatively efficient domestic banks, on the other hand, is not significantly affected by the event (Panel C, column 3). This heterogeneous reaction to liberalization by domestic banks in countries with differing levels of financial development is directly reflected in the development of aggregate loan supply. While foreign banks replace domestic lenders in countries with relatively inefficient domestic banks, it seems as if they do not take over all of their customers, so that aggregate lending decreases. In countries with relatively efficient domestic banks, on the other hand, foreign lending seems to be more of a complement to domestic lending. The substitution effect, if present at all, is much weaker in these countries, so that we see a modest increase in aggregate lending. In column 4 we reproduce the results of columns 2 and 3 in one regression by including an interaction between the event and a dummy variable that takes the value of one in markets with a higher than median share of efficient domestic banks.

Our findings are illustrated in Figure 3, which shows Epanechnikov kernel densities of residuals from a regression of aggregate loan supply on country and year dummies as well as the macro control variables from above. Densities are plotted for countries with an above/below median share of efficient domestic banks at liberalization before and after the event. There is a clear rightward shift for countries with relatively efficient domestic banks, while the density for countries with rather inefficient domestic banks is shifted to the left. Both shifts are statistically significant, as the the Kolmogorov-Smirnov test for the equality of distribution

functions is rejected at the 1 % level.

An interpretation of our findings is that many domestic banks are able to compete with foreign entrants in initially efficient markets. Hence, they remain active in the market and continue to serve their customers. In inefficient markets foreign lending simply replaces domestic lending and aggregate lending declines. Two reasons could explain this finding. On the one hand, it could be that foreign banks make better lending decisions than inefficient domestic banks and simply refuse to take over some of their unhealthy customers. In this case, the decline in the total volume of credit might still be accompanied by an increase in the efficiency of financial intermediation, as more efficient foreign banks are better able to channel capital into its most productive use. On the other hand, it might be that foreign banks over-engage in 'cherry-picking' their customers and also refuse to take over some of the healthy customers of the domestic banks they replace. For example, it could be that small firms who rely on relationship lending become credit-constrained after liberalization. We investigate this issue in Sections IV and V, but first we provide some direct evidence for changes in countries' financial structures (domestic vs. foreign lending).

### III.C Financial structure

We documented in Section III.B that countries with relatively inefficient domestic banking sectors experience large declines in domestic lending following the event. Thus, it is likely that the average efficiency of domestic banks at the time of liberalization affects the post-event market structure (i.e., relative market share of domestic and foreign banks). Changes in financial structure should be more pronounced in countries with less developed domestic banking sectors. To test this prediction, we regress the market share of foreign banks—which we measure as the share of foreign bank assets in all bank assets for each country—on our event variable, including country and year fixed effects as well as the vector of macro control variables from above. Additionally, we use the ratio of foreign banks to all banks within the country as a dependent variable.

Results are reported in Table 4. Columns 1 and 4 use the entire sample. As already noted in Section II.A and visualized in Figure 1, we see a significant increase in the market share of foreign banks following liberalization. Similarly, the number of foreign banks in all banks goes up when entry barriers are removed (column 4). In columns 2 and 3 we apply the same sample split as in Section III.B and run separate regressions for countries with a lower than median and those with a higher than median share of efficient domestic banks at liberalization. We see a significant increase in the market share of foreign banks in both subsamples. However, the effect is much stronger in countries with relatively inefficient domestic banks. An increase of our index by one unit implies a 23.7% increase in the foreign market share in markets with inefficient domestic banks, compared to a 9.4% increase in markets where domestic banks are



relatively efficient.

These results are expected, given our findings in Section III.B. In particular, the documented decrease in domestic lending in inefficient markets implies an additional increase in the market share of foreign banks. The differential effect is even more pronounced if we look at the ratio of foreign banks to all banks in columns 5 and 6. The coefficient for the liberalization variable in the less efficient markets has about 2.5 times the size of the coefficient for the more efficient markets. Foreign banks seem to replace domestic banks in these markets. For both the foreign market share and the foreign bank ratio, the difference between the coefficients for the inefficient and the efficient markets is significant at the 1%-level.

Taken together, our findings are in line with our previous results. In both inefficient and efficient markets liberalization increases the market share of foreign banks. In markets with more efficient banks at the time of liberalization, however, the market as a whole also grew (Table 3). Many domestic banks are able to compete with foreign entrants and remain active in the market. Hence, the ratio of foreign banks to all banks increases only slightly. On the other hand, we observe a large increase in this ratio in markets with largely inefficient domestic banks at the time of liberalization. Thus, the timing of liberalization affects financial structure.

## IV Industry evidence

Given the vital role banks play in the allocation of capital within the economy, we expect that the choice of the liberalization policy transmits to the real sector. We start by examining how liberalization affects industry output and hence economic growth. There are three reasons why we expect a positive impact in countries with relatively efficient domestic banks. First, we find a positive effect of liberalization on aggregate loan supply in these countries. A large literature following King and Levine (1993a) and King and Levine (1993b) documents that financial deepening translates into economic growth. Secondly, foreign banks in transition countries are found to be more cost efficient and provide better services than their domestic counterparts (Bonin et al. 2005a). As foreign banks took over market shares from domestic banks, this should translate into an increase in the efficiency of financial intermediation. Thirdly, stimulating competition from foreign entrants should induce relatively efficient domestic banks to improve their technology and services. Hence, the efficiency of domestic lending should also improve in financially developed countries.

In contrast, the impact in countries with relatively inefficient domestic banks is less clear cut. Although we observe a decrease in aggregate loan supply in these countries (Section III.B), the market share that is taken over by foreign banks is particularly large in countries with relatively inefficient domestic banks (Section III.C). To the extent that these foreign banks indeed improve the allocation of capital, a positive effect on industry output could be observed

also in financially less developed countries.

#### IV.A Economic growth

To investigate the effect of liberalization on industry output, we use the UNIDO data described in Section II.D. As in the loan supply regressions in Section III.B we use the dummy  $d(\text{initial } ROA)$  to split our sample into countries with a lower than median and those with a higher than median share of efficient domestic banks at liberalization and estimate the following specification for each subsample:<sup>23</sup>

$$\log(Y)_{ijt} = \alpha_{ij} + \alpha_t + \delta \cdot \text{event}_{jt} + \epsilon_{ijt} \quad (3)$$

where  $i$  indexes industry,  $j$  country and  $t$  time; the dependent variable is the logarithm of industry output. We include country-industry interactions in all regressions in order to account for any unobserved time-invariant determinants of industry performance (e.g., natural endowments, location). Time fixed effects  $\alpha_t$  control for changes in economic performance over time. As before, standard errors are clustered at the country level.

On average, industry output is not affected by the event. The coefficient for liberalization is positive but insignificant (Table 5, column 1). Thus, in line with our finding that liberalization did not have an effect on aggregate credit supply, we do not observe an effect on growth in the average industry. Next, we apply the sample split discussed above, as pooling countries with efficient and inefficient domestic banking sectors at liberalization masks cross-sectional heterogeneity.

Column 2 includes only the less efficient markets. The coefficient for the event variable is now negative and significant at the 10%-level. The negative impact on aggregate loan supply in these countries corresponds to a negative impact on output in the average industry. In column 3, we include only the more efficient countries. The coefficient for liberalization is positive and significant at the 5%-level, indicating that liberalization promotes economic growth in these countries. This finding underlines our conjecture that domestic banks need to be sufficiently developed before entry barriers are removed in order for liberalization to have a positive impact.<sup>24</sup> Column 4 shows that the difference between the two groups of countries is significant at the 1%-level.

Again, we illustrate our findings by plotting Epanechnikov kernel densities of residuals from a regression of industry output on country-industry interactions and year fixed effects. Figure 4 shows a rightward shift in the density following liberalization in countries with relatively

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<sup>23</sup>Alternatively, we use the whole sample and include an interaction between the event and  $d(\text{initial } ROA)$ .

<sup>24</sup>Bekaert et al. (2005) document that equity market liberalization increases annual real economic growth by about 1 %. In line with our findings they show that the largest growth responses occur in countries with high quality institutions.

efficient domestic banks, while residuals in countries with rather inefficient banks are shifted to the left. The Kolmogorov-Smirnov test for the equality of distribution functions indicates that both shifts are significant at the 1 % level.

## IV.B Differential effects on output

A potential problem with the analysis in the previous section is that countries that differ in the development of the domestic banking sector differ in several other dimensions that might have an influence on industry performance. While the country-industry interactions absorb any fixed differences between countries, time-varying omitted variables pose a threat to identification and might bias our results. To address this problem, we replace the year effects by year-country interactions and include an interaction between the liberalization variable and industry characteristics (i.e., an industry’s external financial dependence and an industry’s SME share) into Equation (3):

$$\log(Y)_{ijt} = \alpha_{ij} + \alpha_{jt} + \lambda \cdot \text{industry characteristic}_i \cdot \text{event}_{jt} + \epsilon_{ijt} \quad (4)$$

We start by examining whether there is a differential impact for industries that differ regarding their external dependence. The idea is that if liberalization is indeed the driving force behind our results, any effect it might have on industries should be especially relevant for those industries that are more dependent on external finance. Accordingly, any increase in the efficiency of the capital allocation process that might be induced by liberalization should be reflected in a positive sign for the interaction coefficient.

Column 1 of Table 6 shows results for our whole sample of countries. The coefficient for the interaction is positive and significant at the 1%-level. Indeed, foreign entry seems to induce an improvement in the efficiency of financial intermediation that is reflected in a more positive development of industries that are more dependent on external finance. The differential effect is economically large: According to the model, moving from the 25th percentile (0.14) to the 75th percentile (0.47) of external financial dependence corresponds to a 16.1 % larger increase in industry output following liberalization in our average sample country (see last line of Table 6). Given our results until now, it is somewhat surprising that the interaction is also positive for countries with a lower than median share of efficient domestic banks at liberalization (column 2). Even though output in the average industry is negatively affected in these countries, those industries that rely on external finance the most have relatively higher output following the event. Although aggregate lending declines in these economies, foreign banks seem to improve the efficiency of capital allocation and lend to more productive firms on average. In other words: Not the quantity, but the average quality of lending increases in these countries.

As mentioned above, the literature suggests that large and multinational foreign banks prefer lending to large and transparent companies, while small firms typically have problems in obtaining loans from them (Stein 2002, Berger et al. 2005, Mian 2006). Consequently, small firms might become credit constrained if foreign banks replace domestic banks previously acting as relationship lenders. This effect should be particularly relevant in markets that are characterized by a low share of efficient domestic banks. On the other hand, Beck et al. (2008) show that small-firm industries grow disproportionately faster in countries with well-developed financial systems. The basic argument is that more efficient financial intermediation reduces informational problems and the need for collateral. Consequently, small firms that are informationally opaque and rely more on intangible assets than large firms disproportionately benefit from financial development. We argue that liberalization increases the efficiency of financial intermediation, particularly in countries with sufficiently developed domestic banking sectors. Hence, liberalization could affect small-firm industries in a positive way. Overall, we expect a negative impact on small firm industries in countries with less developed domestic banks, while the effect should be rather positive in countries with more efficient banking sectors.

Columns 4-6 of Table 6 show results for the regressions using the *SME share* as an industry characteristic. If we include all sample countries in column 4, the coefficient for the interaction between an industry's SME share and liberalization is insignificant and very close to zero. Thus, in the average country, the effect of liberalization for industries with high shares of SMEs is not different from the effect for the average industry. However, we uncover interesting heterogeneities as we split the sample into countries with a lower than median and countries with a higher than median share of efficient domestic banks at liberalization.

The coefficient for the interaction term is negative and significant at the 1%-level in countries with rather inefficient domestic banks. This result is consistent with our previous findings. These markets are characterized by large drops in domestic lending following the event. Since the foreign banks who replace domestic lenders mostly rely on hard information, SMEs are unable to obtain the same level of funding in the post liberalization period. The reduction in funding opportunities translates into lower output for these firms. Interestingly, one cannot observe a similar effect in countries with rather efficient domestic banks. On the contrary, small-firm industries seem to disproportionately benefit from the improvement in financial intermediation that liberalization fosters in these countries (column 6). Better screening and monitoring devices on the part of banks help these firms to overcome financial constraints, a finding that is in line with the results of Beck et al. (2008).

Our results suggest that liberalization indeed increases the efficiency of financial intermediation and hence has a positive impact on industry growth rates within the liberalizing country. This is unambiguously true if domestic banks are sufficiently developed at the time of liberalization, so that they are able to compete with foreign entrants. If this is not the

case, particularly small and opaque firms might be harmed by liberalization, as they lose the domestic relationship lenders they need in order to obtain funding. Section V provides further evidence on the firm level regarding this issue.

#### IV.C Differential impact on industry volatility

We conclude the industry section with some evidence on the effect of liberalization on output volatility. Evidence on whether liberalization increases or decreases volatility of industrial production is mixed. While Morgan et al. (2004) show that the allowance of interstate banking reduced economic growth volatility within U.S. states, Morgan and Strahan (2004) cannot confirm their finding in a study using international data for nearly 100 countries in the 1990s.<sup>25</sup> If anything, their results suggest that a larger foreign bank presence in non-industrial countries is associated with more, not less, volatility. Regarding equity market liberalization, Bekaert et al. (2006) show that liberalization did not—as often claimed—increase consumption growth volatility. Instead, they find a significant decrease in volatility for many countries. However, they conclude that volatility may not decrease or even increase in countries that have a poorly developed financial sector.

To investigate the impact of bank liberalization on the volatility of industrial production, we use an econometric framework similar to the one developed by Morgan et al. (2004). Specifically, we estimate regressions of the following structure:

$$Fluctuation_{ijt} = \alpha_{ij} + \alpha_t + \delta_1 \cdot event_{jt} + \epsilon_{ijt} \quad (5)$$

where  $i$  indexes industry,  $j$  country and  $t$  time. Country-industry interactions and time fixed effects are represented by  $\alpha_{ij}$  and  $\alpha_t$ ,  $\epsilon_{ijt}$  is a random error term.  $Fluctuation_{ijt}$  equals the absolute deviation from conditional mean growth in industry output. Specifically, it is equal to the absolute values of the residuals from a regression of country-industry growth rates on a full set of country-industry interactions and year fixed effects:

$$Growth_{ijt} = \alpha_{ij} + \alpha_t + u_{ijt}, \quad (6)$$

and,

$$Fluctuation_{ijt} = |u_{ijt}|. \quad (7)$$

Hence, the fluctuation in economic growth for a given country-industry-year can be interpreted as the size of the deviation from average growth for that country-industry over our sample period and from average growth for all country-industries in that year.

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<sup>25</sup>Morgan et al. (2004) examine fluctuations in state gross product, employment or personal income within U.S. states, while Morgan and Strahan (2004) focus on volatility in real GDP and real investment growth.

Table 7 provides results for the estimation of Equation (5). In column 1 we include all sample countries. The coefficient for liberalization is positive but insignificant, indicating that the event did not affect economic volatility in our average sample country. Again, we uncover interesting heterogeneities if we divide our sample into countries with a lower than median and countries with a higher than median share of efficient domestic banks at liberalization. Volatility in economic production increases in countries that have mostly inefficient domestic banks (column 2). As foreign banks took over large shares of the market in these countries, this result is in line with arguments that point at possible withdrawals of funds by foreign banks at economic downturns.

In contrast, we document significantly lower volatility in countries with rather efficient domestic banking sectors at liberalization (column 3). Bank liberalization seems to stabilize the economy if the domestic banking sector is sufficiently developed. Column 4 shows that the difference between the two groups of countries is significant at the 1%-level. The more efficient domestic banks are at liberalization, the more stable the economy after the event. Overall, results in this section complement the equity market liberalization results of Bekaert et al. (2006) and confirm our previous finding that only countries that have a well functioning domestic financial sector are able to leverage the maximum benefits from liberalization.

## V Firm evidence

In this section, we extend our analysis by presenting firm level evidence for a subsample of eight Eastern European countries.

### V.A Debt taking

We start by estimating the general effect of liberalization on firm debt taking in the Eastern European countries. Specifically, we estimate the following equation:

$$\log(debt)_{ijt} = \alpha_i + \alpha_t + \theta' F_{it} + \delta \cdot event_{jt} + \epsilon_{ijt} \quad (8)$$

where  $i$  denotes the individual firm,  $j$  denotes country and  $t$  time. The dependent variable is the logarithm of total debt or, alternatively, the debt to asset ratio. Firm and time fixed effects ( $\alpha_i$  and  $\alpha_t$ ) account for unobserved heterogeneity. Additionally we include the logarithm of total sales, the firm's ROA (EBIT/Assets) and a measure of tangibility (tangible assets over total assets) as time-varying firm control variables. Finally, the model includes our liberalization variable from above, as well as a random error term  $\epsilon_{ijt}$ . As before, standard errors are clustered at the country level.

Column 1 of Table 8 provides results for this specification. It can be seen that on average

firms had lower debt following liberalization. Similarly, the debt to asset ratio decreased on average following the reform (column 6). We expect this result to be driven by markets with rather inefficient domestic banks, hence we include an interaction between the event variable and the dummy  $d(\text{initial ROA})$  defined in Section II.C. Indeed, the interaction is significantly positive in both cases: The reduction in average lending and the average debt to asset ratio is much stronger in markets with relatively inefficient domestic banks, which is the expected result given our findings in previous sections (columns 2 and 7). As shown in Table A.1 in the Appendix these results are robust to the inclusion of industry-year interactions and the use of the ratio of debt to pre-liberalization assets as a dependent variable.

## V.B Differential impact on firms

We proceed by investigating whether liberalization had a differential impact on firms in our sample countries. Specifically, we extend Equation (8) in the following way:

$$\begin{aligned} \log(\text{debt})_{ijt} &= \alpha_i + \alpha_t + \theta' F_{it} + \delta \cdot \text{event}_{jt} \\ &+ \eta \cdot \text{event}_{jt} \cdot d(\text{initial ROA})_j \\ &+ \kappa \cdot \text{event}_{jt} \cdot \text{firm characteristic}_i \\ &+ \nu \cdot \text{event}_{jt} \cdot d(\text{initial ROA})_j \cdot \text{firm characteristic}_i + \epsilon_{ijt} \end{aligned} \quad (9)$$

In addition to the event variable and its interaction with the dummy  $d(\text{initial ROA})$ , we include an interaction between liberalization and one of three dummy variables: The first dummy takes a value of one for firms in industries that have a higher than median value of external dependence according to Rajan and Zingales (1998); the second takes equals one if the average firm size (as measured by total assets) prior to the event is above median; and the third is equal to one if the firm is younger than median prior to the liberalization event. To make the equation complete, we also include a triple interaction between the event, the efficiency dummy and the firm characteristic. It should be noted that the coefficients for efficiency and the firm characteristics as well as the interaction between the two are absorbed by the firm fixed effects.

We start with the results for external dependence. The positive coefficient for the triple interaction in column 3 of Table 8 indicates that financially dependent firms are able to obtain relatively more debt in markets with efficient domestic banks as compared to markets with inefficient domestic banks. Firms in these countries benefit from a better capital allocation process and do not suffer from the reduction in aggregate lending that we observe in inefficient markets.<sup>26</sup> This results is robust to the use of the debt to assets ratio instead of the logarithm

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<sup>26</sup>In the output growth regressions in Section IV.B the interaction between liberalization was positive also for countries with inefficient domestic banks, which indicates that—in line with an increase in the efficiency of

of total debt as a dependent variable (column 8).

Next, we investigate the role of firm size in columns 4 and 9 of Table 8.<sup>27</sup> The triple interaction is positive and significant in both cases, indicating that smaller firms are relatively better off in markets with efficient domestic banks. While both large and small firms are better off in efficient markets, the effect is particularly pronounced for the latter, indicating that large firms are able to obtain funding in both types of markets, while small firms depend on their domestic relationship lenders and become credit constrained if these lenders are driven out of the market in countries with initially inefficient domestic banks.

As an alternative to firm size, we use firm age as a measure of opaqueness in columns 5 and 10 of Table 8. Results are qualitatively very similar; the positive coefficient for the triple interaction shows that younger firms are relatively better off in countries with relatively efficient domestic banks at liberalization.<sup>28</sup> Overall, the results on the firm level confirm our previous results on the bank and the industry level. Only countries with a sufficiently developed banking sector are able to leverage the maximum benefits from liberalization. If domestic banks are unable to compete with foreign entrants, they might be driven out of the market and especially small and opaque firms might become credit constrained.

## VI Robustness checks

### VI.A Selection concerns

In this section we undertake several checks to assess the robustness of our findings. First, we consider the issue that is introduced if we exclude banks from the analysis that were taken over by foreign banks during our sample period. If banks that were taken over by foreign entrants are selected based on their efficiency this could create a potential bias to our analysis. On the one hand, foreign banks might ‘cherry pick’ especially efficient banks for takeovers. On the other hand, mostly state owned banks were sold by governments to foreign banks. These banks are likely to operate inefficiently (see e.g. Bonin et al. 2005b).

In order to test whether banks that were taken over were selected based on their efficiency, we estimate a probit model. The dependent variable *Takeover* is a dummy that takes the value of one if a bank was taken over by a foreign bank during the sample period and the value of zero otherwise. Explanatory variables are the ROA, the cost to income ratio, and the cost financial intermediation—those firms that are able to obtain funding following the event are more productive on average.

<sup>27</sup>The sample for these regressions is smaller as we can only include firms for which we have estimates for initial size (or age), i.e., firms for which we have balance sheet information in the year before liberalization. However, sample selection does not affect our results: Results for the first three columns are very similar on the restricted sample and are available from the authors upon request.

<sup>28</sup>Again, results for the ratio of debt to pre-event assets are provided in Table A.1 in the Appendix.



to asset ratio together with further bank characteristics. Table A.2 shows that banks that were taken over were not selected based on their efficiency or performance. Columns 1-3 include all bank-year observations, in columns 4-6 we collapse the data on the bank level. Neither the bank's ROA, nor the cost to income or the cost to asset ratio seem to have an impact on the probability with which a domestic bank is taken over by foreign entrants. Nevertheless, we find that foreign banks took over larger banks and more liquid banks on average.

Next, we investigate whether our results are driven by the mode of entry chosen by foreign banks. We already showed that takeover banks were not selected based on their efficiency or performance. Nevertheless it could be that domestic banks in markets where foreign banks entered mostly by taking over domestic banks are affected differently than domestic banks in markets where foreign banks entered via greenfield investments. To test this, we calculate the share of domestic banks that were taken over by foreign banks in each market and divide our sample into the countries where this share is lower than median and countries where it is higher than median. Columns 1 and 2 of Table A.3 show that the differential effect for banks of differing levels of efficiency is present in both subsamples. Hence, the efficiency of domestic banks at liberalization seems to be more important than the mode of entry chosen by foreign banks.

## VI.B Endogeneity concerns regarding our event

Another issue concerns the potential endogeneity of liberalization reforms. It could be that countries opened their banking sectors when growth prospects were good and the need for capital was high. Alternatively, it could be that countries were forced to open their banking sectors when they had crises in their domestic banking markets. In both cases, liberalization would not actually be causal for the documented effects on loan supply and industry output. Our identification strategy in all sections took these issues into account, as we documented differential effects for banks of varying degrees of initial efficiency or industries and firms with varying degrees of external financial dependence. Political processes and external pressures applied by the IMF or the World Bank should also help to mitigate these concerns.

In column 3 of Table A.3 we re-estimate Equation 1 and include the vector of macro control variables from the country-level regressions. While the sample size is significantly reduced, the coefficient for the interaction between liberalization and the initial efficiency remains significantly positive. To further address reverse causality issues, we study the dynamic effects of liberalization reforms on the loan supply of domestic banks. In columns 4 and 5 of Table A.3 we replace the liberalization index with four variables:  $Before_0$  takes the value of the *event* variable in the reform year and the pre-reform value of the *event* variable in all other years.  $Before_1$  is equal to  $Before_0$  forwarded by one year, and  $After_1$  is equal to  $Before_0$  lagged by one year. Finally,  $After_2$  is equal to the *event* variable lagged by two years. If

the liberalization reforms were endogenous to the development within the domestic banking sector, we should see significant changes in the lending behavior of domestic banks prior to the reform. Table A.3 shows that this is not the case: The coefficient for  $Before_1$  is insignificant for both inefficient (column 4) and efficient (column 5) domestic banks.<sup>29</sup> Hence, the decision to liberalize was not driven by current developments in the domestic banking sector. This assuages any remaining concerns of biases driven by endogeneity.

### VI.C Concerns regarding alternative events

We also control for other reforms that took place in our sample countries that might have an influence on our results. We include indices for creditor rights and capital account liberalization that are obtained from papers by Djankov et al. (2007) and Abiad et al. (2010), respectively. Column 6 of Table A.3 provides estimation results for the bank-year observations where both indices are available. As expected, the coefficient for creditor rights is positive and significant at the 1%-level. Improvements in the protection of creditors induce an increase in the individual bank's supply of credit. In contrast, capital account liberalization does not have an influence on the loan supply of the average domestic bank, as indicated by the negative but insignificant coefficient. Importantly, the inclusion of the two indices does not affect our results on the efficiency of domestic banks, the interaction remains significant at the 1%-level.

### VI.D Concerns regarding our efficiency classification domestic banking markets

A potential concern using ROA as a measure for bank efficiency could be that this measure is influenced by market competition. I.e., banks operating in markets that are highly regulated and therefore not competitive, earn a higher margin and, therefore, a higher ROA. As a final robustness check we use alternative criteria to classify banks prior to liberalization. As shown in Table 1, Panel C, we obtain two variables from the World Bank's Global Financial Development Database: The aggregate cost-to-income ratio and the non-performing loan (NPL) ratio of each banking sector of our sample countries. We use the values of these variables in the year before liberalization in the respective country and split our sample into countries with a higher than median cost-to-income ratio or NPL ratio and those with a lower than median ratio.

Results for the country-level regressions with these alternative classification criteria are presented in Table A.4. Panel A shows that changes in financial structure are more pronounced in countries with a relatively high cost-to-income ratio, i.e., countries where the banking is rather inefficient at the time of liberalization. While aggregate lending evolves similarly in both

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<sup>29</sup>As before we define a bank as initially efficient if it has an ROA in the top quartile of all banks in our sample in the year prior to liberalization.

groups of countries (columns 1 and 2), those with a higher cost-to-income ratio see a greater decline in domestic lending (columns 3 and 4), and—correspondingly—a greater increase in the foreign market share (columns 5 and 6). In Panel B we use the aggregate non-performing loans ratio as a classification criterion. Again, we find that changes in financial structure are more pronounced in countries with rather inefficient banks at liberalization, i.e., countries where the non-performing loans ratio is relatively high. These countries see a much greater decline in domestic lending following the event, which translates into a higher increase in the foreign market share.

## VII Related Literature and Discussion

### VII.A Related Literature

Our paper connects to a large literature that debates the effect of financial liberalization on economic outcomes and presents a mixed set of results (see for a summary Beim and Calomiris 2001). Overall, there seems to be a trade-off between positive economic outcomes and instability associated with financial liberalization. The benign view of bank liberalization is that foreign bank entry improves the functioning of credit markets and this in turn promotes economic growth (e.g., Levine 1996, Levine 2001). This could be for several reasons. First, if domestic firms are financially constrained, which is likely to be the case in emerging and transition economies, entry of foreign banks relaxes financial constraints—a pure supply effect—and this promotes growth. Second, to the extent that foreign banks are more efficient in disbursing capital—due to superior screening and monitoring technology—their entry may lower the cost of providing funds, and improve the allocative efficiency of capital. This in turn promotes growth. Finally, entry of foreign banks may generate positive spill-over effects on existing domestic banks and this may again increase the efficiency of the banking system.<sup>30</sup>

There is, however, a malign view of financial liberalization as well. Some scholars (Vives 2001) have expressed strong concerns that allowing foreign bank entrance may increase the fragility of the banking sector and this may in turn hurt growth. Stiglitz (1994) discusses potential costs for domestic banks and local entrepreneurs as a consequence of foreign bank entrance (see also Aghion et al. 2004), whereas Stiglitz (2000) argues that hastily financial liberalization was one of the major causes of financial and economic instabilities in East Asia and

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<sup>30</sup>These arguments go back to the original work of McKinnon (1973), Shaw (1973). Several empirical studies have analyzed this bright side view of opening banking markets. On a positive note, there is evidence that tighter regulations on bank entry increases the cost of financial intermediation (Demirguc-Kunt et al. 2004) and are associated with lower efficiency of the banks (Barth et al. 2004). Similarly, bank branch deregulation in the U.S. improved the efficiency of financial intermediation (Jayaratne and Strahan 1998, promoted economic growth (Jayaratne and Strahan 1996) and had a positive impact on the creation of new incorporations (Black and Strahan 2002).

Latin America at the end of the last century.<sup>31</sup> Another channel through which foreign bank entry may reduce welfare is pointed out by Detragiache et al. (2008), who argue that foreign bank entry may hurt certain soft information borrowers and thus reduce welfare. Essentially, cream skimming of hard information borrowers leads to credit rationing of soft information borrowers (see also Sengupta 2007). We rationalize the differences between the two streams by arguing and showing that liberalization of banking markets has differential effects that depend on the efficiency of the domestic banks.

Empirically, equity market liberalization indeed seems to foster economic growth (Bekaert and Harvey 2004) and to reduce consumption growth volatility (Bekaert et al. 2006). Similarly, bank branch deregulation in the U.S. had a positive impact on output growth (Jayaratne and Strahan 1996) and the creation of new incorporations (Black and Strahan 2002) and decreased economic volatility (Morgan et al. 2004). However, there is also evidence that suggests increased instability following liberalization. Morgan and Strahan (2004) use international data from almost 100 countries and conclude that at least for non-industrial countries greater bank integration is associated with higher volatility. Moreover, several countries experienced banking sector crises shortly after the financial sector was deregulated, suggesting that indeed there is some connection between liberalization and financial fragility (Demirguc-Kunt and Detragiache 1999, Kaminsky and Reinhart 1999).<sup>32</sup>

Several papers empirically examine the impact of foreign bank entry on the efficiency of financial intermediation (Berger et al. 2000, Claessens et al. 2001, Dages et al. 2005, Degryse et al. 2012, Giannetti and Ongena 2012). Bonin et al. (2005a) provide evidence that banks with a strategic foreign owner in 11 Eastern European transition countries provide better services and are more cost efficient than private domestic or government banks. Potential spillover effects on domestic banks are documented by Claessens et al. (2001), who find that foreign entry improves the efficiency of domestic financial institutions (see also Unite and Sullivan 2003). The effect of foreign entry on firms' access to finance is subject to debate. For example, while Clarke et al. (2006) find that all companies—including small and medium ones—report lower financing constraints with greater foreign bank participation in a sample of 35 emerging markets, Gormley (2010) shows for India that only a small set of very profitable firms benefited from foreign entry while the average firm is less likely to have a loan.<sup>33</sup> Other papers investigate whether increased foreign ownership in the banking sector has real effects for the economy. While Bruno and Hauswald (2009) find that foreign banks seem to relax

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<sup>31</sup>There is also a trade liberalization literature that cautions against the benefits of liberalization and stresses the importance of domestic institutions in fostering growth, e.g. Rodriguez and Rodrik (2000) express reservations against the bright side view of liberalization and assert that contrary to expectations, liberalization may be detrimental to growth.

<sup>32</sup>For the crisis of 2008/2009, Cull and Martinez Peria (2012) document that foreign banks in Eastern Europe reduced their lending more than domestic banks, while there is no such pattern in Latin America.

<sup>33</sup>Several other papers examine the impact of foreign ownership on bank lending and lending conditions, see e.g. De Haas and Van Lelyveld (2011), Jeon et al. (2011), Claeys and Hainz (2013).

financial constraints and hence promote economic growth, evidence from other studies (Berger et al. 2001, Mian 2006, Detragiache et al. 2008, Giannetti and Ongena 2009) suggests that these benefits materialize only for large and transparent companies. Our paper adds to this literature as it sheds lights on the exact relationship between foreign bank entry, the development of the domestic banking sector, economic growth and industry structure, thus helping to explain the controversial findings mentioned above.

Our paper is also related to literature following Lucas (1990) famous article on why we do not observe capital flows from developed countries to emerging markets, although emerging markets have lower levels of capital per worker and hence a higher marginal product of capital. Gourinchas and Jeanne (2013) document an interesting feature of this puzzle: They show that foreign capital does not even flow to those emerging markets that have grown fastest in the past and hence revealed their high marginal productivity. But a poor country's inability to obtain foreign financing does not seem to hurt its growth prospects: Bosworth and Collins (1999) find that nonindustrial countries that relied less on foreign capital grew faster over the period 1970–2004. Similarly, Prasad et al. (2007) show that, among nonindustrial countries with high rates of investment, those that relied less on foreign capital grew faster than those that relied more on foreign capital. As an explanation for this finding they suggest that nonindustrial countries do not have corporations or financial systems to channel the arm's-length foreign capital into its most productive uses. We provide evidence from bank liberalization that is supportive of their claim that countries with underdeveloped financial sectors are unlikely to be able to use foreign capital to finance growth.

Finally, our paper also connects to the industrial organization literature that documents how the removal of entry barriers affects incumbent firms. Several papers show that the removal of entry barriers has more positive effects on economic performance of firms operating close to the world technology frontier (Aghion et al. 2005, Aghion and Bessonova 2006, Aghion et al. 2009). The argument is that the competitive threat provides incentives to these firms to invest and innovate, thus boosting their efficiency. In contrast, firms far away from the frontier have no chance to compete with foreign entrants and hence lower incentives to innovate as the additional competition lowers their returns on investment. While the above papers examine trade liberalization and competition in product markets, we document a similar effect for domestic banks following financial liberalization.

## **VII.B Conclusion**

This paper argues that the nature of financial structure (supply of financing) impacts the industry structure through its influence on the allocation of credit to firms within industries. We exploit the variation in the efficiency of the domestic banking sector at the time of liberalization across 26 emerging economies to identify large changes in the nature of the supply of financing

in an economy. Following liberalization there is an increase in the aggregate supply of credit in countries with relatively efficient domestic banks. In markets with relatively inefficient banks, foreign lending largely crowds out domestic lending. There is a higher growth rate and lower growth volatility for industry sectors in markets with relatively more efficient domestic banks following liberalization. These results are driven by industries that are more reliant on external financing and by smaller firms in economies with more efficient domestic banks at the time of liberalization. To the contrary, in particular smaller firms are negatively affected in countries with relatively inefficient domestic banks, resulting in a negative impact on growth and volatility for the average industry in these countries. Thus, the timing of liberalization of credit markets interacts with the efficiency of the incumbent domestic banking sector which has implications on the allocation of credit and economic growth.

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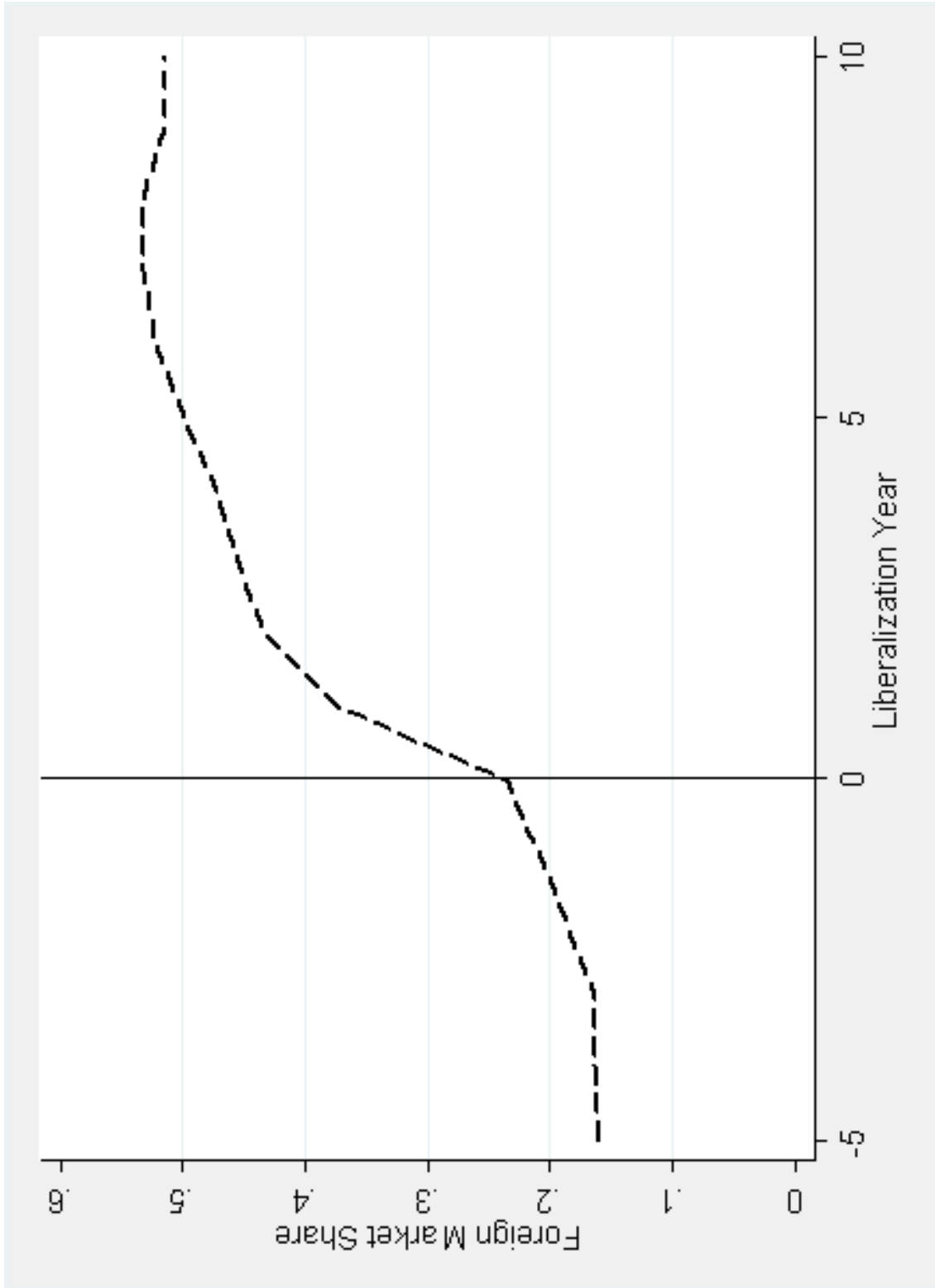


Figure 1: Impact of liberalization on financial structure. The figure align countries around their respective liberalization event (indicated by the vertical line) and shows the development of foreign banks' market share in the average sample country.

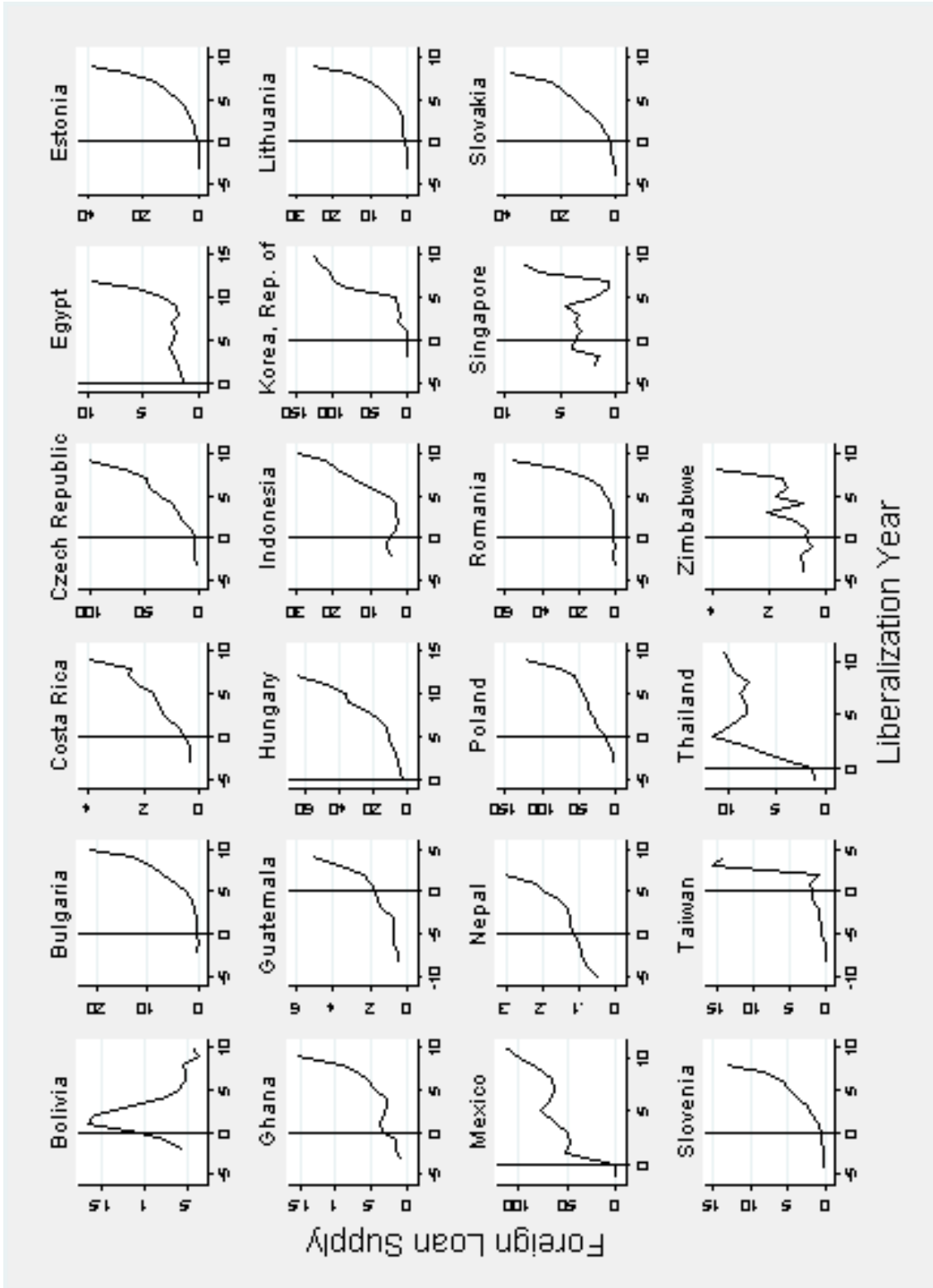


Figure 2: Impact of liberalization on foreign loan supply. The figure shows the development of foreign banks' loan supply within our sample countries around the liberalization events (indicated by the vertical lines). All values are in billion of U.S. dollars.

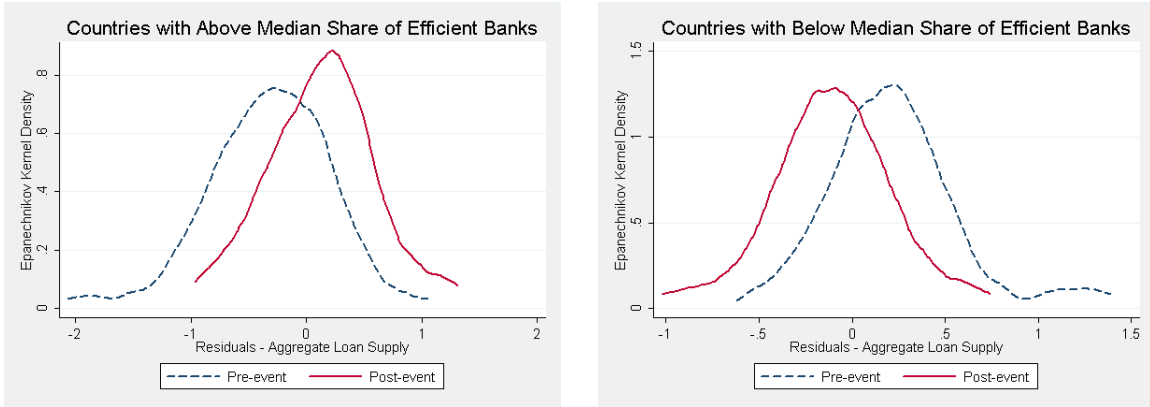


Figure 3: Aggregate loan supply. The figure plots Epanechnikov kernel densities of residuals from an estimation of the following equation:  $\log(loansupply)_{jt} = \alpha_j + \alpha_t + \psi'_k C_{jt} + \epsilon_{jt}$ , where  $\log(loansupply)_{jt}$  is the logarithm of aggregate lending within a country-year,  $\alpha_j$  and  $\alpha_t$  are country and time fixed effects, respectively, and  $C_{jt}$  is a vector of macro control variables that includes GDP growth, inflation and the Hirschman-Herfindahl Index. The left panel shows countries with a higher than median share of efficient domestic banks at liberalization, and the right panel shows countries with a lower than median share.

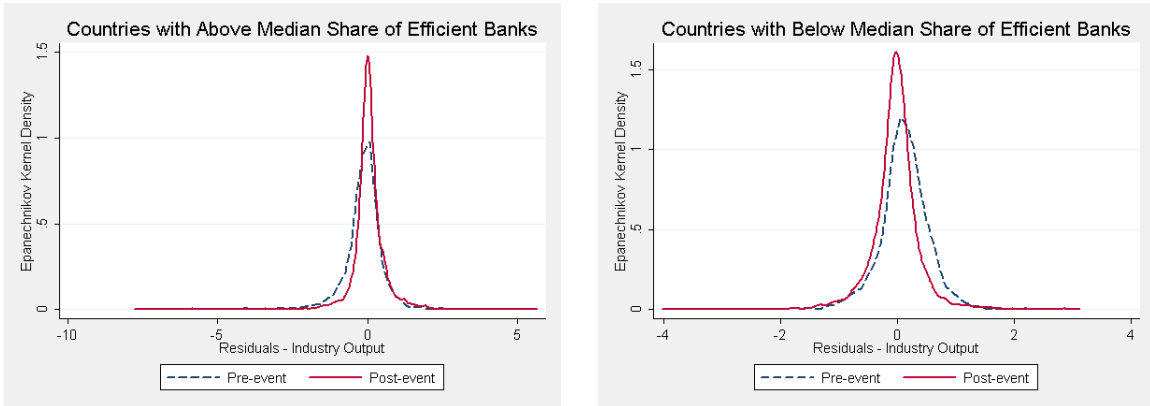


Figure 4: Industry output. The figure plots Epanechnikov kernel densities of residuals from an estimation of the following equation:  $\log(Y)_{ijt} = \alpha_{ij} + \alpha_t + \epsilon_{ijt}$ , where  $\log(Y)_{ijt}$  is the logarithm of country-industry output in a certain year, and  $\alpha_{ij}$  and  $\alpha_t$  are country-industry and time fixed effects, respectively. The left panel shows countries with a higher than median share of efficient domestic banks at liberalization, and the right panel shows countries with a lower than median share.

Table 1: Descriptive statistics

Panel A: Sample countries and liberalization events				
	Event Year	Index Value	Description	Source
Bolivia	1998	1→2	limitation of voting power of majority shareholders of foreign banks eliminated	Abiad/Mody
Brazil	—	1	—	Abiad/Mody
Bulgaria	1998	1→2	privatization process of former state-owned banks with particular focus on foreign investors	Miller/Petranov
Costa Rica	1999	0→1	establishment of fully-owned foreign subsidiaries allowed; establishment of branches of foreign banks still forbidden	Abiad/Mody
Czech Republic	1999	1→2	privatization process of government banks; large stakes sold to foreign banks	Bekaert/Harvey
Egypt	1996	1→2	49% limit on foreign investors' share in joint-venture banks removed	Abiad/Mody
Estonia	1999	1→2	consolidation of the banking market, large stakes of former state-owned banks sold to foreign investors	Bekaert/Harvey
Ghana	1999	1→2	majority foreign ownership of banks allowed	Abiad/Mody
Guatemala	2004	0→1	foreign banks allowed to establish local subsidiaries subject to the conditions of the Monetary Board	Abiad/Mody
Hungary	1996	1→2	foreign investors in the banking sector granted treatment equivalent to that given domestic financial institutions	Bekaert/Harvey
India	—	1	—	Abiad/Mody
Indonesia	1998	1→2	controls on foreign bank branching lifted, up to 85% equity participation allowed	Abiad/Mody
South Korea	1998	1→2	banks being restructured exempted from foreign ownership restrictions	Abiad/Mody
Lithuania	1999	1→2	removal of restrictions on foreign investment	Bekaert/Harvey
Malaysia	—	1	—	Abiad/Mody
Mexico	1997	1→2	removal of all restrictions on foreign bank entry	Hernandez-Murillo
Nepal	2001	1→2	limit on foreign ownership of banks increased from 49% to 66%	Abiad/Mody
Pakistan	—	1	—	Abiad/Mody
Poland	1999	1→2	national treatment for financial institutions from OECD member countries; removal of restrictions on purchase of bigger stock blocks by foreign investors	Bekaert/Harvey
Romania	1999	1→2	all credit operations extended by nonresidents to residents with a maturity exceeding one year were liberalized; privatization of former state-owned banks with focus on foreign investors	Bekaert/Harvey
Singapore	1999	1→2	40% limit on foreign investors total shareholding in local banks lifted	Abiad/Mody
Slovakia	2000	1→2	branches of foreign financial institutions allowed to acquire real estate to operate their business	Bekaert/Harvey
Slovenia	2000	1→2	relaxation of rules on foreign investment; foreign banks allowed to open branches	Bekaert/Harvey
Taiwan	2003	1→2	banking restrictions relaxed to make it easier for foreign banks to set up branches; foreign banks are accorded national treatment to enable them to compete with domestic banks on an equal footing	Abiad/Mody
Thailand	1997	1→2	limits of 25 % of equity participation of banks by nonresidents raised to 100% based on case-by-case approach of the MOF's approval	Abiad/Mody
Zimbabwe	2000,2002	0→1→2	entry criteria objectified by the Banking Act amendment	Abiad/Mody



Table 1 continued...

Panel B: Bankscope data										
Country	Banks	Observations	Total assets	Total loans	Market share	ROA	Equity Total assets	Liquid assets Total assets		
Bolivia	10	90	348	221	0.098	0.22	0.11	0.16		
Brazil	78	581	4,086	1,381	0.014	2.13	0.34	0.22		
Bulgaria	9	76	504	261	0.017	1.86	0.44	0.17		
Costa Rica	25	182	311	174	0.054	2.34	0.16	0.21		
Czech Republic	15	85	3,755	1,604	0.050	-0.28	0.36	0.10		
Egypt	19	201	2,945	1,292	0.053	1.11	0.32	0.09		
Estonia	7	27	1,964	1,431	0.072	1.58	0.26	0.13		
Ghana	6	56	169	68	0.079	3.36	0.44	0.14		
Guatemala	22	251	283	140	0.026	-0.64	0.18	0.10		
Hungary	7	53	2,106	1,257	0.080	0.87	0.3	0.13		
India	63	740	5,448	2,620	0.017	0.83	0.19	0.07		
Indonesia	61	336	1,820	841	0.021	-0.25	0.31	0.11		
Korea Rep. of	29	226	30,695	19,260	0.047	0.01	0.11	0.05		
Lithuania	6	40	949	621	0.067	-0.30	0.3	0.14		
Malaysia	25	200	6,369	3,850	0.050	1.09	0.27	0.10		
Mexico	14	87	4,871	2,888	0.027	0.23	0.28	0.22		
Nepal	7	78	168	79	0.092	1.39	0.27	0.07		
Pakistan	17	192	1,723	848	0.048	0.60	0.26	0.09		
Poland	17	124	2,800	1,376	0.024	1.25	0.22	0.14		
Romania	8	56	1,227	605	0.063	0.63	0.43	0.17		
Singapore	16	119	14,851	7,368	0.103	1.40	0.24	0.20		
Slovakia	6	27	1,906	829	0.019	0.37	0.37	0.10		
Slovenia	15	148	1,321	738	0.066	1.01	0.25	0.13		
Taiwan	44	487	17,080	9,672	0.023	0.38	0.15	0.10		
Thailand	9	90	9,763	6,531	0.093	-0.92	0.13	0.11		
Zimbabwe	7	52	663	225	0.080	7.12	0.25	0.11		

Table 1 continued...

Country	Initial ROA	d(initial ROA)	Initial cost to income ratio	Initial NPL ratio	Herfindahl index	Log(inflation)	GDP growth
Bolivia	0.00	0	0.66	0.05	0.13	1.75	3.62
Brazil	0.22	1	0.76	0.10	0.08	2.23	2.97
Bulgaria	0.36	1	0.69	0.27	0.14	2.78	3.47
Costa Rica	0.06	1	0.77	0.03	0.17	2.59	5.07
Czech Republic	0.01	0	0.67	0.22	0.16	1.57	3.47
Egypt	0.08	1	0.54	0.14	0.14	1.86	4.79
Estonia	0.95	1	0.81	0.02	0.46	1.97	7.32
Ghana	1.00	1	0.38	0.13	0.20	3.07	4.91
Guatemala	0.04	0	0.73	0.07	0.09	2.13	3.97
Hungary	0.03	0	0.61	0.05	0.14	2.34	3.76
India	0.02	0	0.60	0.14	0.08	1.92	6.99
Indonesia	0.01	0	0.88	0.49	0.10	2.43	3.76
Korea Rep. of	0.00	0	1.13	0.07	0.10	1.48	4.98
Lithuania	0.06	1	0.76	0.13	0.25	0.91	6.34
Malaysia	0.00	0	0.37	0.19	0.10	1.26	5.46
Mexico	0.08	1	0.73	0.11	0.16	2.34	2.97
Nepal	0.50	1	0.37	—	0.17	1.87	3.94
Pakistan	0.02	0	1.40	0.20	0.14	2.01	4.48
Poland	0.07	1	0.66	0.13	0.10	1.90	4.81
Romania	0.51	1	0.46	0.08	0.19	3.25	3.36
Singapore	0.00	0	0.35	0.05	0.24	0.64	6.57
Slovakia	0.00	0	0.70	0.14	0.17	1.99	5.31
Slovenia	0.05	1	0.53	0.07	0.19	1.98	4.35
Taiwan	0.01	0	—	—	0.06	0.74	4.79
Thailand	0.02	0	0.49	0.43	0.13	1.39	3.70
Zimbabwe	0.17	1	0.32	—	0.26	4.98	-2.65

Table 1 continued...

Panel D: List of ISIC Rev. 3 industries and corresponding characteristics

ISIC Sector	External Dependence	SME Share	ISIC Sector	External Dependence	SME Share
151 Meat, fish, fruits, vegetables	0.14	0.0382	261 Glass and glass products	0.53	0.0505
152 Dairy products	0.14	0.0382	269 Non-metallic mineral products	0.06	0.1417
153 Grain mill products, starches, animal feeds	0.14	0.0382	271 Basic iron and steel	0.09	0.0162
154 Other food products	0.14	0.0382	272 Basic non-ferrous metals	0.01	0.0476
155 Beverages	0.08	0.0404	281 Structured metal products	0.24	0.0998
160 Tobacco products	-0.45	0.0030	289 Other metal products	0.24	0.0998
171 Spinning, weaving, finishing of textiles	0.4	0.0281	291 General purpose machinery	0.45	0.1368
172 Other textiles	0.4	0.0281	292 Special purpose machinery	0.45	0.1368
173 Knitted and crocheted fabrics	0.4	0.0281	300 Office, accounting, computing machinery	1.06	0.0285
181 Wearing apparel except fur	0.03	0.0818	311 Electric motors, generators, transformers	0.77	0.0344
182 Dressing and dyeing of fur	0.03	0.0818	312 Electricity distribution and control apparatus	0.77	0.0344
191 Tanning, dressing and processing of leather	-0.14	0.1045	313 Insulated wire and cable	0.77	0.0344
192 Footwear	-0.08	0.0161	314 Accumulators, primary cells, batteries	0.77	0.0344
201 Saw milling and planing of wood	0.28	0.2137	315 Lighting equipment, electric lamps	0.77	0.0344
202 Wood products	0.28	0.2137	319 Other electrical equipment	0.77	0.0344
210 Paper and paper products	0.18	0.0303	321 Electronic valves, tubes	1.04	0.0309
221 Publishing	0.2	0.1632	322 TV/radio transmitters	1.04	0.0309
222 Printing	0.2	0.1632	323 TV/radio receivers	1.04	0.0309
231 Coke oven products	0.33	0.0926	341 Motor vehicles	0.39	0.0228
232 Refined petroleum products	0.33	0.0926	351 Shipbuilding	0.46	0.0656
241 Basic chemicals	0.205	0.0121	359 Transport equipment	0.31	0.0121
242 Other chemicals	0.22	0.0580	361 Furniture	0.24	0.0909
251 Rubber products	0.23	0.0315	369 Other manufacturing	0.47	0.1695
252 Plastic products	1.14	0.0609	Average	0.37	0.0707

Table 1 continued...

Country	Period	Observations	Firms	Assets	Debt	Debt/Assets	Sales	Tangibility	Ebit/Assets	d(small)	d(young)	d(exdep)
Bulgaria	1995-2004	2,823	627	11,300	2,546	0.22	11,400	0.53	0.06	0.71	0.24	0.50
Czech Republic	1995-2005	9,788	1,926	20,900	4,042	0.20	24,900	0.47	0.07	0.40	0.72	0.66
Estonia	1995-2006	1,044	175	7,816	2,325	0.28	10,300	0.52	0.09	0.63	0.58	0.58
Hungary	1995-2007	1,516	576	30,800	3,980	0.17	198,000	0.48	0.08	—	—	0.51
Lithuania	1995-2008	706	199	7,178	2,089	0.26	8,066	0.51	0.07	0.73	0.91	0.56
Poland	1995-2009	7,554	1,919	15,200	3,788	0.24	22,200	0.50	0.08	0.43	0.25	0.51
Romania	1995-2010	5,402	1,414	9,615	1,883	0.18	8,396	0.47	0.15	0.67	0.31	0.52
Slovakia	1995-2011	1,656	392	27,500	3,994	0.18	32,500	0.49	0.05	0.28	0.57	0.52

Panel A provides information on our sample countries and the coding of our event variable. Our sample period is from 1995 to 2007. Information on liberalization events is obtained from an extended version of the financial liberalization database used by Abiad and Mody (2005), the Bezaert and Harvey (2004) database on important financial, economic and political events in emerging markets and papers by Hernandez-Murillo (2007) and Miller and Petranov (2001). The liberalization variable takes values between 0 and 2, with 0 indicating tight restrictions on foreign entry, 1 indicating partial liberalization and 2 indicating full liberalization. Four of our sample countries (Brazil, India, Malaysia and Pakistan) were partially liberalized in 1995 and had no reform during our sample period. Panel B reports mean values of balance sheet and income statement items obtained from the Bankscope database. Values are in millions of U.S. dollars. Panel C shows efficiency estimates on the country level that are calculated as follows: We first define a dummy that takes the value of one if the bank has—in the year prior to liberalization—an ROA in the top quartile of all banks in our sample (*efficient bank*). We then calculate the share of efficient domestic banks at liberalization as the market share (in terms of total assets) of domestic banks that are efficient according to the definition above (column 1). We divide our sample into countries with lower and countries with a higher than median value of this variable (column 2). In the same way, we calculate the market share of efficient banks among all banks, including also foreign banks at the time of liberalization (column 3). Instead of ROA, we alternatively use the initial cost to income ratio (column 4) or the initial non-performing loans ratio (column 5) as obtained from the World Bank. The panel further provides mean values for macro control variables by country. Panel D reports two industry characteristics used in the regression analysis. Column 1 reports the aggregated value of capital expenditures minus cash flow from operations over capital expenditures for U.S. industries in the 1980s as calculated in Rajan and Zingales (1998). Column 2 shows the share of total employment of companies with less than 20 employees within U.S. industries in the early 1990s as reported by Beck et al. (2006). Panel E reports mean values for the firm balance sheet and income statement items as obtained from the Amadeus database. Values are in thousands of U.S. dollars. We report mean values for total assets, total debt, the ratio between the two, total sales, a measure of tangibility as defined by fixed assets to total assets, the ratio of EBIT to total assets and three dummy variables:  $d(\text{small})$  takes a value of 1 if the average firm size (as measured by total assets) prior to liberalization is lower than median,  $d(\text{young})$  takes a value of 1 if the average firm age prior to liberalization is lower than median, and  $d(\text{exdep})$  takes a value of 1 if the firm is an industry with a higher than median value of external financial dependence according to Rajan and Zingales (1998).

Table 2: Bank level loans

	(1)	(2)	(3)	(4)	(5)	(6)
	Log(loans)	Log(loans)	Log(loans)	Log(loans)	Log(loans)	Log(loans)
Event	-0.200 (0.185)	-0.292 (0.177)	-0.350* (0.181)	-0.226 (0.161)		
Interaction (Event × initial ROA)		0.100* (0.053)				
Interaction (Event × d(efficient bank))			0.846*** (0.199)	0.496** (0.185)	0.470** (0.217)	0.316* (0.182)
Observations	4604	4604	4604	4604	4604	4604
Distinct banks	542	542	542	542	542	524
R-squared	0.245	0.253	0.261	0.340	0.430	0.602
Year effects	YES	YES	YES	YES	—	—
Bank effects	YES	YES	YES	YES	YES	YES
Country trends	NO	NO	NO	YES	—	—
Year-country interactions	NO	NO	NO	NO	YES	YES
Bank controls	NO	NO	NO	NO	NO	YES

The table reports coefficients for different specifications of the following equation:  $\log(loans)_{ijt} = \alpha_i + \alpha_t + \phi' B_{it} + \delta_1 \cdot event_{jt} + \delta_2 \cdot (initial_i \cdot event_{jt}) + \epsilon_{ijt}$ , where  $i$  denotes the individual bank,  $j$  country and  $t$  time. Dependent variable in all regressions is the logarithm of the loan supply of private domestic banks. Variables of interest are the event variable, an interaction between liberalization and initial ROA (column 2) and an interaction between liberalization and a dummy variable taking a value of 1 if the bank is among the 25% most efficient banks in the year of liberalization (columns 3-6). We use bank and year fixed effects, country-specific trends or a full set of year-country interactions in order to control for unobserved heterogeneity. Time varying bank control variables include the bank's market share within the country, a solvency measure defined as equity over total assets and a liquidity measure defined as liquid assets over total assets. Standard errors adjusted for clustering at the country level are reported in parentheses. \* indicates statistical significance at the 10%-level, \*\* at the 5%-level and \*\*\* at the 1%-level.

Table 3: Aggregate, domestic and foreign lending

Panel A: Aggregate loan supply				
	(1)	(2)	(3)	(4)
	All countries	Low efficiency	High efficiency	All countries
Event	0.054 (0.190)	-0.318** (0.131)	0.419 (0.286)	-0.318** (0.128)
Interaction (event × d(initial ROA))				0.738** (0.306)
Observations	338	169	169	338
Distinct countries	26	13	13	26
R-squared	0.690	0.683	0.721	0.709
Year effects	YES	YES	YES	YES
Country effects	YES	YES	YES	YES
Macro controls	YES	YES	YES	YES
Panel B: Foreign loan supply				
	(1)	(2)	(3)	(4)
	All countries	Low efficiency	High efficiency	All countries
Event	0.654*** (0.224)	0.600* (0.289)	0.705* (0.350)	0.600** (0.283)
Interaction (event × d(initial ROA))				0.106 (0.444)
Observations	328	162	166	328
Distinct countries	26	13	13	26
R-squared	0.698	0.684	0.705	0.698
Year effects	YES	YES	YES	YES
Country effects	YES	YES	YES	YES
Macro controls	YES	YES	YES	YES
Panel C: Domestic loan supply				
	(1)	(2)	(3)	(4)
	All countries	Low efficiency	High efficiency	All countries
Event	-0.428* (0.241)	-0.978** (0.331)	0.111 (0.209)	-0.978*** (0.325)
Interaction (event × d(initial ROA))				1.089*** (0.384)
Observations	337	168	169	337
Distinct countries	26	13	13	26
R-squared	0.425	0.412	0.502	0.471
Year effects	YES	YES	YES	YES
Country effects	YES	YES	YES	YES
Macro controls	YES	YES	YES	YES

The table shows the impact of liberalization on aggregate (Panel A), foreign (Panel B) and domestic (Panel C) loan supply at the country level. Columns 1 and 4 include the whole sample, column 2 includes only the countries with a lower than median share and column 3 includes only the countries with a higher than median share of efficient domestic banks at liberalization. In column 4 we include an interaction between the event and a dummy that is equal to one for countries with a higher than median share of efficient domestic banks at liberalization. We use country and year fixed effects in order to control for unobserved heterogeneity. Furthermore, all regressions include GDP growth, inflation and the Hirschman-Herfindahl Index as time-varying macro control variables. Standard errors adjusted for clustering at the country level are reported in parentheses. \* indicates statistical significance at the 10%-level, \*\* at the 5%-level and \*\*\* at the 1%-level.

Table 4: Financial structure

	(1)	(2)	(3)	(4)	(5)	(6)
	Foreign market share All countries	Foreign market share Low efficiency	Foreign market share High efficiency	Foreign bank share All countries	Foreign bank share Low efficiency	Foreign bank share High efficiency
Event	0.164*** (0.057)	0.237** (0.102)	0.094* (0.048)	0.102*** (0.034)	0.145** (0.062)	0.060** (0.027)
Observations	338	169	169	338	169	169
Distinct countries	26	13	13	26	13	13
R-squared	0.621	0.507	0.698	0.532	0.594	0.502
Year effects	YES	YES	YES	YES	YES	YES
Country effects	YES	YES	YES	YES	YES	YES
Macro Controls	YES	YES	YES	YES	YES	YES

The table shows the impact of liberalization on financial structure. The dependent variable is the market share of foreign banks (measured as the share of bank assets owned by foreign banks divided by all bank assets in the country) in columns 1-3 and the percentage number of foreign banks in all banks in columns 4-6. Columns 1 and 4 include the whole sample, columns 2 and 5 only the countries with a lower than median and columns 3 and 6 only the countries with a higher than median share of efficient domestic banks at the time of liberalization. We use country and year fixed effects in order to control for unobserved heterogeneity. Furthermore, all regressions include GDP growth, inflation and the Hirschman-Herfindahl Index as time-varying macro control variables. Standard errors adjusted for clustering at the country level are reported in parentheses. \* indicates statistical significance at the 10%-level, \*\* at the 5%-level and \*\*\* at the 1%-level.

Table 5: Industry output

	(1)	(2)	(3)	(4)
	Log(output)	Log(output) Low efficiency	Log(output) High efficiency	Log(output)
Event	0.096 (0.164)	-0.250* (0.138)	0.463** (0.196)	-0.250* (0.136)
Interaction (event $\times$ d(initial ROA))				0.713*** (0.234)
Observations	10,520	5,690	4,830	10,520
Distinct country-industries	1,132	637	495	1,132
R-squared	0.334	0.365	0.336	0.348
Year effects	YES	YES	YES	YES
Country-industry-interactions	YES	YES	YES	YES

The table shows estimation results for different specifications of the following equation:  $\log(Y)_{ijt} = \alpha_{ij} + \alpha_t + \delta_1 \cdot (\text{event}_{jt}) + \epsilon_{ijt}$ , where  $i$  denotes industry,  $j$  country and  $t$  time. The dependent variable is the logarithm of country-industry output. All regressions include country-industry interactions and time fixed effects to account for unobserved heterogeneity and a random error term  $\epsilon_{ijt}$ . Columns 1 and 4 use the whole sample of countries, column 2 uses only countries with a lower than median share, and column 3 uses only countries with a higher than median share of efficient domestic banks at liberalization. In column 4 we include an interaction between the event and  $d(\text{initial ROA})$ , a dummy taking the value of 1 in countries with a higher than median share of efficient domestic banks at liberalization. Standard errors adjusted for clustering at the country level are reported in parentheses. \* indicates statistical significance at the 10%-level, \*\* at the 5%-level and \*\*\* at the 1%-level.

Table 6: Industry output by external dependence and SME share

	(1)	(2)	(3)	(4)	(5)	(6)
	Log(output)	Log(output)	Log(output)	Log(output)	Log(output)	Log(output)
		Low efficiency	High efficiency		Low efficiency	High efficiency
Interaction (event × external dependence)	0.454*** (0.120)	0.473** (0.198)	0.434** (0.145)			
Interaction (event × SME share)				-0.014 (0.492)	-1.235*** (0.301)	1.364** (0.574)
Observations	8,799	4,742	4,057	8,606	4,634	3,972
Distinct country-industries	942	527	415	921	515	406
R-squared	0.485	0.511	0.464	0.466	0.493	0.449
Year-country interactions	YES	YES	YES	YES	YES	YES
Country-industry-interactions	YES	YES	YES	YES	YES	YES
Differential (75th vs. 25th perc.)	16.1%	19.7%	15.4%	-0.1%	-7.3%	8.8%

This table shows how liberalization affects industries with different levels of external financial dependence and different shares of small and medium enterprises. Columns 1-3 provide results for the following equation:  $\log(Y)_{ijt} = \alpha_{ij} + \alpha_{jt} + \delta \cdot (\text{external dependence}_i \cdot \text{event}_{jt}) + \epsilon_{ijt}$ , whereas columns 4-6 estimate the following equation:  $\log(Y)_{ijt} = \alpha_{ij} + \alpha_{jt} + \delta \cdot (\text{SME share}_i \cdot \text{event}_{jt}) + \epsilon_{ijt}$ . The dependent variable is the logarithm of industry output. Columns 1 and 4 report results for the whole sample. Columns 2 and 5 include only countries with a lower than median share of efficient domestic banks at liberalization, and columns 3 and 6 include only the countries with a higher than median share. All regressions include country-industry interactions to account for unobserved heterogeneity and year-country interactions that control for country specific developments within a certain year (and absorb the event coefficient itself). We also include a random error term  $\epsilon_{ijt}$ . Standard errors adjusted for clustering at the country level are reported in parentheses. \* indicates statistical significance at the 10%-level, \*\* at the 5%-level and \*\*\* at the 1%-level.

Table 7: Industry volatility

	(1)	(2)	(3)	(4)
	Output fluctuation	Output fluctuation	Output fluctuation	Output fluctuation
		Low efficiency	High efficiency	
Event	0.019 (0.036)	0.094** (0.036)	-0.071* (0.034)	0.094** (0.036)
Interaction (event × d(initial ROA))				-0.165*** (0.049)
Observations	8,936	4,784	4,152	8,936
Distinct country-industries	957	520	437	957
R-squared	0.022	0.013	0.034	0.024
Year effects	YES	YES	YES	YES
Country-industry-interactions	YES	YES	YES	YES

The table provides evidence on how liberalization affects industry volatility by estimating different specifications of the following equation:  $\text{Fluctuation}_{ijt} = \alpha_{ij} + \alpha_t + \delta_1 \cdot (\text{event}_{jt}) + \epsilon_{ijt}$ . We regress fluctuations in the growth rates of industry output on a full set of country-industry interactions, time fixed effects and our liberalization variable. Columns 1 and 4 use the whole sample of countries, column 2 uses only countries with a lower than median share, and column 3 uses only countries with a higher than median share of efficient domestic banks at liberalization. In column 4 we include an interaction between the event and  $d(\text{initial ROA})$ , a dummy taking the value of 1 in countries with a higher than median share of efficient domestic banks at liberalization. Standard errors adjusted for clustering at the country level are reported in parentheses. \* indicates statistical significance at the 10%-level, \*\* at the 5%-level and \*\*\* at the 1%-level.



Table 8: Firm level evidence

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	Log(debt)	Log(debt)	Log(debt)	Log(debt)	Log(debt)	Debt/Assets	Debt/Assets	Debt/Assets	Debt/Assets	Debt/Assets
Event	-0.388*** (0.109)	-0.560*** (0.159)	-0.490** (0.157)	-0.534** (0.198)	-0.437* (0.185)	-0.046** (0.018)	-0.056** (0.022)	-0.051** (0.021)	-0.050 (0.031)	-0.041 (0.030)
Interaction (event $\times$ d(initial ROA))		0.313*** (0.063)	0.225*** (0.060)	0.151* (0.071)	0.166** (0.072)		0.019** (0.006)	0.010** (0.004)	0.009 (0.005)	0.007 (0.004)
Interaction (event $\times$ d(exdep))			-0.115*** (0.014)					-0.009*** (0.001)		
Interaction (event $\times$ d(exdep) $\times$ d(initial ROA))			0.142** (0.048)					0.017** (0.006)		
Interaction (event $\times$ d(small))				0.031 (0.024)					-0.012* (0.006)	
Interaction (event $\times$ d(small) $\times$ d(initial ROA))				0.261*** (0.041)					0.022** (0.007)	
Interaction (event $\times$ d(young))					-0.123*** (0.009)					-0.021*** (0.004)
Interaction (event $\times$ d(young) $\times$ d(initial ROA))					0.293** (0.110)					0.011 (0.017)
Log(sales)	0.476*** (0.050)	0.469*** (0.050)	0.470*** (0.051)	0.574*** (0.061)	0.580*** (0.058)	-0.007 (0.005)	-0.008 (0.005)	-0.008 (0.005)	-0.009 (0.007)	-0.008 (0.007)
Tangibility	0.819*** (0.213)	0.822*** (0.213)	0.822*** (0.213)	0.724** (0.237)	0.722** (0.244)	0.027 (0.032)	0.027 (0.032)	0.028 (0.032)	0.014 (0.034)	0.016 (0.036)
EBIT/Assets	-1.751*** (0.066)	-1.698*** (0.069)	-1.697*** (0.069)	-1.689*** (0.121)	-1.698*** (0.113)	-0.193*** (0.013)	-0.190*** (0.015)	-0.190*** (0.015)	-0.175*** (0.016)	-0.174*** (0.016)
Observations	30,489	30,489	30,489	17,020	17,020	30,489	30,489	30,489	17,020	17,020
Distinct firms	7,228	7,228	7,228	2,755	2,755	7,228	7,228	7,228	2,755	2,755
R-squared	0.088	0.092	0.092	0.108	0.106	0.042	0.043	0.043	0.042	0.042
Firm effects	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Year effects	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES

In this table we examine how firm debt taking and corporate capital structure are affected by liberalization. The dependent variable is the logarithm of a firm's total debt in columns 1-5 and the ratio of total debt to total assets in columns 6-10. Regressions include an interaction between liberalization and a dummy variable taking the value of 1 for countries with a higher than median share of efficient domestic banks at liberalization. We define three dummy variables that take the value of 1 for firms a) in industries with above median external financial dependence according to the measure defined by Rajan and Zingales (1998); b) with above median average size (measured by total assets) prior to liberalization; c) with below median age prior to liberalization. These dummies are interacted with the event and the dummy indicating efficient markets. Furthermore, we include a measure of size (the logarithm of total assets), a measure of profitability (ROA), and a measure of tangibility (tangible assets over total assets) as time-varying firm controls. Standard errors adjusted for clustering at the country level are reported in parentheses. \* indicates statistical significance at the 10%-level, \*\* at the 5%-level and \*\*\* at the 1%-level.

## Appendix

Table A.1: Firm level evidence—Robustness

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Debt	Debt	Debt	Debt	Debt	Log(debt)	Debt	Debt
	Initial Assets	Initial Assets	Initial Assets	Initial Assets	Initial Assets		Assets	Initial Assets
Event	-0.157** (0.050)	-0.223** (0.082)	-0.221** (0.080)	-0.220** (0.081)	-0.213** (0.081)	-0.557*** (0.158)	-0.057** (0.021)	-0.223** (0.083)
Interaction (event × d(initial ROA))		0.137*** (0.018)	0.157*** (0.027)	0.068*** (0.011)	0.103*** (0.014)	0.309*** (0.071)	0.022*** (0.006)	0.136*** (0.014)
Interaction (event × d(exdep))			-0.003 (0.008)					
Interaction (event × d(exdep) × d(initial ROA))			-0.039 (0.025)					
Interaction (event × d(small))				-0.012 (0.017)				
Interaction (event × d(small) × d(initial ROA))				0.127** (0.038)				
Interaction (event × d(young))					-0.014* (0.006)			
Interaction (event × d(young) × d(initial ROA))					0.095** (0.039)			
Log(sales)	0.268*** (0.059)	0.264*** (0.059)	0.263*** (0.058)	0.257*** (0.057)	0.257*** (0.058)	0.467*** (0.047)	-0.007 (0.005)	0.262*** (0.056)
Tangibility	0.382*** (0.119)	0.385** (0.117)	0.382** (0.116)	0.379** (0.116)	0.375** (0.118)	0.821*** (0.214)	0.032 (0.031)	0.408*** (0.113)
EBIT/Assets	-0.591*** (0.038)	-0.554*** (0.040)	-0.554*** (0.041)	-0.549*** (0.040)	-0.552*** (0.039)	-1.662*** (0.102)	-0.188*** (0.016)	-0.550*** (0.050)
Observations	17,020	17,020	17,020	17,020	17,020	30,489	30,489	17,020
Distinct firms	2,755	2,755	2,755	2,755	2,755	7,228	7,228	2,755
R-squared	0.215	0.224	0.225	0.228	0.226	0.143	0.093	0.283
Firm effects	YES	YES	YES	YES	YES	YES	YES	YES
Year effects	YES	YES	YES	YES	YES	YES	YES	YES
Industry-year interactions	NO	NO	NO	NO	NO	YES	YES	YES

This table provide robustness checks for the firm level results. Columns 1-5 repeat the the estimations shown in Table 8 and use the ratio of total debt to total *pre-event* assets as a dependent variable instead. Columns 6-8 include industry-year interactions in addition to firm and year indicators. Regressions include an interaction between liberalization and a dummy variable taking the value of 1 for countries with a higher than median share of efficient domestic banks at liberalization. We define three dummy variables that take the value of 1 for firms a) in industries with above median external financial dependence according to the measure defined by Rajan and Zingales (1998); b) with above median average size (measured by total assets) prior to liberalization; c) with below median age prior to liberalization. These dummies are interacted with the event and the dummy indicating efficient markets. Furthermore, we include a measure of size (the logarithm of total assets), a measure of profitability (ROA), and a measure of tangibility (tangible assets over total assets) as time-varying firm controls. Standard errors adjusted for clustering at the country level are reported in parentheses. \* indicates statistical significance at the 10%-level, \*\* at the 5%-level and \*\*\* at the 1%-level.

Table A.2: Selection of takeover banks

	(1)	(2)	(3)	(4)	(5)	(6)
	Takeover	Takeover	Takeover	Takeover	Takeover	Takeover
ROA	-0.006 (0.006)			-0.000 (0.021)		
$\frac{\text{Cost}}{\text{Income}}$		-0.005 (0.011)			-0.031 (0.047)	
$\frac{\text{Cost}}{\text{Assets}}$			0.156 (0.206)			-0.594 (0.575)
Log(assets)	0.135** (0.062)	0.129** (0.060)	0.133** (0.061)	0.167** (0.069)	0.167** (0.066)	0.156** (0.068)
Market share	-0.013 (1.152)	0.030 (1.139)	-0.002 (1.150)	0.002 (1.420)	-0.027 (1.417)	0.088 (1.416)
Solvency	0.004 (0.004)	0.003 (0.003)	0.003 (0.003)	0.005 (0.007)	0.005 (0.006)	0.004 (0.006)
Liquidity	0.056 (0.245)	0.059 (0.246)	0.059 (0.245)	0.820* (0.464)	0.828* (0.467)	0.798* (0.464)
Observations	6,452	6,440	6,452	760	760	760
Pseudo R-Squared	0.154	0.154	0.154	0.129	0.129	0.130
Year effects	YES	YES	YES	YES	YES	YES
Country effects	YES	YES	YES	YES	YES	YES

The table reports estimated coefficients and standard errors from probit models estimated with maximum likelihood. The dependent variable *Takeover* is a dummy that takes the value of one if a bank is taken over by a foreign bank during the sample period and zero otherwise. Columns 1-3 include all bank-year observation and the value of the explanatory variables in the respective year. In columns 4-6 we collapse the data on the bank level and use mean values of the explanatory variables. Standard errors adjusted for clustering at the bank level are reported in parentheses. \* indicates statistical significance at the 10%-level, \*\* at the 5%-level and \*\*\* at the 1%-level.

Table A.3: Bank level loans—Robustness

	(1)	(2)	(3)	(4)	(5)	(6)
	Log(loans)	Log(loans)	Log(loans)	Log(loans)	Log(loans)	Log(loans)
	Few	Many		Inefficient	Efficient	
	takeovers	takeovers		banks	banks	
Event	-0.322	-0.405	0.045			-0.177
	(0.255)	(0.245)	(0.155)			(0.157)
Interaction (event	0.988***	0.654**	0.534**			0.722***
× d(efficient bank))	(0.292)	(0.233)	(0.221)			(0.189)
Before <sub>1</sub>				-0.104	-0.253	
				(0.138)	(0.221)	
Before <sub>0</sub>				-0.04	-0.28	
				(0.182)	(0.193)	
After <sub>1</sub>				0.181	0.05	
				(0.179)	(0.131)	
After <sub>2</sub>				0.227	0.323*	
				(0.271)	(0.186)	
Capital account liberalization						-0.015
						(0.074)
Creditor rights						0.850***
						(0.172)
Observations	2,474	2,130	2,742	2,065	677	3,477
Distinct banks	280	262	409	320	89	497
R-squared	0.257	0.278	0.486	0.528	0.556	0.129
Year effects	YES	YES	YES	YES	YES	YES
Bank effects	YES	YES	YES	YES	YES	YES
Macro controls	NO	NO	YES	YES	YES	NO
Bank controls	NO	NO	YES	YES	YES	NO

The table reports additional robustness checks for the bank level results reported in Table 2. Dependent variable in all regressions is the logarithm of the loan supply of private domestic banks. Variables of interest are the event variable and an interaction between liberalization and a dummy variable taking a value of 1 if the bank is among the 25% most efficient banks in the year of liberalization. In columns 1 and 2 we distinguish between markets where foreign banks entered mostly via greenfield investments and markets where foreign banks entered mostly via takeover. The specification in column 3 includes macro and time varying bank control variables, and in columns 4 and 5 we use lags and leads of the event variable in order to investigate the dynamics around liberalization, where column 4 includes only inefficient and column 5 includes only efficient domestic banks. Finally, column 6 controls for capital account liberalization and creditor rights. Standard errors adjusted for clustering at the country level are reported in parentheses. \* indicates statistical significance at the 10%-level, \*\* at the 5%-level and \*\*\* at the 1%-level.

Table A.4: Measures of bank efficiency—Robustness

Panel A: Cost-to-Income Ratio						
	(1)	(2)	(3)	(4)	(5)	(6)
	Aggregate loan supply High CIR	Aggregate loan supply Low CIR	Domestic loan supply High CIR	Domestic loan supply Low CIR	Foreign market share High CIR	Foreign market share Low CIR
Event	0.226 (0.341)	0.243 (0.168)	-0.673 (0.409)	-0.090 (0.234)	0.289** (0.094)	0.107** (0.044)
Observations	156	169	155	169	156	169
Distinct countries	12	13	12	13	12	13
R-squared	0.654	0.704	0.407	0.487	0.711	0.444
Year effects	YES	YES	YES	YES	YES	YES
Country effects	YES	YES	YES	YES	YES	YES
Macro controls	YES	YES	YES	YES	YES	YES
Panel B: NPL Ratio						
	(1)	(2)	(3)	(4)	(5)	(6)
	Aggregate loan supply High NPL	Aggregate loan supply Low NPL	Domestic loan supply High NPL	Domestic loan supply Low NPL	Foreign market share High NPL	Foreign market share Low NPL
Event	-0.027 (0.301)	0.279 (0.301)	-1.110** (0.366)	-0.150 (0.335)	0.331*** (0.096)	0.154*** (0.049)
Observations	156	143	155	143	156	143
Distinct countries	12	11	12	11	12	11
R-squared	0.669	0.656	0.427	0.511	0.669	0.650
Year dummies	YES	YES	YES	YES	YES	YES
Country dummies	YES	YES	YES	YES	YES	YES
Macro controls	YES	YES	YES	YES	YES	YES

This table provides results for different definitions of the bank efficiency variables. Panel A uses the aggregate cost-to-income ratio while Panel B uses the non-performing loans ratio, where both variables are obtained from the World and measured in the year before liberalization in the respective country. The dependent variable is the logarithm of aggregate loans in columns 1 and 2, the logarithm of total loans from domestic banks in columns 3 and 4, and the foreign market share in columns 5 and 6. Standard errors adjusted for clustering at the country level are reported in parentheses. \* indicates statistical significance at the 10%-level, \*\* at the 5%-level and \*\*\* at the 1%-level.