THE UNIVERSITY OF CHICAGO

BANKING GLOBALIZATION AND CROSS-BORDER CAPITAL FLOWS TO EMERGING MARKET ECONOMIES

A DISSERTATION SUBMITTED TO
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ACKNOWLEDGMENTS

I entered into my Ph.D. studies straight ahead after graduating from college in Hong Kong. At that time, I had no clear idea what Ph.D. is supposed to be, except some vague idea that I wanted to be a successful female economist and I wanted to do something related to macroeconomics. After I settled down in Chicago and started my first year, I gradually realized that the path is not as cozy and comfort-zone alike as it's thought to be, rather, it's more like a journey that demands both enthusiasm and endurance.

Throughout the journey, I gradually transited from one who was frequently confused and bored with research into one who is determined and enthusiastic about academic research. I was able to become who I am today largely because of my angel Raghuram Rajan. Prof. Rajan has spent generous amount of hours sitting together with me at his office desk. Much of my dissertation was enlightened by his thoughtful insights. His patience and his pinpointing critiques brought me back on track over and over again along the path. There's an ancient Chinese quote: "To teach someone how to fish is better than to just give him a fish." Prof. Rajan is the advisor who really pushed me to generate my own thinking and to think independently, rather than telling me what is the point to make directly. Prof. Rajan has not just been an academic advisor to me. He is the role model of mine as a person. I learnt from him to be a responsible person to the research I'm conducting, to the career I'm pursuing and to the society. I am deeply indebted to him.

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In my job market paper, I investigated how China's financial market has been interacting with the global financial market in the episode of 2000s. The design and pursuance of this study was largely encouraged by Prof. He. He relentlessly pushed me to dive into the data and historical record in that period. After the many heated discussions, office meetings and emails, I finally made the findings that show up in this dissertation. He is also the one who initiated my research interest in Chinese economy and China's financial market. I am grateful for his input.

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female economist.

ABSTRACT

In this dissertation, "Banking Globalization and Cross-border Capital Flow in EMEs", which consists of five chapters, I study how banking sector globalization can generate profound real impact on emerging market economy in an increasingly inter-connected world. Specifically, I investigate the question through the lens of financial contracting between banks that channel foreign credit into emerging market economies.

In Chapter 1, I provide an overview of the big-picture question and the motivation of the whole dissertation. The dissertation is motivated by two categories of facts: (1) a series of demographic changes in the cross-border bank credit between EME's and the center economy, primarily the significant replacement of foreign banks by EMEs' domestic banks in the channeling of cross-border credit; (2) the increasing interconnection between EME and the rest of the world, reflected in firms' and banks' balance sheets, financing conditions, asset prices, etc.

In Chapter 2, I investigate the origin of the rise of the domestic banks in the international financing market. Through investigating multiple pieces of data sets, I found that the rise of domestic banks from EME's first initiated from the beginning of 1990s. And the common driving force for this change was shadow banking institutions' expansion in the U.S.. Before 1990s, over 90% of the cross-border loans were directly channeled by foreign banks from developed world; after 1990, over 35% of the USD denominated loans were lent by EMEs' domestic banks.

In Chapter 3, I provide empirical evidence that domestic banks and foreign banks display different lending technologies when lending to EME borrowers. The fundamental difference lies at the range of collateral assets that they can accept when signing credit contracts. While foreign banks rarely accept physical/tangible assets as collateral, domestic banks, on the other hand, are much more flexible with the type of assets to be pledged as collateral. In the micro-level data, I discovered the sorting pattern of domestic and foreign banks into loan tranches with different assets as collateral. Within the same borrower and the same

loan deal, a 10% increase in foreign banks' holding of the face value is associated with 28% less likely that this tranche is secured by any form of physical collateral.

Chapter 4 mainly documents the real aggregate consequences of the rise of domestic banks in EME's and the real impact of their broader contracting space compared with their predecessors – foreign banks. I found that since the rise of domestic banks in the cross-border financing market, emerging market economies had seen higher proportions of cross-border loans been contracted to firms in high-tangibility sectors; overtime, EMEs' high-tangibility industries' started to grow faster relative to low tangibility sector; and what's more, the high-tangibility industries had become more susceptible to changes in financial conditions in the U.S..

In Chapter 5 of my dissertation, I propose and identify a novel channel – "domestic-bank channeled foreign credit"– through which global financial cycles are mapped into local financial cycles. I exploit a unique cross-city heterogeneity of domestic global bank distribution in China. This is unique, because in China, there's only one domestic bank, BOC, that can channel foreign credit due to historical and institutional reasons. And BOC's local presence is heterogeneous across different cities. My empirical findings show that the enlarged flexibility in cross-border credit contracting, which is made possible by the rise of domestic global banks in EMEs, is a mixed blessing to these economies: It allows the hot money flowing to EMEs to be more efficiently allocated, but may lead to less efficient allocation of domestic credit when hot money leaves. Specifically, we find that cities with high pre-cycle BOC exposure saw higher volume of credit being channeled to young firms with high TFP growth and high job creation rate; but it is precisely these cities that also saw much higher credit accumulation based on local commercial and industrial land. The high land-collateralized borrowing pushed up land prices and spilled over to buoyant domestic credit intermediation in the booming phase, but also led to collateral value loss when hot money was suddenly leaving, which severely impaired domestic credit intermediation in the tightening phase. Echoing the results of the first two essays, the empirical finding in these

two essays illustrates a similar point: under certain environments, increasing the contingency in certain dimension of the contracting space could be a mixed blessing.

CHAPTER 1

INTRODUCTION

Cross-border capital has played an important role in boosting and sustaining the growth of emerging market economies (EMEs). Since the 1970s, most EMEs across the world have liberalized capital accounts to allow for international capital inflow. Following capital account liberalization, there was a steady growth in the volume of cross-border capital that flowed into EMEs from developed economies during the last two decades of the 20th century. Near the end of the century, the volume of foreign credit received by many emerging market countries rose above 30% of their GDP level.

While an extensive literature has documented the growing importance over the last half century of cross-border capital to EMEs, a more recent and equally striking transformation that has taken place in EMEs has received little attention.[1] During the past three decades, the volume of foreign capital received by EMEs scaled by their GDP has not not increased much, but its structure has changed dramatically.[2] Before the 1990s, more than 90% of the cross-border capital that moved to the EME's corporate sector was channeled directly by foreign banks from developed markets; by 2010, an average of more than 50% of cross-border credit was being channeled by domestic banks in EMEs.

What caused this structural change in how cross-border capital flows to EMEs? More importantly, would such a change in capital ow structure materialize into real changes that have a non-trivial economic significance? This paper addresses these questions.

The structural change in how credit from developed markets is channeled to emerging markets is marked by the rise of domestic global banks in EMEs, which can raise money from the global funding market and then lend it to their domestic corporations. We find

1. See, for instance, Kose et al. (2009) for a comprehensive survey of the literature that documents the increasing degree of financial globalization since the 1970s. In this literature, most of the research has focused on the volume of cross-border capital that flows to emerging market economies.

2. Throughout this paper, the dimension of the structure of cross-border credit that is of interest is how it flows into EMEs. Of special interest is the question of who channels these cross-border credits to borrowers from EMEs.

that the rise of these domestic global banks in EMEs and the growing importance of the role they play in channeling cross-border capital coincides with drastic changes in the structure of money markets in developed economies.

The U.S. money market, which is a major source of the cross-border capital that flows to EMEs around the world, experienced significant changes towards the end of the 1980s. Although the first appearance of the money market mutual fund can be dated back to 1971, the market share in the U.S. capital market taken by these institutions did not rise to a non-trivial figure until the late 1980s. Since the 1988-1989 savings and loans crisis in the US, the share of S&L institutions in U.S. capital market has greatly shrunk. At its 1988 peak, S&L institutions took up nearly a third of the US capital market; by the mid 1990s, this number had fallen below 10%. Much of the market share that S&L institutions lost was gained by money market mutual funds (MMMF).[3] Unlike S&L institutions, whose investment choices are bounded by strict regulatory constraints, MMMFs are given much larger flexibility to place the money they raise. In particular, MMMFs will (and can) deploy a non-trivial part of the money they gain from S&L institutions to pursue profitable oversea investment opportunities, which is what traditional banks have been doing since the 1970s. Empirically, we find that US mutual funds' foreign asset holdings (as shares of total asset) increased from less than 1% in 1986 to more than 12% in 1996.

Yet money market mutual funds and traditional commercial banks from developed markets show drastic differences in how they transmit credit to emerging markets. Since commercial banks from the developed market began lending to EMEs, a predominant fraction of this cross- border capital has been directly received by non-financial corporations in EMEs. This is not surprising: these foreign commercial banks know very well how to deal with (screen and monitor) corporate borrowers. There is thus no reason to add an extra layer to the splitting of the pie.

On the contrary, shadow banking institutions like MMMFs generally are not equipped

3. Some recent studies have attributed the quick rise of MMMF around early 1990s to the demographic change in US during that period. See for instance Ordoñez and Piguillem (2018).

with the screening or monitoring technologies that are necessary for financing corporate firms. Lacking such direct financing techniques, these non-bank lenders from the developed market have to rely on an extra layer to transmit capital to emerging market borrowers. Indeed, we show that over 80% of U.S. mutual funds' long-term foreign lending is received by the financial sector of credit-receiving EMEs, which then allocates this capital to the corporate sector. By comparison, nearly two thirds of the credit channeled by U.S. commercial banks to EMEs is directly received by the corporate sector.

A natural question arises: If the manner in which cross-border capital is transmitted to EMEs were to change, would this make an economically non-trivial difference? Our paper suggests that it would: such a change would induce significant changes in who receives these credits and in how these credits are received. We now elaborate.

The point made in this paper hinges on the following fact: when they extend credit to firms in EMEs, foreign lenders and domestic lenders employ significantly different lending technologies. The origins of the differences between the lending technologies of domestic and foreign lenders when facing borrowers in EMEs lie in the constitution of corporate firms' borrowing capacity. The debt capacity of any corporate firm can be broadly categorized into two exclusive sources: those that are tangibility-based and those that are transparency-based. The most common form of tangibility-based lending is the secured loan backed by hard assets as collateral, the value of which is usually insensitive to a firm's own performance.[4] Examples of transparency-based lending include unsecured loans and loans secured by the cash flow of borrowing firms, which often involve the inclusion of EBITDA-related covenants in the credit agreements.

The value that lenders can recover from the collateral assets, be it hard assets or borrower's cash flow, determines a firm's debt capacity. Consequently, a firm's debt capacity is likely to be lender-specific. In emerging markets, the liquidation of defaulting borrowers'

4. Hard assets that are often pledged as collateral in corporate loans include land, real estate properties, machines and equipment, inventories, etc. It often requires frequent and timely monitoring and checking to guarantee the efficacy of these hard assets as collateral.

hard assets often features prolonged liquidation process and a low net recovery rate due to a relatively weak legal protection of creditor rights. Thus, a lender's ability to conveniently conduct a timely monitoring of the pledged collateral could be crucial in weak legal environments. In this paper, we show that although no significant differences can be discerned between foreign and domestic banks in lending on the basis of borrower transparency, this lender identity difference becomes noticeable in the case of hard-asset-based lending.

Empirically, we find that among the loans extended to borrowers from emerging markets, over 60% of those extended by domestic banks are backed by fixed assets as collateral, while only 20% of foreign bank extended loans are tangibility-based. Furthermore, we find that this distinction is much more pronounced for emerging market countries that have relatively high insolvency resolution costs. While foreign lenders on average are 16.3% less likely than domestic lenders to lend against fixed assets in extending credits to EME borrowers, the difference widens by another 5.3% every one more year it takes to resolve insolvency in the borrower's economy. In contrast, we observe no significant differences in lending base preferences between foreign and domestic lenders when credit is extended to borrowers from developed markets.

To strengthen our identification of the causal relationship between a lenders' identity and its lending base preference in extending credit to borrowers from EMEs, we conduct a within firm (and loan package) analysis.[5] Specifically, through a examination of tranche-level credit agreements data that contains detailed information about collateral structure and lender composition, we exploit the variation across different tranches of credit agreements within the *same* loan package. In this way, We identify a significant difference in lending base preference between foreign and domestic lenders when they extend credit to borrowers

5. The main endogeneity issue that we need to deal with when establishing the causal relationship is selection biases on both the lenders' side and the borrowers' side. For instance, the fact two firms borrow from foreign and domestic banks against different lending bases could be driven by different asset structures or the business nature of these two firms rather than by differences in lending base preferences on the lender side. We discuss these potential selection issues and how they might affect our causal identifications in Section 3.3.

from EMEs. Empirically, we find that a 15% increase in the foreign banks' share in the total tranche amount is on average associated with a 36% decrease in the likelihood that a loan deal tranche is contracted on fixed assets as collateral. Relatedly, we estimate a 28.1% increase in the likelihood of covenant inclusion after a 15% increase in foreign banks' share in the tranches' total amount.

Having documented this important difference between the lending technologies of domestic and foreign lenders, we show that domestic and foreign banks produce different "outputs" in the cross-border credit market. Specifically, we examine our deal-level observations of foreign credit agreements established in various emerging markets and show that differences in the lender composition would lead to differences in 1) who are more likely to be the receiver of the credit; and 2) the credit volume received by a given borrower.

Running a multinomial logit estimation, we find that a 10% percent increase in domestic bank share in a deal package leads to a 31.2% increase in the probability that the credit will go to a firm in tangible industries and a 21.5% increase in the likelihood that the credit will be received by an unlisted firm. These results are consistent with those obtained for foreign credit volume. Conditional on the credit receiving firm being from a high-tangibility industry (or being a privately traded firm), a 20% increase in the domestic bank share is associated with a 3.7% (or a 3.5%) increase in the deal volume. In contrast, no significant relationship is observed between the lender identity and the volume of a deal package when loans are conditional on borrowers being from lower-tangibility industries or publicly traded borrowers.

These findings at the disaggregate level naturally lead us to answer the question raised at the beginning: What real economic impact can be generated by the rise of domestic banks in transmitting cross-border credit to EMEs? During the era before the rise of the domestic global banks, cross-border capital was predominantly channeled directly and, thus, it was allocated by foreign banks. Consistent with our finding about the lending base preference of foreign banks in extending credit to EME borrowers, the cross-border capital channeled

to EMEs during this period are primarily in the form of unsecured loans or loans secured by borrowers' cash flow or account receivables. Accordingly, we find that the receivers of cross-border credit during such episodes are mostly highly-rated and publicly listed firms, and EBITDA-related covenants are often seen in these foreign currency denominated credit agreements, guaranteeing the required transparency. From 1986 to 1990, only 5.6% of the USD denominated cross border credit was allocated to private firms in EME and less than 4.8% of the USD denominated loans flew to firms in high-tangibility industries.

The structural changes in the money market of developed economies since the early 1990s have given domestic banks from EMEs better access to the global capital market. Now able to borrow foreign credit from institutional lenders in developed economies, these EME banks can compete with their foreign counterparts in transmitting cross-border capital to EMEs. At individual firm level, we show that many firms that formerly relied on foreign banks for cross-border credit switched to domestic banks when the latter gained accesses to the global capital market. These newly risen domestic global banks in EMEs are able to attract firms that originally borrow from foreign lenders because of their "superior" lending technology. The ability to lend against hard assets allows these domestic global banks to offer credit contracts that feature larger loan sizes and fewer restrictive covenants than those offered by foreign lenders, which must rely on the inclusion of covenant to conduct transparency-based lending.

Consistent with this intuition, we find a clear reduction in covenant inclusion in credit agreements associated with borrowers that switch from foreign lenders to domestic lenders. The allocation of cross-border credit at the aggregate level has changed dramatically. Until 2011-2015, 37.6% of the total value of USD denominated cross-border credit was received by the private firms and more than 20% of the cross-border USD denominated credit was allocated to firms in the high-tangibility sectors in EMEs.

While in this paper we do not take a stance on the pros and cons of the rise of domestic global banks in EMEs, we show that the rise of domestic banks in transmitting cross-border

capital to EMEs can greatly reshape the industry and capital market structure in EMEs, and it can increase the susceptibility of these economies to changes in global financial market conditions. Specifically, we find that the average long-term debt (scaled by lagged total assets) of tangible industries increased by 16.2% during the period 1995-2010, compared with its level before 1995; the corporate annual investment rate of tangible industry firms (measured by capital expenditures scaled by lagged total assets) increased by 5.2%. In contrast, no comparable changes are seen in intangible industries. Not surprisingly, we find an overall higher tangible industry share of total GDP in emerging markets around the world. During this period, the average tangible sectors' output value added as a share of GDP of emerging market economies increased from 15.13% to 24.33%, while average employment in tangible industries increased from 14.67% to 23.12%.[6] Similarly, we find that globalization of banking sector in EMEs also brings additionally faster asset growth and leverage buildup for private and unlisted firms.

In addition to a reshaped industry structure, the sensitivity of real economic outcomes in emerging markets to global financial conditions seems to have increased, accompanying banking globalization in these economies. Comparing the coefficient estimates (before and after 1995) of regressions at the country-year level, we found that before 1995, a 0.5 increase (decrease) in the NFCI index (about half of its standard deviation) is associated with an average of 13 basis point decrease (increase) in real GDP growth rate.[7] After 1995, a same magnitude change in NFCI is associated with an average 85 basis point change in real GDP growth rates in emerging markets around the world.

In addition to these time trend patterns, we exploit cross-country variation for establishing a causal relationship. In other words, given that the replacement of foreign banks by domestic banks in channeling cross-border credit can occur to different degrees in dif-

6. The share of tangible industry in total GDP is measured as the manufacturing sector's value added as a percentage of GDP; the share of employment in tangible industries is measured as total share of employment in a country's construction, mining, and manufacturing sectors.

7. "NFCI" stands for the Chicago Fed National Financial Condition Index, which is measure of the global financial conditions for emerging markets.

ferent countries, we examine whether variations in this dimension will result in different real outcomes. Our estimation results suggest affirmative answers. In particular, comparing post-1995 levels of real economic variables to their pre-1995 levels, we find that a 10% higher de facto cross-border credit channeled by domestic banks is associated with a 2.13% higher tangible industrial sector value added to GDP, a 2.98% higher employment of those employed in tangible industrial sector and a 5.62% higher average annual investment rate in the tangible sector. Similarly, we show that economies in which domestic banks play a larger role in channeling cross-border capital also exhibit higher real economic outcome susceptibility during the global financial cycles.

To further strengthen this causal relationship, we employ and examine several instrumental variable to extract exogenous variations in the cross-country heterogeneity in the share of domestic bank-channeled foreign credit. One variable we consider is the level of financial literacy of emerging markets. We find that countries that have a higher level of financial literacy feature a larger degree of replacement between foreign and domestic lenders after the capital supply shock–i.e., the structural change in money markets in developed economies. In addition, no significant correlation is found between the volume of foreign capital inflow and the financial literacy of the credit receiving country.

Another instrumental variable we utilize is the pre-1990 degree of the exposure of the domestic banking sector to the global funding market for each emerging market. That is, prior to the structural change in the US money market that occurred during the early 1990s, how much connection had an EME's banking sector built with the global capital market? For those with a higher level of endowed connection to the global funding market, we should expect a greater replacement of foreign banks by domestic banks after the rise of MMMFs in the US money market. Regressions based on these instrumental variables confirms that the rise of domestic banks in transmitting cross-border capital to EMEs can significantly reshape the industry structure of these economies and increase their sensitivity to global finance cycles.

Chapters 2-4 are closely related to two main strands in the literature. The first includes a growing body of literature that emphasizes the phenomenon of the global financing cycle and the transmission of center economy financial condition changes to emerging market economies. Recent research in this area has investigated the increasing co-movement of capital flows, financial flows, and asset prices in global economies: Rey (2013), Miranda-Agrippino and Rey (2015a), Jiang et al. (2018), Gabaix and Maggiori (2015), Obstfeld and Taylor (2017), and Han and Wei (2016). Previous research studied how EME companies react to switches in global financial conditions in a globalized financial market setting: Kalemli-Ozcan et al. (2018), **?**, Bruno and Shin (2017), Alfaro et al. (2019). Researchers have also documented how global banks are impacted by center economy conditions and how they intermediate credit from center economy to the EME firms: Avdjiev and Hale (2019), Brauning and Ivashina (2019), Cetorreli and Goldberg (2012), Dages et al. (2000), Ivashina et al. (2015), Giannettiv and Laeven (2012), and Demirgüç-Kunt et al. (2017). Our paper contributes to this strand in the literature by documenting a novel trend wherein the domestic banks that replace foreign banks in the cross-border market can generate new channels of global financing cycle transmission. We also are the first to highlight that when domestic and foreign banks intermediate cross-border credit, they show fundamental differences in leading technologies.

Second, our work is related to the literature that examines how how financial development and financial intermediation affect real economic outcomes. The recent representative works in this strand include: Khwaja and Mian (2008), Mian et al. (2013), Schnabl (2012), Calomiris et al. (2017), Caballero and Krishnamurthy (2001), and Caballero and Krishnamurthy (2003). We contribute to this strand by showing, first, that the global financial market transformation in the 1990s, or more precisely, the emergence of institutional investors in U.S., greatly reshaped the way credit flows from the center economy to the emerging market economy, and, second, that this pure financial market transformation has led to a reshaped industrial structure and real growth susceptibility towards global financial condition switches

in EME.

Chapters 2-4 is organized as follows. Chapter 2 describes the data source and the sample construction for the empirical exercise that this paper conducts. In Chapter 3, we document a recent trend in banking globalization that takes place in many EMEs around the world, and we show its relationship to structural changes in the money markets of developed economies. Chapter 4 examines how domestic banks, which play an increasingly important role in the channeling of foreign capital to EMEs, behave differently from foreign banks when they extend credit to corporations in EMEs. At the second part of Chapter 4, we further investigates the impact of the rise of domestic global banks in EMEs on the allocation and reception of cross-border capital and on its its real impact on economies at aggregate levels. Chapter 5 proposes and identifies a novel channel through which international financial cycles are mapped into local financial cycles using a within-country cross-city Diff-in-Diff analysis during one particular global financial cycle period.

1.1 Data Description for Chapter 2-4

We obtain our data from three categories of data sources. The first is detailed documents of loans issued by domestic and foreign lenders to the emerging market corporate sectors; the second is balance sheet information about firms and banks; and the third is the macroeconomic condition variables. We describe the three categories in more detail.

1.1.1 Loan details and collateral Information

We obtain detailed information about the loans from Thomson Reuters' LoanConnector and LPC Dealscan. These two databases share the same underlying data source, which is syndicated bank loans issued by corporate sectors around the world. The former database focuses on loan characteristic details while the latter focuses on lender composition and borrower information.

We record transaction-level information about syndicated loans to emerging market non-financial corporations. Drawing on on documents extracted from the web-version of Loan-Connector, that information includes the loans' borrower, starting date, maturity date, pricing, currency, lender composition (including each banks' contribution), and the details of assets that serve as the loans' collateral. using the documents extracted from the web-version of LoanConnector. Our data's uniqueness lies in the detailed informationit provides about loan collateral.

For at least three reasons, syndicated loans function well for the investigation of transmission of U.S. monetary policy towards emerging markets' corporate sector for at least three reasons. First, syndicated loans constitute more than 50% of the increases in cross-border bank lending and more than thirty percent of on-balance sheet bank claims in the cross-border positions (Cerutti et al. (2015)). [8] [9] Second, given that USD is the dominant currency in international finance and trade (Gopinath and Stein (2018), Brauning and Ivashina (2019)), syndicated lending captures more than 95% of all bank lending transactions denominated in USD by both domestic and global banks. This high coverage allows us to develop a full screen-shot image of dollar-funding cost condition changes. Third, syndicated loans to EME non-financial corporate sector serve the goal of capturing the bank lending in domestic currency. Domestic currency syndicated loans in EME averaged 47.8% of total syndicated loan amount, and on the firm side, the recipient firms cover both publicly-traded firms and private firms.[10]

8. According to the aggregation calculation that uses Dealscan, the foreign-currency syndicated loan amount averages about 25.8% of GDP, which is close to the average external debt non-financial sector debt as a percent of GDP (37.8%).

9. For the reason mentioned, syndicated loans have been found to be ideal for studying international transmissions of monetary policies in a number of previous works including Giannettiv and Laeven (2012), Haas and Horen (2012), Demirgüç-Kunt et al. (2017).

10. Bond financing, an alternative source of financing, grew quickly in emerging market economies after the Great Recession, but bank loans have remained the major source of financing for most firms in emerging markets. According to documentation by Jiang and Sedik (2019), non-financial corporate bond in Asia peaked at 2200 billion USD in 2015, and the issuers were concentrated in about 200 large firms, while syndicated loans totaled 4000 billion with a total of more than 4000 firms. The pattern is also reflected in Brauning and Ivashina (2019).

In this paper, we record detailed information about 5019 loan packages (11788 tranches) received by 4490 firms, and we maintain a focus on the assets that serve as collateral from 34 emerging market economies during the period 1992-2018. [11] [12] Two samples of the digitized version of the documents are provided in the appendix. For each digitized record, we document the borrowers and lenders of the syndicated loans, the pricing, maturity, currency, whether there are domestic lenders in the top-tier arrangers (lead banks), the contributions of foreign and domestic lenders in each tranche, and importantly, the assets that serve as collateral. In the second sample, Mandarin Bali Oriental Bali borrowed 108 million USD, and the company pledged one of its properties, "Mandarin Oriental Bali Resorts," as collateral. The category of this collateral is "Real Estate." For all 11788 tranches, we have concrete information about the categories of collateral used, although for some of them we do not have information about the exact assets or goods pledged. The constructed data from all loans that provide concrete details and that are of the collateral type covers 65.8% of the total amount of secured loans to the 34 emerging market economies in the database.

1.1.2 Corporate and bank information

We get the corporate and bank information from Worldscope, BvD ORBIS, Compustat International and Datastream. 2872 of the 4490 firms are public firms, and for more than 80% of the private data/de-listed we obtain balance sheet information from Datastream and the firms' annual report. Further, we take down information about whether the firm is a multinational entrepreneur, whether the firm is a joint venture or whether it has foreign ownership. We rely on the same databases to get information about the lending banks' ultimate parent countries and whether the lending banks' ultimate parent country is the

11. We exclude borrowings from government and special public projects financed by international organizations, such as IFC, Worldbank, ADB.

12. The economies covered include Argentina, Brazil, Bulgaria, China, Chile, Colombia, Czech Republic, Egypt, India, Indonesia, Iran, Israel, Hungary, Korea, Kuwait, Malaysia, Mexico, Morocco, Pakistan, Peru, Philippines, Qatar, South Africa, Saudi Arabia, Romania, South Korea, Russian Federation, Taiwan, Thailand, Turkey, UAE, Ukraine, Vietnam, and Venezuela.

same as the borrowing firm.

1.1.3 Cross-country aggregate variables

We get aggregate variables from Worldbank, IMF IFS, and CEIC. The macroeconomic variables involved in the regression analysis include GDP growth, inflation, domestic credit to GDP ratio, the deposit rate of domestic banks and VIX. Specifically, the external debt of an economy is available in either WorldBank or the country's bureau of statistics website.

1.2 Data Description for Chapter 5

In this paper, we combine data from three main sources: (1) firm-level balance sheet data from the Annual Industrial Survey of China and firm bank relationship lending data CSMAR, Datastream and iFinD; (2) city-level economic data from the Statistical Year Book at either the city or the provincial level; and (3) land transaction and city-level industrial land price data manually extracted from various official websites operated by the Land Bureau of China.

1.2.1 Firm level data

Industrial firms' asset accumulation, investment, and leverage behavior during the global financing cycle are crucial ingredients of my analysis. Moreover, we wish to investigate how firms' borrowing and asset accumulation behavior varies across cities that have different levels of access to China's major domestic global bank (BOC) relative to foreign banks. Two major firm-level databases fit my goal perfectly. The first is the Annual Industrial Survey (AIS in the following paragraphs) and the second is the CSMAR's firm-bank relationship lending database for listed firms.

The AIS is a panel survey of all SOEs and privately-owned enterprises that had revenue of at least five million RMBs (about 601.48 k USD in 2003 USD/RMB) during the period

1998 to 2014. The survey includes rich information about firms' balance sheets, income statements, and cash flows as well as the ownership structure of all manufacturing firms. As of 2007, the database consists of more than 330,000 Chinese industrial firms in a wide industry category that includes more than 40 major industrial categories, 90 industrial groups, and 600 industrial classes. The total output value of firms in AIS covers about 95% of China's nation-wide industrial output value. Further, comparing the summary statistics of the total number of firms' in each city in the AIS and the city-level total number of industrial firms, the coverage on average exceeds 92%. AIS's high coverage allows us to acquire a perfect measure of the leveraging and asset accumulation as well as the foreign credit issuance of China's industrial firms at the city-level. This is because industrial firms are the main foreign credit issuers in China. We drop SOE's from our sample. This leaves me with a sample of 285,298 firms and 2,368,897 firm-year observations. We rely on the AIS to construct firm-level variables on debt issuance, capital expenditures, and TFP. To measure the leverage of firms, we utilize firms' total debt outstanding scaled by lagged total assets. To measure tangibility of firms, we use the firms' PPE (property, plants and equipment) scaled by lagged total assets. We calculate the firms' TFP for each year from 2003-2009 and aggregate it at city level to gauge the industrial sector's productivity change of in the city over time.

1.2.2 City-level Characteristics

Cities are the other key unit of experimental laboratory of our paper as the source of heterogeneity comes from the city heterogeneous presence of Bank of China. The cities in our analysis are prefecture-level cities, which is the administrative unit one level lower than provincial- or municipality- level administrative unit. There are in total 333 prefecture-level cities in China, with an average 10 in each province.[13] [14] The average geographical size of

13. In our analysis, we exclude Hong Kong SAR and Macao SAR.

14. The establishment of an prefecture-level city must meet the following three criteria: first, the city must have a non-rural population sive over 250,000; second, a total gross output value of over 2.5 billion RMB (US$353 million); third, the total industrial and agricultural output value need to exceed 35% of the local

a prefecture-level city is comparable to metropolitan statistical areas (MSA) in the U.S.

In this analysis, there are two key sets of variables: the city-level total lending balances of financial institutions in (1) RMB and in (2) RMB plus Foreign Currency. We obtain the city-level total RMB lending balance to the industrial sector from *China City Statistical Yearbook*,and the lending balances in both foreign and domestic currencies from the *China Statistical Yearbook for the Regional Economy*.[15] [16]

Aside from the main variables of concern, we employ a wide category of city-level control variables to establish the validity of our identification methodology. We focus on three main categories of city-level characteristics. First are basic macroeconomic development indicators, including GDP, GDP per capita, real GDP growth rate, unemployment rate, and endowment of land supply. Second is the city's industrial structure, among which are the total employment/output in industrial sector, service sector, real estate sector, and financial sector. Third is the city's FDI and Export exposures, among which we include the city's total Export/GDP, FDI/GDP, no. of FDI contracts, % of firms that are exporters. From the China City Statistical Yearbook and the provincial/city-level statistical yearbook we obtain a balanced panel of city-level characteristics for 316 prefecture-level cities. The summary statistics of the city-level variables are provided in Table 5.1.

1.2.3 City-level Land Price and Transactions

Land is a very special type of asset that joins domestic credit intermediation and cross-border credit intermediation. Because absence of any frictions or limitation on contracting space, land could be used by local firms as collateral to reach both domestic and foreign credit. We obtain the city level land prices and transactions from various resources.

GDP.

15. China City Statistical Yearbook is available from 1985 and China Statistical Yearbook of Regional Economy starts from 2000.

16. In both cases, we supplement the data with the provincial and city-level statistical yearbook for both consistency and completeness of city coverage.

The first piece of this data is city-level industrial and commercial land price data. The main source of this piece of data is the terminal of China Real Estate Information (operated by the National Information Center of China and the China Land Value Monitoring Report.[17] [18] From CREI we obtained collateralized financing by industrial firms at the prefecture city level for 301 prefecture cities. CREI also contains information on industrial and commercial land prices for 70 major cities in China. The China Land Value Monitoring Report records industrial and commercial land prices for 116 cities. Combining these two sources of data and supplementing them with city-level Statistical Yearbook data we obtain commercial and industrial land price data for 214 prefecture-level cities.

The final piece of data for this part is the city level commercial land transactions and commercial mortgage issuance information. This information is collected from the official website of China's Land Transaction website.[19] The website publishes the *piece-by-piece* land transaction record and land mortgage record. The starting year of the piece-by-piece land transaction record is 1997, each of the 1.8 million total transaction records document the date of the transaction, the buyer and seller of the land, the location of the land, the primary purpose of the land, and the characteristics of the buyer and seller (personal or corporate). The land mortgage publication records a total of 166,756 pieces of transaction between 1999 and 2009. This part of our analysis focuses on transactions between firms and banks.[20] Table 5.16 summarizes data for this part of analysis.

17. http://www.crei.cn/

18. http://www.landvalue.com.cn/

19. https://www.landchina.com/

20. About 80% of the transaction transpires between a local firm and a local bank.

CHAPTER 2

RISE OF DOMESTIC BANKS IN THE INTERNATIONAL FINANCIAL MARKET: ORIGIN AND FACTS

In this chapter, I examine the structure of the cross-border capital that flows to EMEs and how this foreign capital is channeled to EMEs. I document a drastic structural change in the way in which cross-bordered capital has been transmitted to EMEs since the 1990s. Importantly, I provide novel evidence that such a structural change in cross-border capital flow to EMEs can (at least partly) be explained by significant changes in the structure of the US money market during the late 1980s.

2.1 Description of the Structural Change in how Foreign Capital Flowing to EMEs

Over the past several decades, many emerging market economies (EMEs) around the world have experienced unprecedented economic growth. A common factor is often seen behind the fast growth in these EMEs: the flow of cross-border capital to these economies.[1] Starting in the 1970s, emerging market economies around the world began to liberalize their capital accounts, allowing more financial inflows from lenders in the developed world.[2] Since then, the volume of cross-border capital received by corporations in EMEs has been steadily rising. As shown in Figure 2.1, prior to the mid-1990s, the average private sector external debt in fifty major EMEs as a share of their GDP rose to around 30%. In the most recent two decades, this ratio of foreign currency debt to GDP in EMEs around the world seems to have reached its steady state level and has not increased much further.

While the change in the volume of cross-border capital flow to EMEs has become minimal since the late 1990s, since then a drastic compositional change has taken place. Prior to 1990,

1. See Wei (2018), Kose et al. (2009)

2. See Kose et al. (2009)

the cross-border capital flow to EMEs was predominantly channeled directly by foreign banks from developed economies. In constructing measure of cross-border capital, we classify a sum of credit to be foreign credit if the currency of the denomination of the loan is different from the borrowers' home country currency.[3] As shown by the red line in Figure 2.1, almost all of the foreign currency-denominated credit received by corporations in EMEs during this period was issued by foreign global banks.

I show that beginning in the 1990s, domestic banks in emerging markets started to play a nontrivial role in bringing in foreign credit. When constructing measures of the cross-border capital that is channeled by domestic banks in EMEs, we classify a bank as a domestic bank if the nationality of its parent economy is the domestic emerging market economy that it provides credit to; otherwise it is classified as a foreign bank. For example, when extending credit to a corporation in South Korea, Citibank as well as its branches in South Korea are categorized as a foreign bank, while Woori Bank, a bank headquartered in Seoul, is a domestic bank for South Korea. Based on this categorization, for each emerging market we calculate the fraction of foreign credit received by its corporations that is channeled by its own domestic banks.

In figure 2.1, the red curve displays the worldwide average of the fraction in foreign credit (in terms of face value) that is received by 50 major EMEs and channeled by their own domestic banks. Although this ratio remained at a minuscule level throughout 1980s, it started an ascending trend in the 1990s. Until 2007, the year prior to the global financial crises, domestic banks' foreign-currency credit had reached an amount comparable to that extended by foreign banks. Figure 2.3 uses an alternative measure in which the fraction of domestic-banks-channeled foreign credit is constructed on the basis of whether or not the loan has domestic bank participation; it shows a similar ascending trend with a comparable

3. This measurement of foreign capital inflow is constructed on the basis of loan-level observations assembled from LPC DealScan, which covers over 95% of the US dollar denominated loans (in terms of face value) that have occurred across the world. Our measurement does not capture the portion of credit that originates in foreign countries but is loaned by domestic banks in domestic currencies.

scale over the last 3 decades.[4] Furthermore, we show that this ascent in the fraction of domestic-lender-channeled foreign credit is a general trend observed in most EMEs across the world; it is not driven by a few large EMEs. In Figure 2.2, we conduct the same calculations with EMEs grouped in different continents. A common pattern can be seen in all four panels: the volume of the cross-border capital inflow started to increase long before the 1990s, while domestic banks have started to play a role in transmitting foreign capital since then. In Figure 2.10, we show that this temporal trend in the role that domestic banks play in channeling foreign credit is consistently observed at the country level.

2.2 Driving Force of the Structural Change

Having documented changes in the way that cross-border capital is channeled to EMEs, we turn our attention to how these changes occur. Specifically, what factors are likely to have caused these changes? Did they occur because these emerging markets saw an internal demand for globalizing their banking sector and, thus, liberalized their domestic banks' access to the global funding market? Or did something happen on the credit supply side that made it easier for domestic banks in EMEs to raise funding from the global market? In this section, we investigate the causes of this structural change in cross-border capital flow to EMEs.

A. Demand Side Factors

The increase in the share of cross-border capital that is channeled by domestic banks could be driven by changes on the credit demand side. Imagine an emerging economy that experiences fast growth in its housing industry and imagine that only domestic banks can finance the housing industry. In this circumstance, we would expect internal demand to globalize this country's banking sector.

However, three lines of evidence in our empirical investigation suggest that changes on

4. Figure 2.4 displays the same contents as Figure 2.3 using the actual amount channeled by domestic banks rather than the face value of loans with at least some domestic banks participated.

the credit demand side are unlikely to cause the increase. First, if internal demand drives banks in EMEs to gain more access to the global funding market, then we would expect that some countries would have developed this demand during the 1980s. But our finding that the foreign capital received by almost all EMEs was predominantly channeled by foreign rather than domestic banks during the 1980s clearly suggests otherwise.

Second, our cross-country evidence suggests that demand side factors cannot be the whole story. In Figure 2.2, we conduct at the continent level the same calculation carried out in Figure 2.1. A notable similarity is readily seen: on all four continents, the average ratio of foreign credit channeled by domestic banks started to take off during the mid-1990s. In a more detailed country-level calculation, and as displayed in Figure 2.10, we see that this ascending trend in the importance of the domestic-bank transmission of foreign credit is consistently seen in almost all countries. After all, if an analyst were to insist that the structural changes in cross-border capital flow are all driven by internal demand from the credit-receiving EMEs, how would she explain why this internal demand arose everywhere in the world shortly after 1990?

Furthermore, we specifically examine an important alternative – the housing demand in the emerging market world. If the real estate sector can only be financed by domestic lenders (which, in section 3, we show is generally true in the case of EMEs), then such a global structural change in foreign credit flow can only be explained if there is an increased demand for housing everywhere in the world.[5]

B. Supply Side Story: Changes in the U.S. Money Market

If demand side factors cannot be the main driving force, then it is natural to expect that something happened on the credit supply side that might have contributed to this structural

5. However, the domestic bank-channeled foreign credit both started during the same period and grew at a similar pace in Emerging Asia and in emerging Europe and emerging Africa. Emerging Asia saw the fastest middle-class population growth during the past two decades, while middle-class population growth stagnated in emerging Europe and emerging Africa Kharas (2011). Given the fast that residential real-estate is the most important durable goods demanded by middle-class population in an economy, these pieces of evidence suggest that housing demand could not be the sole explanation for the rise of domestic banks in the international financing market.

change in credit flow to EMEs. In this subsection, we argue that the rise of domestic banks in channeling foreign credit to emerging market economies is driven by structural changes in the U.S. money market. Translated into structural change in the global funding market, these changes lead domestic banks in the emerging market to increase their direct participation in the transmission of foreign credit.

i) Structural changes in the U.S. money market around 1990

Throughout the 1980s, the U.S.'s financial market went through an important evolution. Deregulation in the banking sector and other deposit-taking institutions facilitated the rapid growth of savings and loans institutions and stimulated their investment in a broader set of non-homeowner related loans.[6] As shown in Figure 2.5 panel (a), the asset size of S&L institutions had reached more than half of that owned by commercial banks by the end of the decade. Meanwhile, the share taken by mutual funds in the U.S. money market during the 1980s stayed at a negligible level, although the birth of the first mutual fund can be dated back to 1924.

While many S&L institutions took advantage of the loose regulation and made many speculative real estate investment, the end of the 1980s' witnessed a nationwide crisis, during which many of these S&L institutions went bankrupt.[7] Since then the market share of S&L institutions in the U.S. money market had greatly shrunk. Interestingly, the biggest beneficiary of the fall of S&L institutions had been mutual funds and market market funds. In 1985, the share of assets owned by these "shadow bank" institutions was below 5%. By 1995, this number had exceeded 30%. Before the end of the century, these non-bank institutions had gained a comparable share of the U.S. money market as commercial banks. This rise of mutual funds and money market funds in the U.S. deposit market is also documented by

6. Before the deregulation, S&L's by law could only lend up to 20% of their assets for commercial loans, and only half of that could be used for small business loans. Moreover, in the case of Federal Home Loan Bank borrowing approvals, an S&L had to show that 65% of its assets were invested in residential mortgages and other consumer-related assets. Commercial banks not subject to these types of limitations.

7. According to the Savings and Loans Institution Databook published by FDIC, about 4600 savings and loans institutions operated in 1980; in 1990, less than 2000 survived.

a number of institutional studies (Swamy et al. (1996), Gup (1998), Dow and Elmendorf (1998), Kennickell et al. (1997)).[8]

A recent literature has documented and attributed the rapid growth of mutual funds during this episode to the demographic change in the U.S. economy. As documented by Ordoñez and Piguillem (2018), the remarkable increase in population expectancy in the U.S. (and also other developed economies) translated into a large increase in demand for savings and investment. According the the Mutual Fund Fact Book (1998), during the fifteen-year span from 1984 to 1998, the percent of U.S. households that owned mutual funds rose from 11.2% to 44.0%. Typical investors in mutual funds are middle class, and more than 80% of households with mutual fund holdings are headed by individuals in their primary (25-64) income-earning years, with the heaviest concentration in the 35-44 bracket. The quantitative increase in the savings demand does not necessarily mean that the increased demand is going into the shadow banking system. Workers with low income growth and low financial literacy would simply put their wage bills into their local commercial banks. In fact, statistics prepared by the Consumer Finance Survey reveal that the households that are contributing to the increased holdings in the shadow banking system are exactly those that have higher financial literacy and whose household income exhibited faster growth.[9] All of the demographic changes explain the fundamental source on the supply side that led to the emergence of shadow banks or investment companies in the U.S. during the 1990s.

ii) Differences in the foreign investment behavior of the U.S. financial institutions

To understand how such a structural change in the U.S. money market would impact the

8. For example, between 1950 and 1993, U.S. financial assets held by commercial banks fell from 50% to 25%, while the financial assets held by MMFs simultaneously grew from 1% to 10%.

9. In 1998, the median before-tax household income of households whose household head had at least some college education was $\$53,000$ and and the median household income of households that owned mutual funds in 1998 was $\$55,000$. The income of households whose head had a college degree increased by more than 24% from 1992 to 2001, while the growth rate of income in households whose heads had a high school degree or less was less than 7%. The median household financial assets of households whose head had a college degree was close to \$109,000, while the median household financial assets reported by the Mutual Fund Fact Book (1998) was close to \$88,000.

rest of the world, we need to know if these players in the U.S. money markets behave any differently in their choice of assets and investments. In this part, we provide evidence that these distinct types of intermediaries indeed do drastic differences in choosing their asset portfolio, particularly whether or not they make oversea investments and if they do, how they make these investments.

Stringent legal restrictions constrain savings and loans institutions when they choose investment categories. To comply with these legal restrictions, S&L institutions must refrain from investing abroad. Shadow banking institutions, which have largely gained the market share that S&L institutions lost in the U.S. money market, do not face such restrictions in their asset choices. Having a large volume of money to deploy, mutual funds in the U.S. started to expand their investment spectrum to pursue the most profitable projects, sometimes in foreign lands. This fact is reflected in the bottom panel of Figure 2.5. Starting at the end of the 1980s, the international asset holdings of U.S. funds started to increase dramatically. At the end of 1986, the international asset holdings of U.S. funds represented less than 1% of their total holdings. By 1996, that number had risen to more than 12% and exceeded 495 billions.

The differences between U.S. shadow banking institutions and commercial banks in their foreign investments are somewhat more subtle. Commercial banks, too, do not face the investing abroad constraints imposed on S&L institutions. In fact, as reported in the bottom panel of Figure 2.6, throughout the 1980s, cross-border lending accounted for a non-trivial portion of U.S. commercial banks' lending. Although both types of intermediaries shared a willingness and eligibility to invest abroad, how they did so differed drastically.

To examine the foreign asset portfolio structures of these intermediary types in developed economies we explore transaction-level data on U.S. dollar-denominated cross-border loans. Figure 2.6 visualizes the portfolio difference between U.S. shadow banking institutions (MMF and mutual funds) and U.S. commercial banks in the international syndicated loan market.[10]

10. For two reasons, the syndicated loan market provides a lens that can be used to determine how MMFs and mutual fund investors distribute their portfolios. First, during early 1990s, financial innovation facilitated

The figure delivers two pieces of messages. First, starting about 1990, investors in shadow banking institutions sharply increased their investment portfolio share in the international market; in contrast, no such changes are observed in commercial banks. Second, commercial banks focused on making loans directly to emerging market non-financial corporations; these loans accounted for more than 70% of their cross-border syndicated loan portfolio. In contrast, MMFs and mutual funds allocate more than 80% of their cross-border syndicated loan portfolio towards banks and other financial intermediaries in foreign countries.

Figure 2.7 shows the composition of capital credit flows towards emerging market economies. Across all regions of the emerging market world, net bank and trade-related lending started to grow during the 1980s and then stabilized during the 1990s. In contrast, the net flow of portfolio bonds did not start to increase until the 1990s, while at the same time the shadow banking system in U.S. began to grow drastically. The aggregate volume of net bond flows to Latin American economies and Asia Pacific emerging market economies grew almost ten-fold. Coevally, the net bond flow in European emerging market economies' grew five fold, and even in African emerging market economies, where in the 1990s net banking and trade lows were negative, bond issuance grew quickly. Taking another look at issuance level data from the emerging market economies' side, which is shown in Figure 2.8, we decompose the receivers of the bond flows by financial sector and non-financial corporate sector. Consistent with World Bank country-level aggregate data, the total bond issuance volume did not start to increase until the 1990s, and, importantly, approximately 75% of the bonds flowed to financial sectors in the emerging market world. Our findings are also consistent with Kaminsky et al. (2001).

These differences between how U.S. shadow banking institutions and commercial banks made loans in the emerging market is not difficult to understand. Having developed the skills

the active participation of institutional lenders (Nandy and Shao (2007) Nini (2013)), including, especially, the participation of lending banks in the international arena. Second, the data on syndicated loans provide information about lending and borrowing institutions. This information includes accurate identifications of investors' asset allocations. In the case of other asset types, such as bonds and equity, the data are not consistently available and, thus, are hard to track.

(screening and monitoring, etc.) needed to finance the operations of non-financial firms in their own countries, commercial banks in developed economies directly extended credit to real sectors in emerging markets. Shadow banking lenders, however, did not possess such skills. Instead, the MMF and mutual funds in the developed world that wished to invest in profitable projects in EMEs had to develop an additional institutional arrangement: the use of domestic financial institutions from credit-receiving countries, which borrowed from non-bank lenders in the developed world and transmitted the credit to their domestic real sectors.

2.3 Rise of Domestic Global Banks in EMEs

The structural change in the financial market of the U.S. translated into a structural change in the global funding market because the U.S. is the center economy of international finance. Prior to this transformation,the predominant player that channeled credit from the developed world to the emerging market economies had long been commercial banks in developed markets. The on-going expansion of shadow banking institutions in the U.S. money market gave rise to the emergence of a group of new players that brought credit to emerging economies: *globally funded domestic banks* in emerging markets.

In this subsection, we examine foreign-currency debt issuance behavior on the credit-receiving side. Consistent with the credit supply-side changes documented above, we find that commercial banks in the rest of the world started to borrow more and more frequently from the global funding market during the early 1990s. In the upper panel of Figure 2.9, we plot the time-variation of non-U.S. banks' USD wholesale liability as a share of their total wholesale liability. Prior to 1990, this ratio for non-U.S banks from developed market economies (primarily European banks) stayed below 10%, while the ratio for non-U.S. banks from emerging market economies essentially stayed close to zero. Coinciding with the structural change in the U.S. money market, both series started to take off around 1990. By 2005, the U.S. dollar liability reliance of emerging market economies' banks had reached

25%, and in European banks it exceeded 30%.[11]

Moreover, we find that as the U.S. shadow banking institutions expanded their international investment, banks from emerging market economies became more responsive to U.S. monetary policy changes. Figure 2.9 displays how EME banks' USD liability issuance responded to U.S. financial condition indices over time. The U.S. financial condition indices are NFCI (Chicago Fed National Financial Conditions Index) and IMF-index for the United States (2017 GFSR Chapter 3 Annex 3.1). The Figure 5.18(a) and 5.18(c) estimate:

$$\left(\frac{\text{USD liability issuance}}{\text{Total issuance}}\right)_{b,t,r} = \alpha_b + \mu_r + \sum_{r=76-80}^{r=06-10, r\neq 85-90} \beta_r D[t \in r] \times \mathrm{F}_t^{U.S.} + \theta\ \mathbf{X} + \epsilon_{b,t,r}$$

while Figure 5.18(b) and 5.18(d) estimate:

$$1[\text{USD liability issuance}]_{b,t,r} = \alpha_b + \mu_r + \sum_{r=76-80}^{r=06-10, r\neq 85-90} \beta_r D[t \in r] \times \mathrm{F}_t^{U.S.} + \theta\ \mathbf{X} + \epsilon_{b,t,r}$$

where b refers to bank, t refers to year, r refers to the year range, and $\mathbf{X}$ is a vector of country-level control variables, including GDP growth rate, net export/GDP, FDI/GDP, the domestic deposit rate, REER, and the inflation rate. All four regressions transpire at the bank-year level and include 956 banks from 35 emerging market economies. Each bank in the regression has at least three times of issuance. All regressions in the figures include bank fixed effect, year range fixed effect. Standard errors are heteroskedastically robust and clustered at year level. In Figure 5.18(a) and 5.18(c), the LHS is the liability issuance denominated in USD (bond and loan) divided by the total liability issuance of a bank in a given year. In Figure 5.18(b) and 5.18(d), the LHS is a dummy variable that equals 1 if a bank issued USD liabilities in a given year.

As Figure 2.9 clearly indicate, prior to 1990, banks from EMEs essentially did not respond to changes in U.S. financial and monetary conditions. From early 1990s, when U.S. shadow

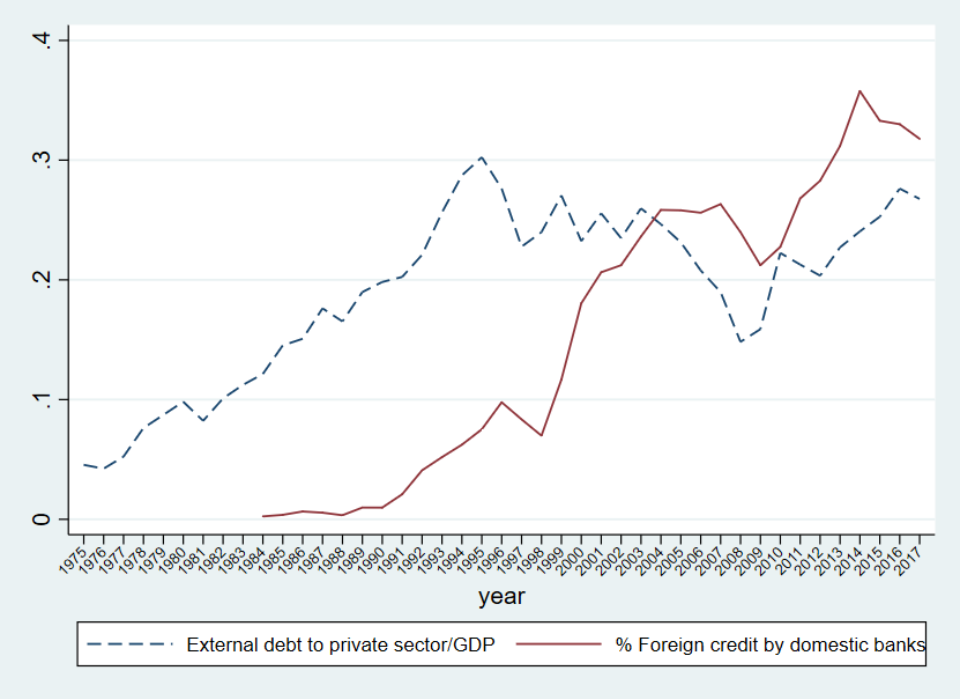
11. The wholesale funding activities of global banks and their reliance on MMFs is also documented in Ivashina et al. (2015), Baba et al. (2009).

banking institutions began to dabble in the international markets, accommodative financial and monetary conditions in United states (lower NFCI and IMF-index) start to generate substantial spillover to the EME banks: EME banks started to issue significant amount of USD liability in response to easing financial conditions in the U.S..

These EME banks did not issue USD liabilities in order to let them to sit idle. Instead, access to global funding markets allowed banks in EMEs to conduct more foreign credit lending. We run a bank-year level regression to examine the correlation between the USD lending and the USD liability issuance of EME banks. As shown in Table 2.1, changes in a EME bank's USD liability issuance are followed by responses in its USD lending, the size of which is both statistically and economically significant. As such, the newly-gained access to the global funding market allowed EME banks to compete with and, thus, replace their developed economy counterparts, which, prior to these structural changes in the U.S. money market, had dominated the transmission of cross-border capital to EMEs.

As a summary of the findings we document above, the burgeoning of shadow banking institutions in the U.S. money market during the last decade of the 20th century gave banks in emerging markets more convenient access to the global financing market. In this way, changes in the money market of the center economy translated into changes in *how* cross-border capital was channeled to borrowers in emerging markets. Access to the global funding market enabled domestic banks in emerging markets to compete with and gradually replace foreign counterparts that previously had dominated the channeling of cross-border credit to firms in EMEs.

Figure 2.1: EME External Debt and FX Credit Intermediated by Domestic Banks



Source: IMF IFS and LPC Dealscan. The navy dashed line plots the external debt to non-financial sector as a proportion of GDP during 1975-2017. The red solid line plots the dollar amount of foreign currency bank credit that are lent by domestic global banks as a proportion of total amount of foreign credit over the span of years during 1990-2017. The compilation is the average of 50 emerging market economies.

2.4 Appendix

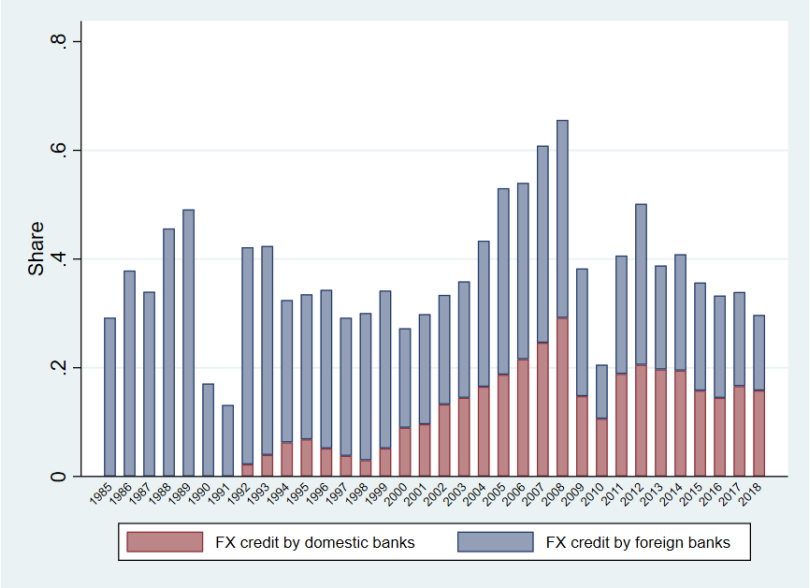
Figure 2.2: Rise of Domestic banks in cross-border lending all over the world

(a) (b)

(c) (d)

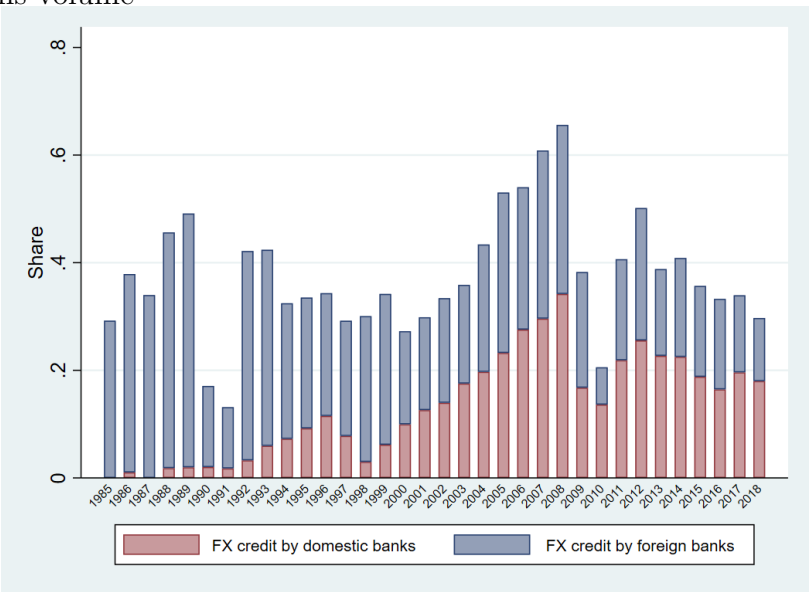
Source: IMF IFS and LPC Dealscan. For regional figure, the navy dashed line plots the external debt to non-financial sector as a proportion of GDP during 1975-2017. The red solid line plots the dollar amount of foreign currency bank credit that are lent by domestic global banks as a proportion of total amount of foreign credit over the span of years during 1990-2017. The compilation is the average of 50 emerging market economies.

Figure 2.3: Domestic bank participated foreign-currency cross-border loans and foreign-bank only cross-border loans



Source: LPC Dealscan. Figure shows the dollar amount of foreign-currency denominated loans to emerging market economies' non-financial corporate sector that are issued by domestic bank participated tranches and by foreign-bank-only tranches respectively. The share is calculated as the sum of loans in respective definitions scaled by total volume of loans to EME in a given year. The calculation is based on 50 major emerging market economies.

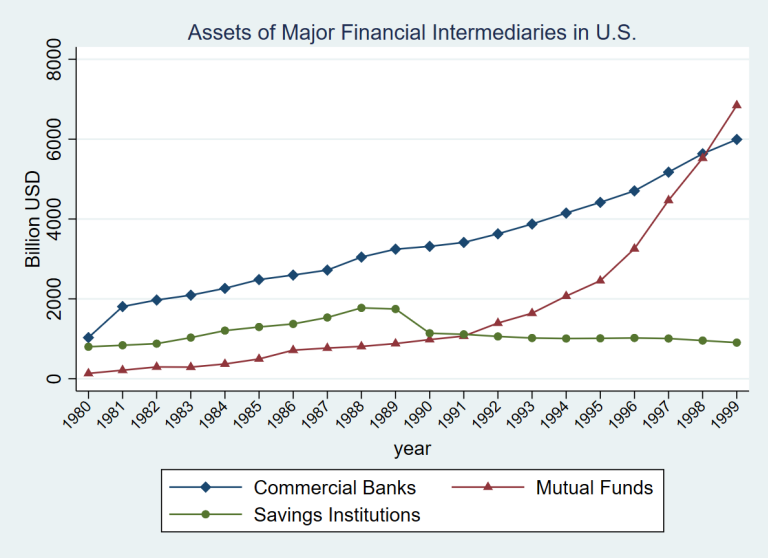
Figure 2.4: Domestic bank foreign-currency cross-border loans volume and foreign-bank lent cross-border loans volume



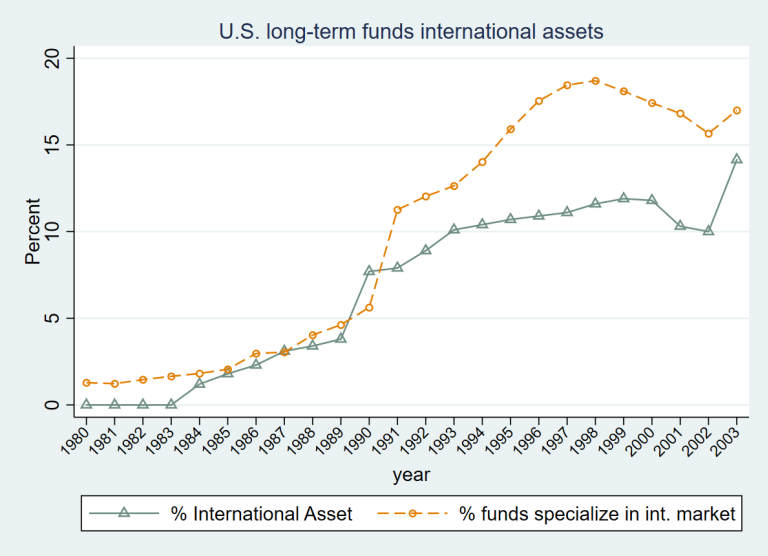
Source: LPC Dealscan. Figure shows the dollar amount of foreign currency denominated loans to emerging market economies' non-financial corporate sector that are lent directly by domestic bank-participated tranches and by only by foreign banks respectively. The share is calculated as the sum of loans in respective definitions scaled by total volume of loans to EME in a given year. The calculation is based on 50 major emerging market economies.

Figure 2.5: Expansion of Mutual funds in the U.S. Financial Market and in international market

(a)



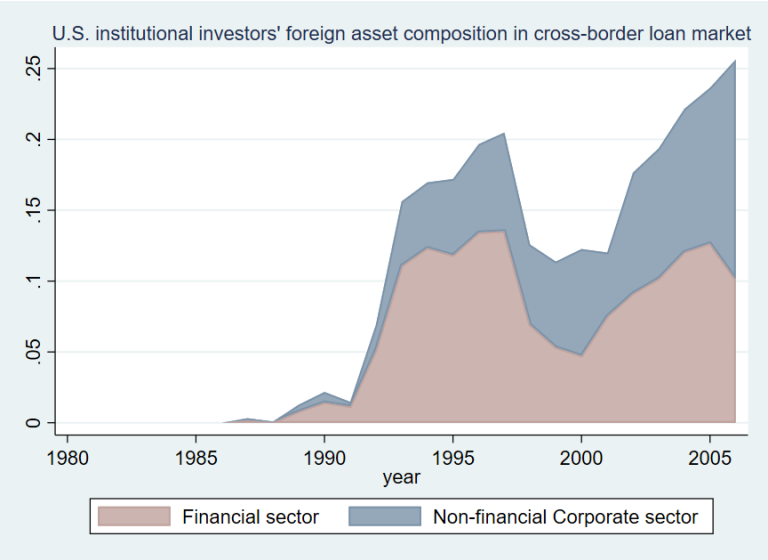
(b)



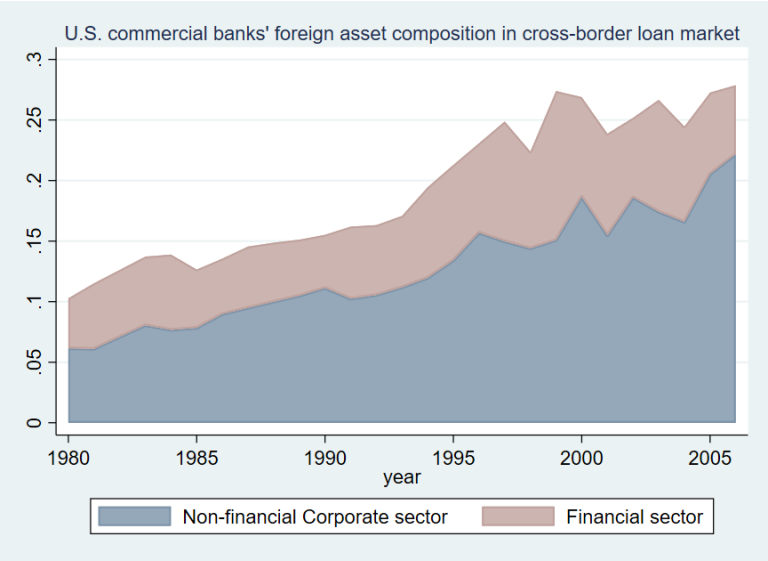
Notes: The source of the data in the above figure comes from *Mutual Fund Fact Book (1980-2000)*. In panel (a) "Savings Institutions" include all the mutual savings banks and savings & loans associations. Mutual funds include money market funds and bond funds. Panel (b) plots the share of total net assets that are classified as investment in the international market, the funds in this figure includes money market funds and bond funds.

Figure 2.6: Mutual funds and commercial banks different investment strategy in international market

(a)

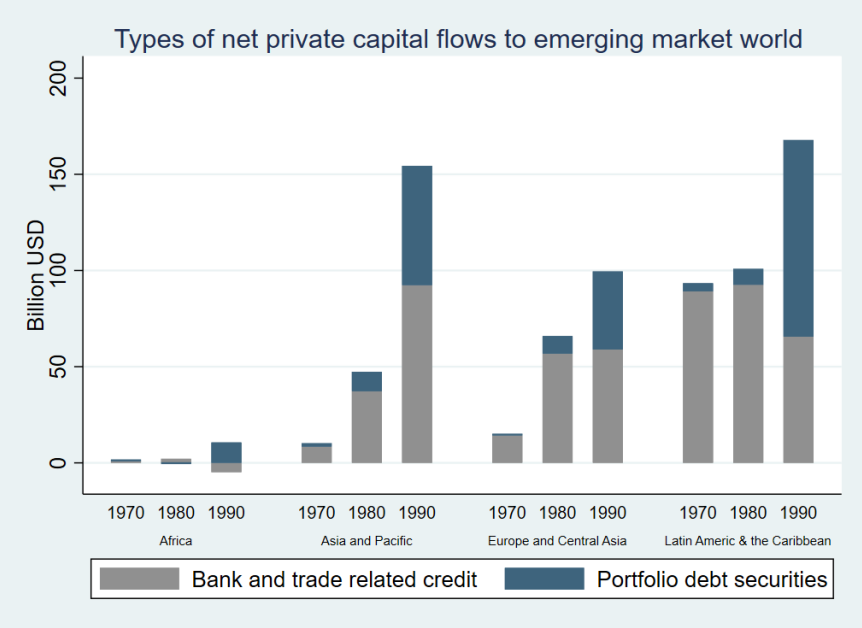


(b)



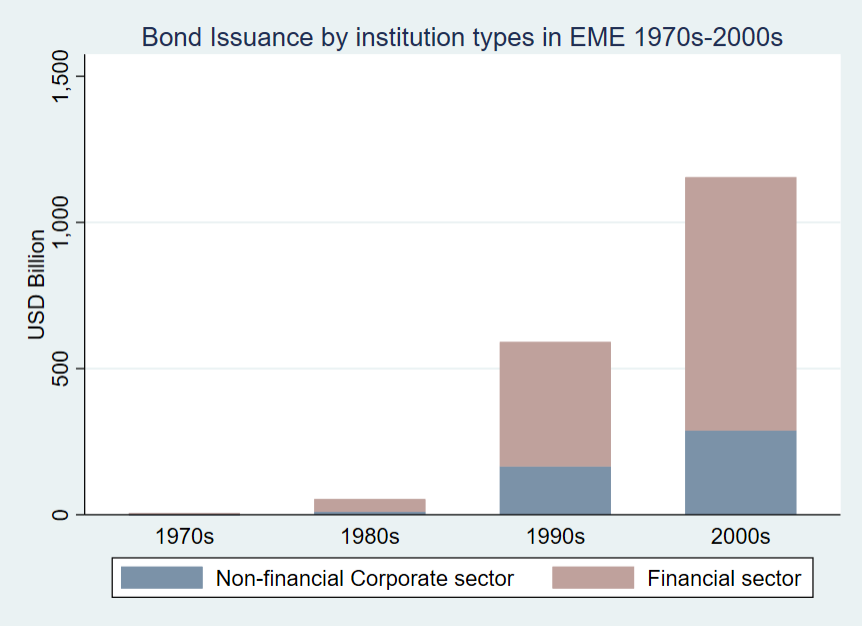
Source: Dealscan. The sum of blue and red area shows the proportion of total lending of U.S. non-bank fianancial institutions (panel (a))/commercial banks (panel (b)) total lending to foreign entities as of total lending; the blue area shows the proportion of lending to foreign borrowers of total lending amount in a given year, the red boundary shows the proportion of total lending to foreign banks, both are aggregate proportions. Mathematically, Blue+Red $= \frac{\sum_l \text{Loan amount}_l \times 1[[\text{EME borrower}]_l}{\sum_l \text{Loan amount}_l}$, Blue $= \frac{\sum_l \text{Loan amount}_l \times 1[[\text{EME borrower}]_l \times 1[[\text{Non-financial}]_l}{\sum_l \text{Loan amount}_l}$, Red $= \frac{\sum_l \text{Loan amount}_l \times 1[[\text{EME borrower}]_l \times 1[[\text{Financial}]_l}{\sum_l \text{Loan amount}_l}$.

Figure 2.7: Types of net private debt flows to emerging market economies



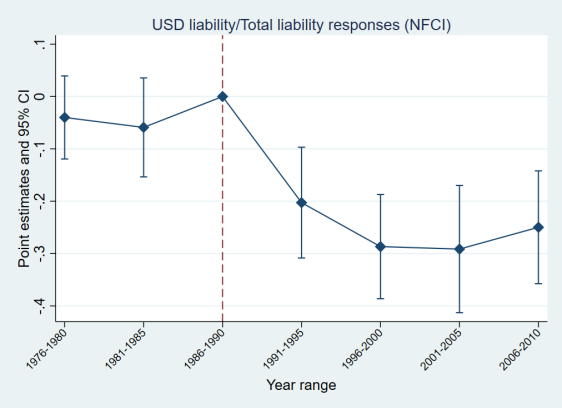
Source: Worldbank. The figure displays types of cross-border net debt flows to private sector of EMEs. Bank and trade related refers to bank debt, portfolio debt securities refers to portfolio bonds.

Figure 2.8: Bond issuance by sector in EME

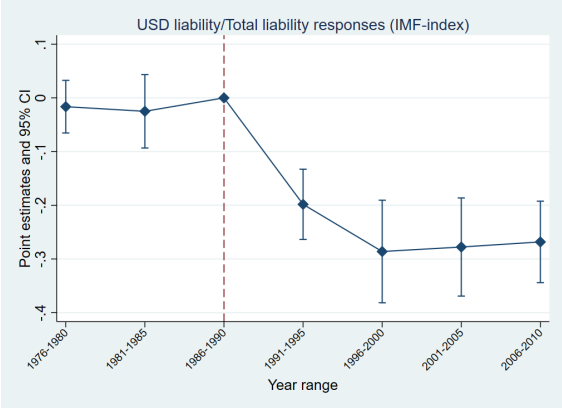


Source: Thomson One Banker. The figure displays the bond issuance volume by EME non-financial corporations and financial sector. From 1970s to 2000s.

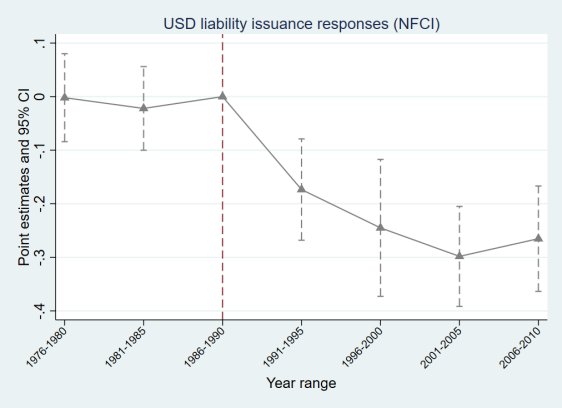
Figure 2.9: EME banks' dynamic responses to U.S. financial condition indices



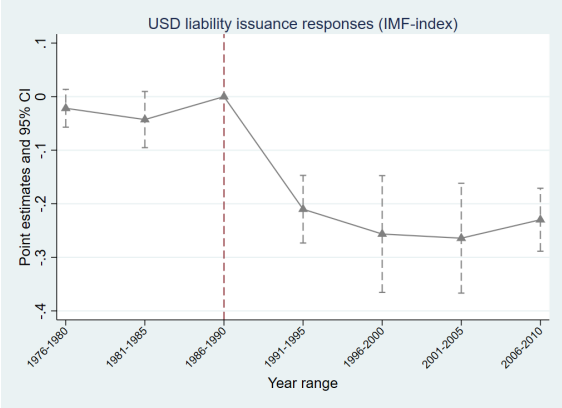
(a) Share of USD liability issuance to NFCI



(b) USD issuance to NFCI



(c) Share of USD liability issuance to IMF-index



(d) USD issuance to IMF-index

Figure 2.9 illustrates EME banks' USD funding issuance in response to U.S. financial condition indices over time. The U.S. financial condition indices are NFCI (Chicago Fed National Financial Conditions Index) and IMF-index for the United States (2017 GFSR Chapter 3 Annex 3.1). The Figure 5.18(a) and 5.18(c) estimate:

$$\frac{\text{USD liability issuance}}{\text{Total issuance}}_{b,t,r} = \alpha_b + \mu_r + \sum_{r=76-80}^{r=06-10, r\neq 85-90} \beta_r D[t \in r] \times \mathrm{F}_t^{U.S.} + \theta\ \mathbf{X} + \epsilon_{b,t,r}$$

while Figure 5.18(b) and 5.18(d) estimate:

$$1[\text{USD liability issuance}]_{b,t,r} = \alpha_b + \mu_r + \sum_{r=76-80}^{r=06-10, r\neq 85-90} \beta_r D[t \in r] \times \mathrm{F}_t^{U.S.} + \theta\ \mathbf{X} + \epsilon_{b,t,r}$$

where b refers to bank, t refers to year and r refers to the year range, $\mathbf{X}$ is a vector of country-level control variables including GDP growth rate, net export/GDP, FDI/GDP, deposit rate, REER, and inflation rate. All four regressions are at bank-year level, and include 956 banks from 35 emerging market economies, each bank in the regression has at least three times of issuance. All regressions in the figures include bank fixed effect, year range fixed effect, standard errors are heteroskedastically robust and clustered at year level. In Figure 5.18(a) and 5.18(c), the LHS is the liability issuance denominated in USD (bond and loan) divided by total liability issuance of a bank in a given year; in Figure 5.18(b) and 5.18(d), the LHS is dummy variable that equals to 1 if a bank issued USD liabilities in a given year.

Figure 2.10: Snap-shot of domestic bank channeled foreign credit in cross-border market by selective countries

Source: LPC Dealscan. Figure shows the share of foreign currency denominated credit to emerging market economies' non-financial corporate sector that are lent directly by domestic banks, taken from three snapshot years.

Table 2.1: EME banks' USD borrowing and lending behavior

Panel A: USD Lending and Funding Comovement

	Ln[USD lending]			
	(1)	(2)	(3)	(4)
Ln[USD liability]	0.189***	0.188***	0.189***	0.188***
	(0.0331)	(0.0360)	(0.0473)	(0.0467)
U.S. Interst rate	0.723	0.720	0.723	0.720
	(1.703)	(1.703)	(1.352)	(1.359)
Δ GDP	0.342	0.342	0.342	0.342
	(1.134)	(1.134)	(0.302)	(0.302)
REER	-0.00551	-0.00549	-0.00551	-0.00549
	(0.00405)	(0.00405)	(0.00421)	(0.00430)
Ln[USD liability]$\times$ 1[US expansion]		0.0239***		0.0239***
		(0.0275)		(0.0174)
Observations	3832	3832	3832	3832
Adjusted R^2	0.950	0.950	0.950	0.950
Bank FE	Yes	Yes	Yes	Yes
Cluster			21	21

Panel B: USD Funding and U.S. Monetary Condition

	Ln[USD Liabilities]		%USD Liabilities	
	(1)	(2)	(3)	(4)
U.S. Interest rate	0.748***	0.747**	0.0344**	0.0342**
	(0.221)	(0.237)	(0.0109)	(0.0112)
Δ GDP	-0.382	-0.198	-0.0173	-0.0231
	(0.330)	(0.183)	(0.0229)	(0.0113)
REER	-0.0763*	-0.00752	-0.0117	-0.00536
	(0.0346)	(0.0317)	(0.00842)	(0.00355)
VIX	-0.00135	-0.00878	-0.00545	-0.00560*
	(0.00100)	(0.00755)	(0.00880)	(0.00260)
Observations	65611	65611	65122	65122
Adjusted R^2	0.982	0.989	0.038	0.666
Bank FE	Yes	Yes	Yes	Yes
Clusters		21		21

Standard errors in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

The above table presents USD funding issuance and USD lending behavior of emerging market banks. Panel (A) shows the correlation between the amount of USD funding issuance and the amount of USD lending; panel (B) shows the correlation between the amount of USD funding issuance and the U.S. interest rate (Federal Fund rate).

CHAPTER 3

PREFERENCES OF LENDING BASES: FOREIGN BANKS V.S. DOMES-TIC BANKS

In the above chapter, we have documented a global trend in the transmission of credit ow to emerging markets, wherein domestic banks from EMEs gradually took over the role of channeling cross-border credit, which originally had been played by foreign banks. A natural question arises: Do these two distinct groups of lenders allocate cross-border credit differently? In this chapter, we examine these differences.

We begin by identifying two types of corporate firm borrowing bases: those that are transparency-based and those that are tangibility-based. We find that the two groups of lenders differ drastically in their lending bases preferences. Specifically, foreign banks are considerably more reluctant to conduct collateralized lending against fixed assets. Exploiting cross-country variations, we provide evidence that this difference can be explained by the difficulty that foreign lenders face when monitoring and seizing physical collateral; among domestic lenders, these tasks are less difficult. We then focus our attention on corporate lending in emerging markets; monitoring and seizing physical collateral in these markets is more costly. We also exploit within-firm variation to determine how the lending technologies of foreign and domestic lenders differ from one another.

3.1 Constituents of Firm Debt Capacity: Transparency and Tangibility

A borrower cannot borrow from a rational creditor an amount that exceeds what he can commit to pay back. Corporate debt capacity, a key concept in any corporate finance textbook, plays a pivotal role in the transmission of cross-border capital flow to emerging markets.

In the literature of corporate finance theory, non-financial firms have access to two major

sources of debt capacity that they can rely on for borrowing. The first is the transparency (or pledgeability) of firms' cash flows and earnings (e.g. Stiglitz and Weiss (1981), Holmstrom and Tirole (1997)). The second is the tangibility (or redeployability) of firms' assets (e.g., Hart and Moore, 1994; Kiyotaki and Moore, 1997; Bernanke, Gertler, and Gilchrist, 1999.) Figure 3.2 illustrates these two major constituents of corporate firms' debt capacity and the relevant lending bases for each type of debt capacity source.

Transparency-based lending includes arms-length debt, unsecured bank loans, and bank loans backed by assets whose value is sensitive to the earning and cash flow of borrowing firms. As shown in Figure 3.2, the income and cash flows of firms such as Formosa Plastics Corp. and Tencent Holdings (paralleling Ineos in the U.K. and Apple Inc. in the U.S.) are highly transparent and trustworthy in their reporting. These qualities allows these firms to issue large sums of bonds and unsecured loans. Normally, a reputation-related lending base is not written into credit agreement documents. A second tier of borrowers explicitly pledges their future earnings and receivables to creditors in loan documents. The most common of these pledged lending bases are "Securities", "Agency Guarantees", "Account Receivables", and "Reserve and Inventories". Often such earning/cash flow-based lending is accompanied by EBITDA-related financial covenants.

In contrast, tangibility-based lending often is based on assets that have a value that is independent of a firm's operating conditions. This type of lending is exclusively carried out by commercial banks in the form of collateralized loans secured by physical fixed assets. Should borrowers fail to make the promised payment, the creditors are granted the right to seize the collateralized fixed assets and sell those assets at market prices. Examples of fixed assets in collateralized lending include aircraft, vehicles and vessels, commercial lands, properties, machines, and real estate.

Which lending base a credit agreement would rely upon is obviously determined (at least in part) by the borrowers' characteristics. As documented in a large literature, only borrowers that have a strong reputation and financial sophistication can base their borrowing

on transparency (e.g. Diamond (1991)). Other borrowers, such as newly established corporations, usually have to rely on their tangible assets for borrowing before they become ready and qualified for transparency-based borrowing. In table 3.4, we report the frequency of corporate lending base reliance in both developed markets (DME) and emerging markets (EME).[1] In emerging market economies, which often feature a large fraction of newly established and less financially sophisticated firms, lending is often based on fixed value assets.

3.2 Lender Identity and Insolvency Resolving Easiness

In addition to it's obvious contingency on borrower-side characteristics, the debt capacity of a corporate firm is also determined by who is conducting the lending. In this part, we show that a particular dimension of lender identity– whether the lender is domestic or foreign– affects corporate lending bases. Specifically, we provide evidence that foreign banks behave very differently from domestic ones when, under certain circumstances, they choose their lending base.

A well-documented feature of emerging market economies is their relatively weak protection of creditor control rights when the debtor encounters insolvency conditions. According to the World Bank Doing Business, the average period of time needed to deal with insolvency in our sample's 62 emerging market economies is greater than 3 years, and the average cost as a share of the borrowers fixed assets is about 20%.[2] In the developed market group, in contrast, the average length of time spent dealing with insolvency is 1.7 years and the average cost as a share of the borrowers fixed assets is 9.3%.

In economies that provide weak general creditor protection and debt enforcement, lenders must conduct more frequent and timely monitoring and be skillful at dealing with a variety

1. The calculation is based on loans recorded in Dealscan, LoanConnector and Datastream.

2. Detailed information can be found at: https://www.doingbusiness.org/en/data/exploretopics/resolving-insolvency

of insolvency-related situations. The following cases of "ghost collateral" in China vividly illustrate how domestic and foreign lenders approach the problem of dealing with misbehaving borrowers differently. Hanning Iron and Steel Co. and Decheng Mining Ltd. are Chinese companies in similar industries. Both companies have proposed fraudulent collateral when they have reached for loans; the former, for example, pledged the same pile of 291-ton steel to multiple lenders, while the latter faked warehouse receivables. In the Hannings case, the lender was CITIC, and its inspector, assigned to a local branch in Shanghai, discovered the fraud unexpectedly during a regular inspection. Eventually CITIC won the court order and recovered a significant part of its losses. But in the Deching Minings case, the main lenders are Standard Chartered and HSBC, both of which are foreign banks. The banks failed to uncover the fraud carried out by the company, and eventually they faced a potential loss of several billion dollars.[3].

Indeed, the extra difficulty that foreign lenders face when they conduct a close monitoring of the physical assets being pledged as collateral prevents them from extending credit on the basis of tangibility. Figure 3.4 compares the lending bases of foreign and domestic banks that extend loans to borrowers in the two economies. In both panels, the orange-shaded bars represent the dollar amount proportion of loans that were based on fixed-value assets extended by either domestic or foreign banks.[4] The left part of panel (a) reports the lending base compositions of loans extended to emerging market borrowers. A drastic difference can be seen: over 60% of the loans extended by domestic banks are backed by fixed-value assets as collateral, but only 20% of foreign bank extended loans are tangibility-based. Yet when we examine the loans received by borrowers from developed markets, we see no such distinctions, as is illustrated in the right part of panel (a).

We propose, then, that the different lending base preferences of domestic and foreign banks are driven by the relatively higher costs associated with insolvency resolution in

3. The link to the relevant case: https://www.reuters.com/investigates/special-report/china-collateral-fake/

4. Foreign bank participation is defined as the loans with at least one foreign bank in the syndication.

emerging markets. To justify this, we direct our attention to emerging markets and sort them according to their debt enforcement conditions.[5] As shown in the Panel (b) of Figure 3.4, the difference between the lending base preferences of domestic and foreign lenders is much more pronounced in emerging market countries that have relatively high insolvency resolution costs.

To formally test the relations illustrated in Figure 3.4, we run a panel regression with the deal-level data that contains detailed information on the lender-borrower pair and lending bases. Specifically, for each deal we regress the lending base on a set of proxies for the ease with which to liquidate fixed assets in the borrower's country and whether the lender is a foreign lender or domestic lender:

$$\begin{aligned} 1[\text{Fixed assets}]_{b,c,t} &= \alpha_{b,t} + \beta I^{c}_{\text{Liquidation cost}} \\ &+ 1[\text{Foreign bank}] + 1[\text{Foreign bank}] \times I^{c}_{\text{Liquidation cost}} + \gamma X + \epsilon_{b,t} \end{aligned}$$

where b indexes bank, c indexes the borrower's country, and t indexes year, 1[Foreign bank] is a dummy variable that equals to 1 if the lending bank is a foreign bank relative to the borrower's home country, and $I^{c}_{\text{Liquidation cost}}$ is the measure of the ease with which fixed assets in the borrower's home country c can be liquidated. We use four measures to capture this liquidation cost. The first is Year resolve, which is the average number of years it takes to resolve insolvency in the borrower's country; the second is the average cost of resolving an insolvency (in percentage of the borrowing firm's fixed assets); the third is the number of days it takes to register property; and the fourth is the number of steps it takes to register property in the borrower's country.[6] All four measures are intended to measure difficulty or relatively higher cost for foreign lenders of dealing with fixed-asset-based lending, either at

5. The classification of higher and lower debt enforcement strength are based on the World Banks' Doing Business Debt Enforcement Index overall score. Details about each country are provided in the appendix.

6. The four variables in the regression come from World Bank Doing Business's "Resolving Insolvency" series and "Registering Property" series.

the contracting stage or when a borrowing firm in EME runs into insolvency conditions.

Table 4.13 reports the results of the above regression. In column (1), we find that the longer it takes in the borrower country's to resolve insolvency, the less likely it is that any bank will lend on the basis of fixed value assets to firms in that country. While foreign lenders on average are 16.3% less likely than domestic lenders to lend on the basis of fixed assets, the difference will widen by another 5.3% if in the borrower's economy it takes 1 more year to resolve insolvency. The longer it takes on average to resolve insolvency, the more costly it is for lenders to make sure that the collateral's value is preserved; to do this lenders must periodically be able to monitor and evaluate the value of the collateral– a process that is generally more costly for foreign lenders than domestic banks.

Similarly, in column (2) we interact the foreign bank dummy with the average cost of resolving insolvency as a percentage of the borrower's fixed assets. The pattern is similar to that seen in column (1): A 10% higher cost associated with resolving insolvency in terms of seizing borrower's fixed assets is associated with 5.8% increase in the difference between foreign banks and domestic banks in the likelihood that they will accept fixed assets as lending bases. In column (3) and (4) of Table 4.13, we conduct the same set of investigations, but here we interact the foreign bank dummy with the number of years and procedures it takes to register property in the borrower's country. The longer the time it takes and the more complex it is to register property, the more costly it is and the more uncertain it becomes for foreign banks (relative to domestic banks) to ensure that the value of the borrower's fixed assets can be maintained and, thus, the less likely it is that foreign banks will accept the borrower's fixed assets as a lending base. For every additional year that it takes to register property, the likelihood that a foreign bank will accept the borrower's fixed assets as a lending base decreases by 3.3%–relative to the likelihood that a domestic bank from the borrower's country will accept the same terms. For every 2 additional steps that it takes to register property, the likelihood that a foreign bank will loan funds decreases by 5%– relative to the likelihood that a domestic bank from the borrower's country will do so.

3.3 With-in Firm Analysis: Lending Base Differences between Foreign and Domestic Lenders

Based on the categorizations of the lending bases and having documented the source of the differences in domestic and foreign banks, we now examine how these two distinct types of lenders behave differently when they extend credits to EME borrowers. Our goal is to conduct a with-in firm analysis based on our loan-level data in order to establish causal inferences about how the underwriting of credit agreements is affected by foreign bank participation. Specifically, we examine how collateral usage and covenant inclusion in foreign-currency dominated loans are affected by the degree of foreign lender participation. We start by specifying the empirical framework and sample construction for our tests.

Empirical Specifications

A major issue with simply running a cross-sectional analysis is that selection biases could potentially happen on both the lender's or the borrower's side. On the lenders' side, banks could choose to enter into certain loan contracts for reasons other than how much friction they expect to encounter when they need to liquidate or monitor. For example, foreign banks might be systemically more familiar than domestic banks in EMEs with lending to technology or communication industries. But firms in these industries intrinsically feature an intangible asset structure and, thus, they are unlikely to borrow against physical assets. In this case the fact that foreign banks conduct less tangiblility-based lending should not be attributed to their distinctive preference on lending base from domestic banks.

Similarly, on the borrower's side, even within a single firm, the availability of fixed assets and the prosperity of future earnings might differ at different points in time. Simply controlling for firm fixed effects and time fixed effects does not solve the problem. It could be possible that in one year, a firm issues a loan with domestic lenders in order to buy some physical inputs (e.g., commercial land) and pledges the purchased assets as collateral. In a different year, this same firm issues another loan with foreign banks to finance its export-

ing, in which case the firm pledges its export receivable to the creditors. In this scenario, domestic and foreign lenders finance this same firm against different lending bases because the specific purposes of the loans differ at different points in time in the firm's operation. In other words, such differences do not always reflect differences in the capacity to lend against tangible assets as collateral.

To establish a causal correlation, we restrict our sample to firms that have issued at least one multi-tranche deal, with each tranche having different lender compositions (in terms of foreign bank participation).

This allows us to investigate *within-firm* (and at the *same point* in time) whether two tranches of the same loan package that have different foreign bank participation rates will produce differences in the structure of lending bases.

Our tests examine two main aspects of the underwriting of corporate debt contracts. First, we study how the usage of fixed assets as collateral in loan contracting is affected by the participation of foreign lenders, as shown in the following equations:

$$1[\text{Fixed assets collateral}]_{i,d,tr} = \alpha_i + \mu_d + \beta(\text{Foreign bank share/participation}) + \gamma\mathbf{X} + FE's \quad (3.1)$$

$$[\%\text{Face value fixed assets}]_{i,d,tr} = \alpha_i + \mu_d + \beta(\text{Foreign bank share/participation}) + \gamma\mathbf{X} + FE's \quad (3.2)$$

where i stands for the firm i, d stands for deal, and tr stands for tranche of the deal. The physical collateral usage in each deal tranche is proxied by two measures: a dummy variable that equals to 1 if any fixed asset is being pledged as collateral; and the fraction (in terms of face value) of the tranche that is backed by physical collateral. Analogously, we apply two similar measures to proxy our main regressor, which is foreign lender participation in each loan tranche. The first of these is a dummy variable that equals 1 if the tranche involves the participation of at least one foreign bank (1[Foreign bank participation]); the other is the share of the foreign banks in the total dollar amount of the tranche expressed in percentage terms (Foreign bank share %).

In parallel, we conduct the same set of analyses on the covenant inclusion in loan contracting. Specifically, we run the following tranche-level regression

$$1[\text{Covenant}]_{i,d,tr} = \alpha_i + \mu_d + \beta(\text{Foreign bank share/participation}) + \gamma\mathbf{X} + \epsilon_{i,d,tr} \quad (3.3)$$

where i indexes borrowing firms, d indexes deal, and t indexes the deal's tranche. Firm and deal fixed effects are captured by α_i and μ_d respectively. Foreign lender participation in each deal tranche is measured as described above, while covenant inclusion is measured by a dummy variable that equals 1 if the deal tranche includes covenants.

Baseline Results

In Table 3.4 to Table 3.7, we display our identification results, which reveal how foreign bank participation affects the physical collateral usage in the contracting of cross-border credit. In Table 3.4 and Table 3.5, the LHS variable is a dummy variable that equals 1 if and only if the tranche is secured by some fixed assets. We find that the degree of foreign bank participation has a significant impact on lending bases outcomes. As presented in column (1) of Table 3.4, foreign bank participation is associated with a 19.2% decrease in the probability that a tranche in a given deal is contracted based on fixed assets for any given firm. This effect remains stable after accounting for the time and industry-time fixed-effects, as shown in column (2). Similarly, in column (1) and (2) of Table 3.5, we see that a 15% increase in the share of foreign banks in the total tranche amount is associated with a 36% decrease in the likelihood that a firm's tranche in a deal is contracted on the basis of fixed value assets.

To account for the effect of tranche-specific characteristics on lending base outcomes, we add control variables that reflect tranche-specific properties. These variables include the natural log of the tranche's amount, the tranche's maturity, the tranche's purpose dummies, and tranche-type dummies. Results that combine tranche-level controls as well as all the fixed effects are reported in column (3).[7] In column (4), we report results after controlling for

7. There are three main categories of purposes, M& A, trade-related, and general purposes.

a variable called Debt Enforcement. This variable captures how efficient it is on average for an insolvency case to be resolved in the borrower's country. The higher the score, the more efficient the procedures are that resolve insolvency issues in the borrowing firms' country. Notice that including this variable also absorbs the country fixed effects, which are country-specific variables.

We further take into consideration the possibility that macroeconomic conditions in borrowers' countries may distort the effect of foreign bank participation on lending base outcomes. For instance, macroeconomic conditions in the borrower country'could potentially affect the favorability of specific types of lending bases, or it could induce foreign banks to extend corporate lending to certain types of firms. In both cases, the regression results are likely to be tilted. To deal with this concern, we add three key borrower-country macroeconomic controls variables: GDP growth, REER, and Domestic Credit/GDP. As can be seen in column (5) in both Table 3.4 and Table 3.5, adding these macro-level control variables barely changes the main coefficient of interest.

Finally, in column (6) and column (7), we further add dummy variable controls that reflect whether a borrowing firm is a multinational entreprenuer and whether it is jointly owned by foreign investors. Both MNE and firms with foreign ownership structures have a much higher probability than general firms in the domestic market of having non-domestic fixed assets. Controlling for these firm types ensures that the results are not affected by the presence of special ownership structures on the firms' side.

In Table 3.6 and Table 3.7, we run the same set of regressions that we run in Table 3.4 and Table 3.5. The difference here is that we focus on a sub-sample of tranches and deals that contain detailed information about the percentage of the tranche's face value that is secured by domestic fixed assets. This allows us to construct a measure of the degree of foreign lender participation in each deal tranche that is more refined than the dummy variable, which indicates whether domestic fixed assets are used in the lending base formation. After this restriction, our sample shrinks to a total of 5062 tranches in 2104 deals undertaken by

1762 firms. Consistent with the results in Table 3.4 and Table 3.5, foreign bank participation decreases by 18.8% the likelihood that domestic fixed assets will show up in lending bases, while a 15% increase in foreign bank share in the tranche value will result in a 33.5% decrease in the percentage of a loans' face value that is written against fixed assets. These results stay robust after adding industry-time, and time fixed effects do not alter the results, nor does adding country-level legal enforcement quality, country-level macroeconomic controls, and firm ownership characteristics.

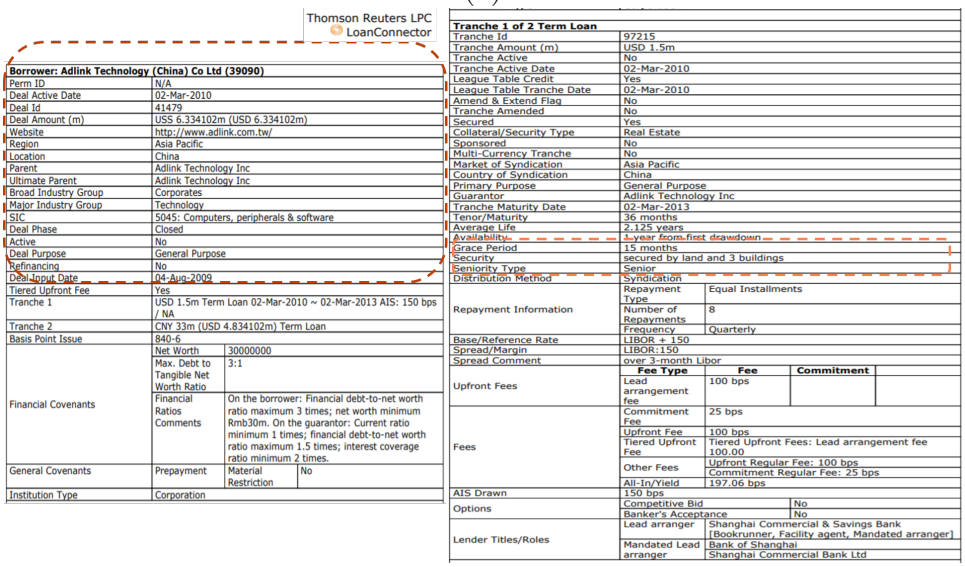
The second part of our tests in this subsection examines the effect of foreign bank participation on the likelihood of covenant inclusion in debt contracts. In accordance with Table 3.4 to Table 3.7, we run the same set of regressions with main regressors being dummy variables that indicate whether there is foreign bank presence and the total share of the face value that is lent by foreign banks. Table 3.2 and Table 3.3 display the results for this part of test, which is based on equation (3). We find that foreign bank participation on average increases the likelihood of covenant inclusion in the contract, underwriting cross-border credit by 12.4%. A 15% increase in a foreign bank's share in the tranche total amount increases by 28.1% the likelihood of covenant inclusion. These results remain statistically significant and quantitatively similar after we add on industry-time and time fixed effects, as well as country-level debt enforcement strength, country-level macroeconomic controls, and firm ownership characteristics.

To summarize, by examining tranche-level observations in foreign-currency-denominated credit agreements in EMEs, we find that foreign and domestic banks differ drastically in their lending base preferences. Specifically, when they extend credit to borrowers from emerging markets, foreign banks show a significantly greater reluctance than domestic banks to conduct collateralized lending against fixed assets. Instead, cross-border credit extended by foreign banks is more likely to be transparency-based, an arrangement that often relies on the inclusion of covenants in credit agreements.

3.4 Appendix

Figure 3.1: Data Sources Demonstration

(a)



Thomson Reuters LPC
LoanConnector

Borrower: Adlink Technology (China) Co Ltd (39090)			
Perm ID	N/A		
Deal Active Date	02-Mar-2010		
Deal Id	41479		
Deal Amount (m)	USS 6.334102m (USD 6.334102m)		
Website	http://www.adlink.com.tw/		
Region	Asia Pacific		
Location	China		
Parent	Adlink Technology Inc		
Ultimate Parent	Adlink Technology Inc		
Broad Industry Group	Corporates		
Major Industry Group	Technology		
SIC	5045: Computers, peripherals & software		
Deal Phase	Closed		
Active	No		
Deal Purpose	General Purpose		
Refinancing	No		
Deal Input Date	04-Aug-2009		
Tiered Upfront Fee	Yes		
Tranche 1	USD 1.5m Term Loan 02-Mar-2010 ~ 02-Mar-2013 AIS: 150 bps / NA		
Tranche 2	CNY 33m (USD 4.834102m) Term Loan		
Basis Point Issue	840-6		
Financial Covenants	Net Worth	30000000	
	Max. Debt to Tangible Net Worth Ratio	3:1	
	Financial Ratios Comments	On the borrower: Financial debt-to-net worth ratio maximum 3 times; net worth minimum Rmb30m. On the guarantor: Current ratio minimum 1 times; financial debt-to-net worth ratio maximum 1.5 times; interest coverage ratio minimum 2 times.	
General Covenants	Prepayment	Material Restriction	No
Institution Type	Corporation		

Tranche 1 of 2 Term Loan				
Tranche Id	97215			
Tranche Amount (m)	USD 1.5m			
Tranche Active	No			
Tranche Active Date	02-Mar-2010			
League Table Credit	Yes			
League Table Tranche Date	02-Mar-2010			
Amend & Extend Flag	No			
Tranche Amended	No			
Secured	Yes			
Collateral/Security Type	Real Estate			
Sponsored	No			
Multi-Currency Tranche	No			
Market of Syndication	Asia Pacific			
Country of Syndication	China			
Primary Purpose	General Purpose			
Guarantor	Adlink Technology Inc			
Tranche Maturity Date	02-Mar-2013			
Tenor/Maturity	36 months			
Average Life	2.125 years			
Availability	1 year from first drawdown			
Grace Period	15 months			
Security	secured by land and 3 buildings			
Seniority Type	Senior			
Distribution Method	Syndication			
Repayment Information	Repayment Type	Equal Installments		
	Number of Repayments	8		
	Frequency	Quarterly		
Base/Reference Rate	LIBOR + 150			
Spread/Margin	LIBOR:150			
Spread Comment	over 3-month Libor			
Upfront Fees	Fee Type	Fee	Commitment	
	Lead arrangement fee	100 bps		
Fees	Commitment Fee	25 bps		
	Upfront Fee	100 bps		
	Tiered Upfront Fee	Tiered Upfront Fees: Lead arrangement fee 100.00		
	Other Fees	Upfront Regular Fee: 100 bps		
		Commitment Regular Fee: 25 bps		
	All-In/Yield	197.06 bps		
AIS Drawn	150 bps			
Options	Competitive Bid	No		
	Banker's Acceptance	No		
Lender Titles/Roles	Lead arranger	Shanghai Commercial & Savings Bank [Bookrunner, Facility agent, Mandated arranger]		
	Mandated Lead arranger	Bank of Shanghai Shanghai Commercial Bank Ltd		

(b)

Thomson Reuters LPC
LoanConnector

Borrower: Mandarin Oriental Bali (96352)			
Perm ID	5000934442		
Deal Active Date	25-Feb-2008		
Deal Id	161627		
Deal Amount (m)	USD 108m		
Additional Borrowers	Club International Bali		
Region	Asia Pacific		
Location	Indonesia		
Ultimate Parent	Mandarin Oriental Bali		
Broad Industry Group	Corporates		
Major Industry Group	Hotel & Gaming		
SIC	7011: Hotels and motels		
NAIC	721111: Hotels (exc Casino Hotels) & Motels		
Deal Phase	Pre-Mandate		
Active	No		
Deal Purpose	Real estate loan		
Refinancing	No		
Deal Input Date	29-Feb-2008		
Tiered Upfront Fee	No		
Tranche 1	USD 75m Other Loan		
Tranche 2	USD 33m Other Loan		
Basis Point Issue	769-6		
General Covenants	Prepayment	Material Restriction	No
Institution Type	Corporation		

Tranche 1 of 2 Other Loan			
Tranche Id	204717		
Tranche Amount (m)	USD 75m		
Tranche Active	No		
Tranche Active Date	25-Feb-2008		
League Table Credit	No		
League Table Tranche Date	25-Feb-2008		
New Money	USD 75m		
Amend & Extend Flag	No		
Tranche Amended	No		
Secured	Yes		
Collateral/Security Type	Real Estate		
Sponsored	No		
Multi-Currency Tranche	No		
Market of Syndication	Asia Pacific		
Country of Syndication	Indonesia		
Primary Purpose	Real estate loan		
Sponsor Comment	The sponsor for both projects is Yanuar Arsad, which has over US$40.2m of cash equity behind the financing		
Tenor/Maturity	36 months		
Security	The facility will be secured by Mandarin Oriental Bali Resort		
Seniority Type	Senior		
Distribution Method	Syndication		
Options	Competitive Bid	No	
	Banker's Acceptance	No	
Lender Titles/Roles	Mandated arranger	Wachovia Bank [Bookrunner, Coordinator]	

Tranche 2 of 2 Other Loan	
Tranche Id	203005
Tranche Amount (m)	USD 33m

Notes: The above figure shows the original record used to construct the data on basic characteristics and the lending bases of cross-border loans. Both (a) and (b) are the digitized example of the original record in the LoanConnector terminal. The orange dashed line area in (a) shows the standard appearance location of the basic information of the loans, the name of the borrowing firm, the deal and tranche ID, the industry sector of the borrowing firm, volume, pricing, maturity of the loan etc. The cells highlighted in yellow in (b) shows the standard appearance of the lending base of the tranche.

Table 3.1: Loan Characteristics

Panel A: Summary Statistics (Tranche-level, Overall sample)						
Tranche Information	N	Mean	Sd.	p(25)	p(50)	p(75)
Maturity(years)	11788	5.8	3.9	3.0	5.0	7.0
All In Spread Drawn (bps)	11788	190.2	197.0	90.0	140.0	240.0
Loan amount (m)(USD)	11788	102.7	482.6	24.6	60.2	167.6
1[Foreign banks participation]	11788	0.54	0.29	0	1	1
Foreign banks share	11788	0.45	0.36	0.08	0.41	0.77
Total number of lenders	11788	7.84	8.61	3	5	9
1[Term loan]	11788	0.65	0.33	0	1	1
1[Lead bank domestic bank]	11788	0.42	0.47	0	0	1
1[Multinational firm]	11788	0.29	0.45	0	0	1
1[Foreign ownership/Joint venture]	11788	0.12	0.28	0	0	1
Deal's Currency	**No.**	**%**				
Domestic currency	2901	24.6				
Euro	940	8.0				
USD	7893	67.0				
Yen	54	0.5				
Loan Purpose	**No.**	**%**				
General corporate purpose	10479	88.9				
M&A	306	2.6				
Trade and export	1001	8.5				
# Firms	4490					

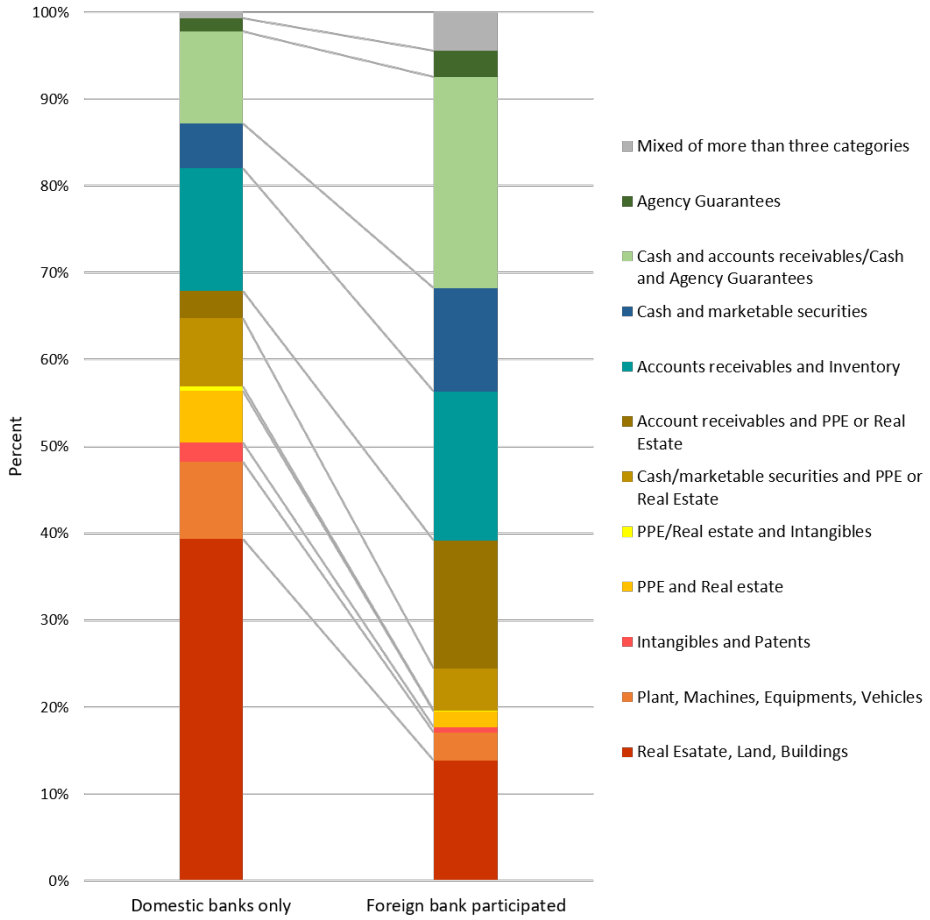
Notes: The above table presents the summary statistics of the sample of observations that serve as our baseline regression sample as shown in equation 3.1. 1[Foreign banks participation] is a dummy variable that equals 1 if the tranche has at least one foreign bank participated, foreign bank share is the total contribution of foreign banks in the tranche's face value scaled by the total amount of the tranche value, Total number of lenders is the total number of all lenders in a tranche. 1[Term loan] is a dummy variable that equals 1 if the loan is a term loan with bullet type of repayment. 1[lead bank domestic bank] is a dummy variable that equals 1 if the lead arranger is a domestic bank with the same parent country as the borrower, 1[multinational firm] is a dummy variable that equals 1 if the firm is a multinational firm, 1[foreign ownership/ joint venture] is a dummy variable that equals 1 if the firm has foreign ownership.

Figure 3.2: Categorization of lending bases

Debt capacity						
	Transparency				Tangibility	
	Earnings/cash flow based				Fixed-value assets	
	Securities	Agency guarantee	Account receivables	Reserves & Inventories	Internationall y-deployable	Domestic-based
Tencent, Formosa Plastic, Butik Asam, Philp Morris, etc	*"Stock shares of a listed subsidiary in XX"*	*"Standby L/C"*	*"Assignments of leasing income"*	*"Oil inventories"*	*"Boeing 777 aircraft"*	*"Plant and equipment of a subsidiary XXX"*
	"Floating charge over securities"	*"Promissory notes specifying XXX from parent company XXX"*	*"Toll income of Express No.XX"*	*"Sellables in XXXX-quarters."*	*"Vessel XXX"*	*"Mortgage over land and properties"*
					"Ship XXX"	*"Mortgage over new extension of shopping mall"*
Unsecured	Secured					

Notes: The above table provides an exhaustive categorization of all types of assets that firms the database have borrowed against as lending bases. We also demonstrate here how different types of assets are related to firms' debt capacity. In general, firms have two sources of debt capacity: first is transparent cash flows or earnings ("Transparency"), and the second is through offering tangible assets up-front to lenders ("Tangibility"). Similar categorizations of debt capacity is also demonstrated by Lian and Ma (2018).

Figure 3.3: Detailed types of lending bases in documentation



Notes: The above figure shows the full spectrum of the categories of lending bases of domestic-bank-only loans and foreign-bank participated loans that have shown up in the sample. The height of each colored block represents the total amount of loans based on a specific category of assets as a share of total secured loan amount.

Table 3.2: Covenant inclusion and foreign bank participation

	1[Covenant Inclusion]						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
1[Foreign bank participation]	0.124**	0.113**	0.135***	0.185***	0.136**	0.118**	0.122***
	(0.0456)	(0.0355)	(0.0342)	(0.0552)	(0.0565)	(0.0377)	(0.0267)
Ln[Loan amount]			0.287*	0.284**	0.309**	0.288*	0.312**
			(0.155)	(0.0944)	(0.101)	(0.122)	(0.103)
Maturity			-0.0166	-0.0188	-0.0201	-0.0101	-0.0122
			(0.0155)	(0.0172)	(0.0198)	(0.0133)	(0.0145)
1[LBO]			-0.255	-0.225	-0.282	-0.265	-0.248
			(0.262)	(0.272)	(0.266)	(0.253)	(0.269)
1[Trade finance]			0.0201*	0.0121	0.0113	0.0103*	0.0141
			(0.00982)	(0.0179)	(0.0165)	(0.00522)	(0.126)
1[Term loan]			-0.0187	-0.0192	-0.0179	-0.0222	-0.0252
			(0.0232)	(0.0212)	(0.0203)	(0.0232)	(0.0268)
Resolving Insolvency Score				0.0309**			
				(0.0102)			
GDP growth					3.118		
					(2.334)		
REER					0.0655		
					(0.0448)		
Domestic credit/GDP					2.332		
					(1.176)		
1[Multinational Entrepreneur]						0.0912*	
						(0.0365)	
1[Foreign ownership/J.V.]							0.119**
							(0.0395)
Observations	22782	22782	22782	18762	18762	18762	18762
Adjusted R^2	0.233	0.276	0.443	0.482	0.498	0.452	0.466
Lead bank country FE	Y	Y	Y	Y	Y	Y	Y
Industry-Year FE	N	Y	Y	Y	Y	Y	Y
Deal FE	Y	Y	Y	Y	Y	Y	Y

Standard errors in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

The table presents results on the baseline regression equation:

$$1[\text{covenant inclusion}]_{i,d,tr} = \alpha_i + \mu_d + \beta(1[Foreignbankparticipation]) + \gamma\mathbf{X} + FE's$$

Ln(loan amount) is the log of tranche amount, maturity is maturity in years, 1[LBO], 1[Trade finance] are indicator variables that equal to 1 if the loan is for M&A purpose or trade financing respectively. Resolving insolvency score is the borrower country's overall score of resolving insolvency defined by WorldBank Doing Business. GDP growth is the real GDP growth of the borrower's economy in year t, REER is real effective exchange rate, Domestic credit/GDP is the total credit to private sector lent by domestic financial intermediaries. 1[Multinational Entrepreneur] and 1[Foreign ownership/J.V.] are indicator variables that equals 1 if the firm is an MNE or J.V.

Table 3.3: Covenant inclusion and foreign bank participation

	1[Covenant Inclusion]						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Foreign bank share (%)	1.872**	1.763***	1.902***	1.776***	1.553**	1.287***	1.366***
	(0.587)	(0.502)	(0.543)	(0.489)	(0.515)	(0.349)	(0.355)
Ln[Loan amount]			0.166**	0.124**	0.177**	0.165**	0.182**
			(0.0546)	(0.0418)	(0.0581)	(0.0576)	(0.0583)
Maturity			-0.0233	-0.0302*	-0.0334	-0.0298*	-0.0276*
			(0.0176)	(0.0147)	(0.0203)	(0.0143)	(0.0135)
1[LBO]			-0.0872	-0.0762	-0.0988	-0.0923	-0.121
			(0.0622)	(0.0679)	(0.0853)	(0.0872)	(0.0877)
1[Trade finance]			0.0337*	0.0421*	0.0403	0.0377*	0.0382*
			(0.0166)	(0.0203)	(0.0282)	(0.0172)	(0.0167)
1[Term loan]			-0.0423	-0.0394	-0.0388	-0.0323	-0.0562*
			(0.0366)	(0.0309)	(0.0315)	(0.0432)	(0.0244)
Resolving Insolvency Score				0.0203*			
				(0.00663)			
GDP growth					2.772		
					(1.993)		
REER					0.0452*		
					(0.0203)		
Domestic credit/GDP					3.109		
					(2.093)		
1[Multinational Entrepreneur]						0.0766**	
						(0.0365)	
1[Foreign ownership/J.V.]							0.123**
							(0.0257)
Observations	22782	22782	22782	18762	18762	18762	18762
Adjusted R^2	0.209	0.302	0.339	0.402	0.488	0.426	0.438
Lead bank country FE	Y	Y	Y	Y	Y	Y	Y
Industry-Year FE	N	Y	Y	Y	Y	Y	Y
Deal FE	Y	Y	Y	Y	Y	Y	Y

Standard errors in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

The table presents results on the baseline regression equation:

$$1[\text{covenant inclusion}]_{i,d,tr} = \alpha_i + \mu_d + \beta(\text{Foreign bank share\%}) + \gamma\mathbf{X} + FE's$$

Ln(loan amount) is the log of tranche amount, maturity is maturity in years, 1[LBO], 1[Trade finance] are indicator variables that equal to 1 if the loan is for M&A purpose or trade financing respectively. Resolving insolvency score is the borrower country's overall score of resolving insolvency defined by WorldBank Doing Business. GDP growth is the real GDP growth of the borrower's economy in year t, REER is real effective exchange rate, Domestic credit/GDP is the total credit to private sector lent by domestic financial intermediaries. 1[Multinational Entrepreneur] and 1[Foreign ownership/J.V.] are indicator variables that equals 1 if the firm is an MNE or J.V.

Table 3.4: Baseline results: I

	1[Fixed assets collateral]						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
1[Foreign bank participation]	-0.192**	-0.194**	-0.195***	-0.225***	-0.236**	-0.228**	-0.213***
	(0.0655)	(0.0642)	(0.0551)	(0.0642)	(0.0775)	(0.0756)	(0.0602)
Ln[Loan amount]			0.104*	0.115*	0.109*	0.108*	0.112*
			(0.0501)	(0.0506)	(0.0509)	(0.0511)	(0.0509)
Maturity			-0.0163	-0.0173	-0.0164	-0.0222	-0.0203
			(0.0174)	(0.0204)	(0.0329)	(0.0180)	(0.0176)
1[LBO]			-0.255	-0.225	-0.282	-0.265	-0.248
			(0.262)	(0.272)	(0.266)	(0.253)	(0.269)
1[Trade finance]			0.0137	-0.0142	-0.0167	-0.0143	-0.0139
			(0.146)	(0.149)	(0.152)	(0.143)	(0.126)
1[Term loan]			0.109	0.116	0.122	0.121	0.135
			(0.112)	(0.117)	(0.179)	(0.132)	(0.128)
Resolving Insolvency Score				0.0480*			
				(0.0241)			
GDP growth					-7.092		
					(4.181)		
REER					-0.0443		
					(0.0319)		
Domestic credit/GDP					9.332		
					(5.176)		
1[Multinational Entrepreneur]						0.175	
						(0.148)	
1[Foreign ownership/J.V.]							0.261*
							(0.122)
Observations	11788	11788	11788	10652	10652	10652	10652
Adjusted R^2	0.329	0.477	0.534	0.542	0.404	0.539	0.541
Lead bank country FE	Y	Y	Y	Y	Y	Y	Y
Industry-Year FE	N	Y	Y	Y	Y	Y	Y
Deal FE	Y	Y	Y	Y	Y	Y	Y

Standard errors in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

The table presents results on the baseline regression equation:

$$1[\text{Fixed-assets collateral}]_{i,d,tr} = \alpha_i + \mu_d + \beta 1[\text{Foreign bank participation}] + \gamma \mathbf{X} + FE's$$

Ln(loan amount) is the log of tranche amount, maturity is maturity in years, 1[LBO], 1[Trade finance] are indicator variables that equal to 1 if the loan is for M&A purpose or trade financing respectively. Resolving insolvency score is the borrower country's overall score of resolving insolvency defined by WorldBank Doing Business. GDP growth is the real GDP growth of the borrower's economy in year t, REER is real effective exchange rate, Domestic credit/GDP is the total credit to private sector lent by domestic financial intermediaries. 1[Multinational Entrepreneur] and 1[Foreign ownership/J.V.] are indicator variables that equals 1 if the firm is an MNE or J.V.

Table 3.5: Baseline Results: II

	1[Fixed assets collateral]						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Foreign bank share (%)	-2.413***	-2.443***	-2.793***	-2.744***	-2.685***	-2.527***	-2.811***
	(0.501)	(0.516)	(0.503)	(0.527)	(0.412)	(0.488)	(0.407)
Ln[Loan amount]			0.122*	0.132*	0.131*	0.119*	0.123*
			(0.0501)	(0.0487)	(0.0628)	(0.0500)	(0.0503)
Maturity			-0.0211	-0.0231	-0.0281	-0.0259	-0.0241
			(0.0172)	(0.0192)	(0.0540)	(0.0176)	(0.0182)
1[LBO]			-0.264	-0.253	-0.262	-0.278	-0.282
			(0.266)	(0.276)	(0.281)	(0.265)	(0.268)
1[Trade finance]			-0.0376	-0.0386	-0.0424	-0.0597	-0.0386
			(0.162)	(0.144)	(0.157)	(0.145)	(0.156)
1[Term loan]			0.0831	0.0923	-0.0799	0.0675	0.0752
			(0.114)	(0.135)	(0.153)	(0.124)	(0.122)
Resolving Insolvency Score				0.127**			
				(0.453)			
GDP growth					-7.311		
					(4.223)		
REER					-0.0493		
					(0.0350)		
Domestic credit/GDP					9.697		
					(5.322)		
1[Multinational Entrepreneur]						0.168	
						(0.145)	
1[Foreign ownership/J.V.]							0.421**
							(0.142)
Observations	11788	11788	11788	10652	10652	10652	10652
Adjusted R^2	0.337	0.485	0.541	0.524	0.408	0.547	0.542
Lead bank country FE	Y	Y	Y	Y	Y	Y	Y
Industry-Year FE	N	Y	Y	Y	Y	Y	Y
Deal FE	Y	Y	Y	Y	Y	Y	Y

Standard errors in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

The table presents results on the baseline regression equation:

$$1[\text{Fixed-assets collateral}]_{i,d,tr} = \alpha_i + \mu_d + \beta(\text{Foreign bank share\%}) + \gamma\mathbf{X} + FE's$$

Ln(loan amount) is the log of tranche amount, maturity is maturity in years, 1[LBO], 1[Trade finance] are indicator variables that equal to 1 if the loan is for M&A purpose or trade financing respectively. Resolving insolvency score is the borrower country's overall score of resolving insolvency defined by WorldBank Doing Business. GDP growth is the real GDP growth of the borrower's economy in year t, REER is real effective exchange rate, Domestic credit/GDP is the total credit to private sector lent by domestic financial intermediaries. 1[Multinational Entrepreneur] and 1[Foreign ownership/J.V.] are indicator variables that equals 1 if the firm is an MNE or J.V.

Table 3.6: Baseline Results III

	% of loan value secured fixed assets						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
1[Foreign bank participatoin]	-0.188***	-0.196**	-0.201**	-0.179***	-0.192***	-0.203***	-0.186**
	(0.0403)	(0.0355)	(0.0422)	(0.0389)	(0.0401)	(0.0378)	(0.0398)
Ln[Loan amount]			0.0163	0.0172	0.0219	0.0129	0.0212
			(0.0145)	(0.0198)	(0.0181)	(0.0199)	(0.0211)
Maturity			-0.00403	-0.00455	-0.00488	-0.00804	-0.00507
			(0.00492)	(0.00474)	(0.00419)	(0.00652)	(0.00679)
1[LBO]			-0.0809	-0.0942	-0.0913	-0.0925	-0.0933
			(0.112)	(0.114)	(0.123)	(0.132)	(0.127)
1[Trade finance]			-0.0205*	-0.0299*	-0.0298*	-0.0276*	-0.0293*
			(0.0102)	(0.0144)	(0.0127)	(0.0139)	(0.0133)
1[Term loan]			0.0286	0.0289	0.0321	0.0203	0.0299
			(0.0477)	(0.0469)	(0.114)	(0.0453)	(0.0333)
Resolving Insolvency Score				0.0332**			
				(0.0113)			
GDP growth					1.344		
					(1.762)		
REER					-0.00879		
					(0.0166)		
Domestic credit/GDP					1.106		
					(1.503)		
1[Multinational Entrepreneur]						0.152*	
						(0.0624)	
1[Foreign ownership/J.V.]							0.477**
							(0.145)
Observations	5062	5062	5062	4496	4219	5062	5062
R^2	0.499	0.553	0.617	0.688	0.692	0.703	0.711
Lead bank country FE	Y	Y	Y	Y	Y	Y	Y
Industry-Year FE	N	Y	Y	Y	Y	Y	Y
Deal FE	Y	Y	Y	Y	Y	Y	Y

Standard errors in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Notes: The table shows the results The table presents results on the baseline regression equation:

$$1[\%\text{ face value secured by fixed assets}]_{i,d,tr} = \alpha_i + \mu_d + \beta(1[\text{Foreign bank participation}]) + \gamma\mathbf{X} + FE's$$

Ln(loan amount) is the log of tranche amount, maturity is maturity in years, 1[LBO], 1[Trade finance] are indicator variables that equal to 1 if the loan is for M&A purpose or trade financing respectively. Resolving insolvency score is the borrower country's overall score of resolving insolvency defined by WorldBank Doing Business. GDP growth is the real GDP growth of the borrower's economy in year t, REER is real effective exchange rate, Domestic credit/GDP is the total credit to private sector lent by domestic financial intermediaries. 1[Multinational Entrepreneur] and 1[Foreign ownership/J.V.] are indicator variables that equals 1 if the firm is an MNE or J.V.

Table 3.7: Baseline Results IV

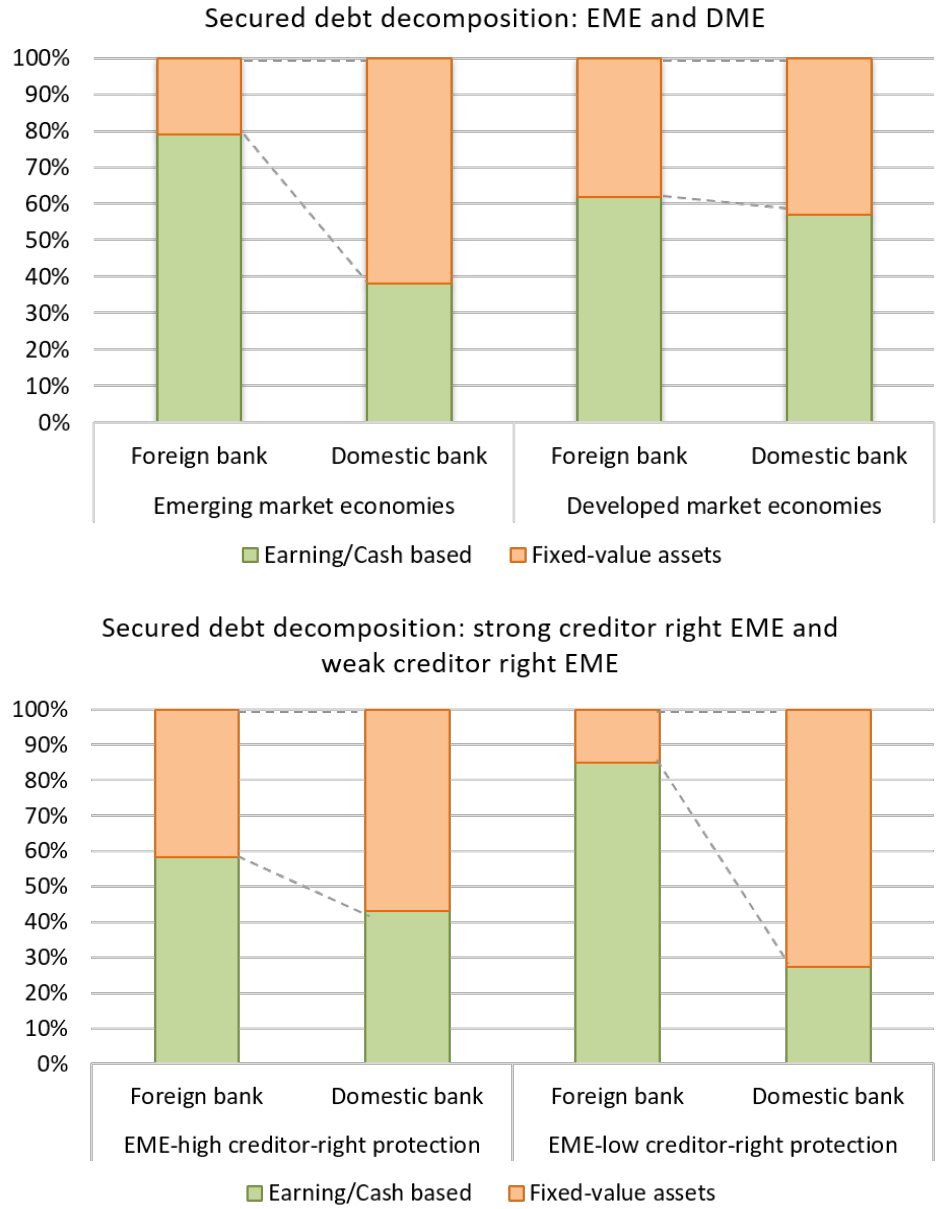
	% of loan value secured fixed assets						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Foreign bank share (%)	-2.223***	-1.924**	-2.303**	-2.335***	-2.209***	-2.229***	-2.453**
	(0.427)	(0.392)	(0.401)	(0.361)	(0.353)	(0.363)	(0.327)
Ln[Loan amount]			0.0152	0.0152	0.0349	0.0134	0.0152
			(0.0220)	(0.0220)	(0.0671)	(0.0215)	(0.0220)
Maturity			-0.00487	-0.00487	0.0157	-0.00804	-0.00487
			(0.00754)	(0.00754)	(0.0216)	(0.00759)	(0.00754)
1[LBO]			-0.0930	-0.0930	-0.0908	-0.0983	-0.0930
			(0.117)	(0.117)	(0.125)	(0.114)	(0.117)
1[Trade finance]			-0.00255	-0.00255	-0.227	-0.0165	-0.00255
			(0.0632)	(0.0632)	(0.223)	(0.0623)	(0.0632)
1[Term loan]			0.0279	0.0279	0.0370	0.0177	0.0279
			(0.0498)	(0.0498)	(0.117)	(0.0490)	(0.0498)
Resolving Insolvency Score				0.0307**			
				(0.0102)			
GDP growth					-1.278		
					(1.690)		
REER					-0.00757		
					(0.0140)		
Domestic credit/GDP					1.106		
					(2.130)		
1[Multinational Entrepreneur]						0.111**	
						(0.0324)	
1[Foreign ownership/J.V.]							0.536*
							(0.224)
Observations	5062	5062	5062	4496	4219	5062	5062
R^2	0.529	0.654	0.708	0.702	0.810	0.726	0.705
Lead bank country FE	Y	Y	Y	Y	Y	Y	Y
Industry-Year FE	N	Y	Y	Y	Y	Y	Y
Deal FE	Y	Y	Y	Y	Y	Y	Y

Standard errors in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Note: The table shows the results The table presents results on the baseline regression equation:
$1[\%\text{ face value secured by fixed assets}]_{i,d,tr} = \alpha_i + \mu_d + \beta(\text{Foreign bank share}\%) + \gamma\mathbf{X} + FE's$
Ln(loan amount) is the log of tranche amount, maturity is maturity in years, 1[LBO], 1[Trade finance] are indicator variables that equal to 1 if the loan is for M&A purpose or trade financing respectively. Resolving insolvency score is the borrower country's overall score of resolving insolvency defined by WorldBank Doing Business. GDP growth is the real GDP growth of the borrower's economy in year t, REER is real effective exchange rate, Domestic credit/GDP is the total credit to private sector lent by domestic financial intermediaries. 1[Multinational Entrepreneur] and 1[Foreign ownership/J.V.] are indicator variables that equals 1 if the firm is an MNE or J.V.

Figure 3.4: Foregin and domestic bank participation in Developed market and Emerging market



Notes: The above figure shows the differences between domestic banks and foreign banks in lending base choices in developed countries and emerging markets and in emerging market with high score of property registration. Developed Market Economies include United States, United Kingdom, Canada, Germany, Netherlands and Switzerland. Authors' calculation based on Datastream, Thomson One Banker and Loanconnector. The shaded bars represent the proportion of dollar amount of secured loans using different categories of lending bases. High resolving insolvency score EME's include South Africa, Malaysia and Czech Republic, and Low credit score EME's include Peru, Colombia and Mexico.

CHAPTER 4

THE REAL IMPACT OF THE RISE OF DOMESTIC GLOBAL BANKS

In the above section we document an ongoing change in how cross-border capital is channeled to emerging markets: globally-funded domestic banks in EMEs are replacing foreign banks as the primary source of foreign credit extended to firms in emerging markets. Section 3 further examines how the behavior of domestic banks would differ from that of from foreign banks if they chose their lending base from emerging markets. In this section, we investigate the real impact that this rise in domestic global banks has on emerging markets around the world.

4.1 Allocation of Cross-border Credit: Foreign Banks v.s. Domestic Banks

In Section 3 we have shown that foreign banks and domestic banks employ different lending technologies when they evaluate whether to accept lending bases. In this subsection, we show that due to this differences in lending technologies, domestic and foreign banks produce different "outputs" in the cross-border credit market. Specifically, we are interested to study how differences in the lender composition would lead to differences in (1) who is more likely to receive the credit; and (2) the credit volume that a given borrower receives.

Because the differences in the lending technologies of the two groups hinge on their ability to seize fixed assets and their relative preference for transparent cash flows, we consider two particular aspects of firm characteristics: tangibility and transparency. Throughout the analysis that follows, we focus on characterizing whether or not credit is more likely to be allocated to firms in tangible/intangible industries (tangibility) or to firms that are listed/unlisted firms (transparency). To study the matching patterns of cross-border lending in EMEs, we examine our deal-level observations of foreign credit agreements established in

various emerging markets.

To study matching patterns between distinct lenders and credit receiving firms, we run the following multinomial logit model based on deal-level data in Dealscan. Each deal can be viewed as a matched pair of borrowers and lenders:

$$Ln(\frac{P(\text{High-tang/Low-trans})}{1-P(\text{High-tang/Low-trans})})_{i,c,t} = \alpha_i + \mu_{c,t} + \beta(\text{Domestic bank share}(\%)) + \gamma X + \epsilon_{i,c,t} \quad (4.1)$$

where i indexes the firm, c indexes the country and t indexes the year. The main explanatory variable is the total face value share owned by domestic banks in the deal package. A borrower is from a high-tangibility industry if the average tangibility (defined by PPE/total assets) of the borrower's two-digit SIC industry is above the 75th percentile of all two-digit industries in its economy. A borrower is classified as a low-transparency firm if it is a private firm. α_i is the firm-level fixed effects and $\mu_{c,t}$ is the borrower country-time fixed effects. $\mathbf{X}$ is a vector of control variables that includes the maturity of the loan deal, the total number of banks in the deal package and the dummy variables that control for the purpose of the loan.

Table 4.1 shows the results of the regression in equation 4.1. As reported by column (1) of the table, a 10% percent increase in the domestic bank share in a deal package leads to a 31.2% increase in the probability that the credit will go to a firm in tangible industries.[1] Similarly, column (2) of the table shows that a 10% percent increase in the domestic bank share in a deal package is associated with a 21.5% increase in the likelihood that the credit is received by an unlisted firm.

The matching between a deal's lender composition and the characteristics of the credit receiving firm could be thought of as measuring the allocation of cross-border credit on the extensive margin. For a more refined measurement of cross-border credit allocation, we take an additional step to investigate the intensive margin of the credit allocation. We ask, in other words, do certain types of firms tend to receive a larger credit volume from domestic

1. The borrower's industry tangibility is constructed using the corporate balance sheet data from Worldscope. Tangibility is defined as industry's average PPE/Assets over 1995-2015.

banks than from foreign banks, and, if so, do they receive larger volume of credit from domestic banks especially when they contract on the basis of their tangible assets? To this end, we focus on a sub-sample of firms for which there are at least two foreign currency loan issuance observations, and we estimate the following two equations:

$$\begin{aligned} Ln(\text{Amount})_{i,c,t} = \alpha_i + \theta_{c,t} + \beta_1(\text{Domestic bank share\%}) \\ + \beta_2(\text{Domestic bank share\%}) \times 1[\text{High tang/Low trans}] + \gamma X + \epsilon_{i,c,t} \end{aligned} \tag{4.2}$$

$$\begin{aligned} &Ln(\text{Amount})_{i,c,t} = \alpha_i + \mu_{c,t} + \beta_1(\text{Domestic bank share\%}) \\ &+ \beta_2(\text{Domestic bank share\%}) \times 1[\text{High tang/Low trans}] \\ &+ \beta_3(\text{Domestic bank share\%}) \times 1[\text{High tang/Low trans}] \times 1[\text{Fixed-assets }] + \gamma X + \epsilon_{i,c,t} \end{aligned} \tag{4.3}$$

The results of these two regression equations are reported in Table 4.2 and Table 4.3. Columns (1)-(3) of Table 4.2 show that the domestic bank share in lender composition is not on average significantly correlated with the foreign credit package amount on average, but if the credit-receiving firm is privately traded, a 20% increase in the domestic bank share will be associated with a 3.5% increase in the total foreign credit volume. This result stays statistically and economically robust after we add deal-level control variables and cluster the standard errors at the year level. Similarly, and as shown in column (4)-(6), the domestic bank share in the package does not significantly predict the average foreign credit deal size, but conditional on the receiver being a firm from a high-tangibility industry, a 20% increase in the domestic bank share is associated with a 3.7% increase in the deal volume.

We take one more step to figure how and why firms that have high tangibility or low cash flow transparency receive more cross-border credit from domestic banks. In Table 4.3, we interact (Domestic bank share%) $\times$ 1[High tang/Low trans] with the dummy variable to indicate whether the deal has fixed assets pledged as collateral. In columns (1) and (3) of Table 4.3, we find that this newly introduced term absorbs a large fraction of the coefficient

on (Domestic bank share%) $\times$ 1[High tang/Low trans]. This fact implies that borrowers in high-tangibility industries or that have low cash flow transparency receive higher foreign credit from domestic lenders because they pledge their tangible assets as collateral.

A measure of cross-border capital allocation that is perhaps more direct is the fraction per unit of credit that a lender would allocate to certain categories of borrowers. In Figure 4.6 and Figure 4.7, we show the credit allocation from the banks' point of view. We calculate the average share of USD-denominated credit allocated to EME firms in different industries and to private firms by foreign banks and domestic banks, respectively. Our calculation is based on 50 major global banks and all of the domestic banks that have at least 5 consecutive years of lending in the Dealscan.

In Figure 4.6, panel 4.7(a) and 4.7(b) display foreign banks' average share of lending volume to the eight major industries categorized by the 2-digit SIC code. Industries are sorted from left to right according to their tangibility. Specifically, panel 4.7(a) displays foreign banks credit allocation profiles during normal times, while panel 4.7(b) shows the allocation profile during periods when the U.S. financial condition is accommodative. Similarly, panel 4.7(c) and 4.7(d) display domestic banks' USD portfolio across industries during normal and expansion periods, respectively.

Two pieces of messages can be easily read from Figure 4.6. First, the distribution of the domestic banks' USD loan portfolio is much more left-tailed than that of foreign banks. In other words, for each unit of cross-border credit channeled by domestic banks, the fraction being allocated towards tangible industries is much larger than that channeled by a foreign bank. Indeed, as can be seen in panel 4.7(a), the amount of credit that foreign banks extend to tangible sectors such as agriculture, mining and construction, is very limited. Second, when U.S. financial conditions ease, the USD loan portfolios of domestic banks tend to shift leftwards and evenly toward the high-tangibility industries. By comparison, the distribution of foreign banks' loan portfolios across industries does not respond significantly to these credit supply side changes. Similarly, in Figure 4.7, we examine how the cross-border

loan portfolios of foreign and domestic banks differ with regards to borrower transparency. Specifically, we calculate the average fraction of USD loans (in terms of face value) extended to private firms in EMEs by foreign banks and domestic banks. Consistent with the regression results of equations (5) and (6), in transmitting cross-border capital to emerging market borrowers, domestic banks allocate a much larger portion to private firms than foreign banks do. Furthermore, during the expansion period of global financing cycles, domestic banks respond by allocating an even larger portion of cross-border credit to unlisted firms, while foreign banks barely change their credit allocation in this dimension.

The above micro-level evidence, revealed by either the scope of cross-border deals or the credit allocation profiles of banks, suggests that the replacement of foreign banks by domestic banks in the cross-border loan market in EMEs can have potentially important real outcomes. In particular, as domestic banks become more accessible to the global funding market and begin to penetrate into the cross-border loan market, firms in the high-tangibility sector or that are less transparent are likely to get the opportunity to receive foreign credit more often than before. Additionally, during the expansion phase of the global financing cycle, when domestic banks start to play a nontrivial role in cross-border credit transmissions, these borrowers can get an even larger share in the allocation of cross-border capital.

4.2 Real impact at the aggregate level: Time-trend analysis

In this part, we conduct a time-trend analysis to examine the aggregate real impact on emerging markets of the rise of domestic global banks in these economies. In particular, we investigate both 1) the long-run effect, or how the industry structure in EMEs is reshaped, and 2) the short/medium-run effect, or how EMEs' susceptibility to global financing cycle is affected.

A. Reshaped industry structure

As documented above, when foreign banks channel cross-border credit to emerging mar-

ket borrowers, their allocation of credit differs drastically from that of domestic banks. Specifically, once they gain access to the global financing market,domestic banks in EMEs generally allocate a much larger fraction of the cross-border credit they bring to firms in tangible industries than foreign banks do. Thus, it is natural to expect that the rise of globally funded domestic banks in emerging markets will have important real impacts on the industry structure of these economies.

In panel 4.2(a) of Figure 4.1, we display the time trend of the share of the total face value of USD-denominated loans received by high-tangibility sectors to the total face value of USD denominated loans made to EMEs. Specifically, we calculate the average share for two five-year brackets–1986-1990 and 2011-2015–using data assembled from Dealscan. During the 1986-1990 period, less than 4.8% of the USD denominated loans flew to firms in high-tangibility industries. Since the 1991-1995 period, when domestic bank in EMEs started to access the global funding market, the share of USD-denominated credit allocated to high-tangibility industries has steadily grown. Prior to the 2011-2015 bracket, more than 20% of the cross-border USD-denominated credit was allocated to firms in the high-tangibility sector. In Appendix B Figure 4.8, we document the pattern at an annual frequency.

In a similar calculation shown in panel 4.2(b) of Figure 4.1, during the 1986-1990 period, only 5.6% of the USD-denominated cross-border credit was allocated to private firms in EMEs. By the 2011-2015 period, 37.6% of total value of USD-denominated cross-border credit was channeled to private firms. In Figure 4.8, we show the year-by-year distribution of the share of USD-denominated credit channeled to private firms in 65 EME's. The steepest increase in the reallocation happened during the 1990-1995 period, which coincided with the fast growth of institutional lenders in the developed economies and the burgeoning of globally-funded domestic banks in EMEs.

Starting in the early 1990s, then, the manner in which foreign credit was channeled from the global funding market to emerging market economies changed. Similarly, during the 10 years after 1995, the industrial structure of emerging markets was greatly reshaped. For

example, in the tangible sector, the average output value added as a share of GDP (measured by the construction, mining, and manufacturing sectors' value added as a percentage of GDP) in emerging market economies increased from 15.13% to 24.33%. Also during the same period and thereafter, average employment in tangible industries (measured by the total share of employment in a country's construction, agricultural, and manufacturing sectors etc) increased from 14.67% to 23.12%. Moreover, an analysis of data for listed firms in emerging market economies suggests that, compared to the average level of long-term debt before 1995, the average long-term debt (scaled by lagged total assets) of tangible industries during the 1995-2010 period increased by 16.2%. During the same period, the corporate annual investment rate (measured by capital expenditures scaled by lagged total assets) increased by 5.2%.

B. Increased susceptibility to global financing cycle

Another important difference between domestic and foreign banks in their allocation of cross-border capital lies in their distinct responses to global financing cycle. In contrast to foreign banks, which barely respond in their credit allocation to changes in global financing conditions, domestic banks exhibit a high sensitivity to global funding fluctuations in their allocation of cross-border capital. Given this difference, it is likely that the replacement of foreign banks by domestic banks in the cross-border loan market made these economies more susceptible to global financial conditions.

To investigate the time variation in emerging markets' susceptibility to global financial conditions, we consider the following regression specification and run the regression estimation for the pre-1995 period and the post-1995 period separately.

$$Y_{i,t} = \alpha_i + \theta F_t^{U.S.} + \phi X_{i,t} + \epsilon_{i,t} \tag{4.4}$$

where $Y_{i,t}$ is the outcome variable of interest for economy i in year t. We focus on three outcome variable, the annual Real GDP growth rate, and the annual Domestic credit growth

rate and the annual tangible sector value-added growth rate. $F_t^{U.S.}$ stands for U.S. financial market conditions, for which we consider two measures. The first is "NFCI" (Chicago Fed National Financial Condition Index) and the second is "IMF-index", which is similar to the index constructed by IMF's GFSR -2017. Parameter α_i is the economy-level fixed effect that captures all time-invariant economy-specific characteristics that could affect differences in the level of outcome variables. $X_{i,t}$ is a set of economy-specific time-varying control variables that capture time-varying economy-specific trending factors which not directly related to the main regressor that could result in differences in the responses of outcome variables. We include two major sets of control variables in $X_{i,t}$. The first set includes economy i's Net export/GDP, FDI/GDP, and REER, which reflect the economy's demand from overseas; the second set includes inflation, unemployment rate and the domestic deposit rate, which reflect the economy's internal demand conditions. The sample in the regression spans 1975 to 2015.

The coefficient of interest is θ, which captures the average degree of susceptibility of real economic outcomes in EMEs to U.S. financial market conditions. We separately estimate θ for both the pre-1995 period ($\theta_{\text{before1995}}$) and the post-1995 period ($\theta_{\text{after1995}}$) for the three outcome variables and the two measures of U.S. financial conditions. Table 4.5 through Table 4.16 report the results of the regression in Equation 4.4. In columns (1) and (2) of Table 4.5, we find that before 1995, a 0.5 increase (decrease) in the NFCI index (about half of its standard deviation) was associated with an average of 13 basis point decrease (increase) in real GDP growth rate. After 1995, a same magnitude change in NCI was associated with an average 85 basis point change in the real GDP growth rate. The difference between $\theta_{\text{after1995}}$ and $\theta_{\text{before1995}}$ is statistically significant. This result remains robust after including control variables on time-varying factors and demand-side factors, as shown in column (3) to column (8).

In Table 4.4, we run the same set of regressions from column (1) to column (8) to estimate the susceptibility of the EME's domestic credit growth to the global financing

cycle. The domestic credit of an EME is measured by the total currency-denominated credit to the private sector extended by domestic banks. We find that before 1995, a 0.5 increase (decrease) in NFCI was associated with only a 13 basis points decrease (increase) in domestic credit growth, whereas after 1995, the effect increased to over 50 basis points. Finally, we investigate how EME's tangible sector value-added growth co-moves with U.S. financial market conditions over time. As shown in Table 4.6, before 1995, a 0.5 unit decrease (increase) in the NFCI was only associated with an average 6 basis point increase (decrease) in the tangible sector's growth in the EME, whereas after 1995, this susceptibility increased to 1.6%. In Table 4.14 to Table 4.16, we run the same set of analysis but instead replacing $F_t^{U.S.}$ with the IMF-index. The results remain statistically robust.

4.3 Real impact at aggregate level: Cross-country analysis

Despite the statistically and economically significant results documented above, it is difficult to claim that these real changes in emerging markets were driven by the rise of domestic global banks in these economies. In this subsection, we take an additional step that further exploits cross-country variation in the causal relationship. Given that the degree to which foreign banks are replaced by domestic banks can differ across countries, we ask whether such variations can result in differences in real outcomes. In what follows, we display the results of the baseline cross-country regression and turn to an IV analysis for identification.

A. Baseline Results

In emerging markets around the world, domestic banks are replacing foreign banks in cross-border capital transmissions, and the degree to which this replacement is occurring varies significantly across countries. To measure the country-specific degree of replacement, which can be thought of as the country's exposure to the global money market transformation

since the early 1990s, we construct the following measure D_i:

$$D_i = \frac{\sum_b \sum_{t>1995} C_{b,t}^{USD} \times 1[\text{Domestic bank}_b]}{\sum_b \sum_{t>1995} C_{b,t}^{USD}}$$

where i indexes the economy, b indexes a bank, t indexes the year and $C_{b,t}^{USD}$ represents the amount of USD-denominated cross-border loans issued by bank b in year t that showed up in Dealscan. $1[\text{Domestic bank}_b]$ is a dummy variable that equals 1 if bank b is a domestic bank. D_i is thus a de facto measure of the actual percentage of foreign credit that is channeled by domestic banks into country i after the global funding market transformation that happened in the beginning of 1990s. The higher the D_i, the higher the exposure of the economy to the global money market transformation, and in turn, the higher the share of domestic-channeled foreign credit in the upcoming years.

i) Reshaped industry structure

In section 5.2, we found that coincides with the rise of domestic global banks in emerging markets around the world, since early 1990s, tangible industries in these economies have undergone accelerated growth. Moving a step further, we exploit cross-country variation in the degree to which domestic banks replace foreign banks. Specifically, we test whether in countries that experience a relatively higher degree of replacement, industry structure, too, is reshaped.

Under our empirical setting, we examine how the share of domestic banks that channeled foreign credit D_i for country i affected the country's tangible sector growth conditions in the during the 15-year period since 1995. To formalize the analysis, we write down the following specification:

$$\Delta Y_{1996-2010,i} = \alpha + \beta D_i + \phi \mathbf{X} + \epsilon_i \tag{4.5}$$

where i indexes country. $\Delta Y_{1996-2010,c}$ is change in the (average) outcome real economic variables of interest of country i during 1996-2010 period compared to the outcome variable prior to 1995. In this specification, the variable of interest could be the tangible sectors' share of output value added in GDP, the annual growth of tangible sector's output value added, the share of employment in tangible sector, or the average investment rate of tangible sector firms.

The results of the baseline OLS regressions are reported in Table 4.7. Panel (A) reports the regressions without country-level control variables and panel, while panel (B) presents the table with control variables included. Column (1) shows that a 10% higher de facto cross-border credit lent directly by domestic banks is associated with 2.13% higher tangible sector value added to GDP compared to the pre-1995 period, a 3.7% higher average annual tangible sector growth compared to the pre-1995 period, a 2.98% higher employment employed in tangible industrial sector compared to the pre-1995 period, and a 5.62% higher average annual investment rate of tangible sector compared to the pre-1995 period. The pattern is robust after we include in the regression the control variables reported in panel (B).

ii) Increased susceptibility to global financing cycle

Analogously, exploiting national variation, we conduct a cross-sectional analysis to determine how the rise of domestic global banks in EMEs affect economy's susceptibility to changes in the global financial market. The baseline regression equation is specified as follows:

$$Y_{i,t} = \alpha + \beta_1 1[\text{Post 1995}] + \beta_2 F_t^{U.S.} + \gamma D_i \times 1[\text{Post 1995}] \times F_t^{U.S.} + \phi \mathbf{X} + \epsilon_{i,t} \quad (4.6)$$

$Y_{i,t}$'s are the economy-year level outcome variables of interest, including the real GDP growth rate, the domestic credit growth rate, and the growth rate of tangible sector value added. The global financial condition measurement variables $F_t^{U.S.}$ are as defined in equation (4.4). o t account for other important factors that could have an impact on the dependent variables,

we include in control variable **X** the unemployment rate, Net export/GDP, and inflation . To tease out the effects that external shocks have on a country's susceptibility—shocks that are driven simply by the volume of external credit—we control for the ratio of external debt to GDP for each country. The sample in the regression spans 1975 to 2015 and covers 65 emerging market economies.

The coefficient of interest is γ. The goal of our test is to see if including this interaction term in the regression equation would be able to absorb a non-trivial portion of the coefficient on the term $F_t^{U.S.}$ itself. As reported in Table 4.4 through Tale 4.14, negative and statistically significant coefficient estimates of γ imply that the structure of cross-border credit received by a country explains its susceptibility to global financial shocks. More specifically, economies in which domestic banks play a larger role in channeling cross-border capital also exhibit a higher real economic outcome susceptibility to the global financial cycle.

B. IV Analysis for Identification

As in most causal identification exercises, the channeled cross-border credit share of a country's domestic bank does not emerge exogenously. Instead, for any country i, the fraction of the cross-border capital that is channeled by its domestic banks D_i is likely to be affected by internal characteristics of country i that may also have an impact on the country's industry structure and how susceptible the country will be to external shocks. To identify the real impact that is driven only by the rise of domestic global banks in emerging markets, we conduct an IV analysis so as to distills the exogenous part of variation in D_i's across countries.

We consider two sets of instrumental variables. First is the domestic banking sector concentration, measured by the asset share of the five biggest banks (*Fivebank*) and the asset share of the three biggest banks (*Threebank*), respectively. The starting year of both measures is 1996. The second set of instruments measure the workforce education level. As documented by Philippon and Reshef (2013) and Philippon and Reshef (2012), employees working in the financial sector on average have a higher skill bias, and demand for skilled

labor tends to grow faster when there is a transformation in the financial market. Since the worker education level is a relatively slow-moving variable, when the global financial market transformation occurred in the early 1990s, economies that had a relatively more educated workforce tended to evolve a more absorbed domestic banking sector in response. We utilize two measures along this line of reasoning: *Secondary_24*, which is the Barro-Lee average years of secondary education of workers age 20-24; and *Tertiary_25*, which is the Barro-Lee average years of tertiary education of workers of age 25+.[2]

First stage:

$$D_i = \mu + \beta_1 Z_i + \beta_2 \bar{X}_{i,1990-1995} + \epsilon_i \tag{4.7}$$

Second stage:

$$Y_{i,t} = \alpha + \beta_1 1[\text{Post 1995}] + \beta_2 F_t^{U.S.} + \gamma \widehat{D_i} \times 1[\text{Post 1995}] \times F_t^{U.S.} + \phi \mathbf{X} + \epsilon_{i,t}$$

where Z is the instrumental variable discussed discussed in the paragraph above and $\widehat{D_i}$ is the fitted value from the first-stage regression.

Table 4.9 shows the results of the first-stage regressions when the two sets of instrumental variables are used. The control variable vector $\mathbf{X}$ is the averages of the unemployment rate, inflation, and Net export/GDP during the 1990-1995 period. As can be seen from the column (1) and column (2) of Table 4.9, in an emerging market economy, a 10% increase in the asset shares of the three largest banks is associated during the 1991-1995 period with a 1.2% lower incremental in the share of domestic bank-channeled foreign credit. Similarly, in an emerging market economy, a 10% increase in the asset shares of the five largest banks is associated during the 1991-1995 period with a 1.5% lower incremental in the share of domestic bank-channeled foreign credit. In columns (3) and (4), every 1 additional year of average secondary school education in the workforce aged 20-24 is associated with a 2.7%

2. Both the Barro-Lee *Tertiary_25* and *Secondary_24* start from the year of 1990 and are estimated every five years. We use as our instrumental variable construction the average of the 1990 and 1995 measures of the two variables.

increase in the incremental of domestic bank-channeled foreign credit. Also during the 1991-1995 period, every 1 additional year of average tertiary school education in the workforce aged 25+ is associated with a 3.3% increase in the incremental of domestic bank-channeled foreign credit.

Table 4.10 to Table 4.12 demonstrate the equation 4.6 and the equation 5.4. Column (1) of Table 4.10 through Table 4.12 report the OLS regression equation 4.6, while column (2) to column (5) report the 2SLS regression using the four instrumental variables from the two categories. The negative and statistically significant coefficient indicates a higher susceptibility to real outcome variables in U.S. financial conditions if, after the transformation of the global funding market during the early 1990s, the economy's domestic banks were engaged more actively in cross-border credit channeling. On the basis of column (1)'s in Table 4.10 and 4.11 and 4.12, we estimate that the post-1995 real GDP susceptibility towards a 0.5-unit U.S. financial condition change (measured by NFCI) to be 39.3 basis points higher; and domestic credit growth susceptibility towards a 0.5-unit U.S. financial condition change to be 16.5 basis point higher if the incremental of domestic bank channeled foreign credit goes up by 6.5%; and the domestic tangible sector growth susceptibility towards a 0.5-unit U.S. financial condition change to be 65 basis point higher if the incremental of domestic bank channeled foreign credit goes up by 6.5% (about one standard deviation across the distribution of D_i of the 65 economies). The results remain quantitatively robust if we turn to 2SLS estimations and remain qualitatively unchanged if we switch to the IMF-index as shown in Table 4.17, 4.18 and 4.19.

4.4 Conclusion

Over the last several decades, while the volume of cross-border credit flows relative to their economic size has not changed much, the manner in which foreign capital has been channeled to emerging markets has changed drastically. We document an ever-growing share of cross-border credit channeled by domestic banks from EMEs since the early 1990s. This

trend–the rise in the importance of the role played by domestic banks in cross-border capital transmission is commonly observed in most EMEs around the world. We argue and provide evidence that this structural change in how capital from developed market is transmitted to developing economies is unlikely to be driven by credit demand-side factors. Instead, we find consistent evidence that the transformations taking place in the emerging market world can (at least partly) be explained by the compositional change in the U.S. money market. As the market share owned by shadow banking institutions has increased, especially since the fall of S&L institutions around 1990, the non-bank intermediaries have tapped into businesses outside the country. That U.S. non-bank intermediaries generally do not know how to deal with corporate firms in foreign countries gives banks from emerging markets a new source of access to the global funding market. Thanks to their newly gained access to the global funding market, domestic banks are thus able to compete with and gradually replace their foreign counterparts in the cross-border loan market.

The change in how cross-border credit is channeled to EMEs could make a difference, if there exists certain important distinctions between foreign banks and those that are replacing them– the domestic banks in EMEs. Indeed, we find that in extending credit to firms in emerging markets, foreign banks and domestic banks have drastically different preferences on lending base. In particular, foreign banks are much more reluctant to extend credit against fixed assets as collateral than domestic lenders, especially in economies where the insolvency resolution process is costly and lengthy. Using tranche-level data on cross-border loans in EMEs, we find that higher foreign bank participation in a tranche deal is associated with a significantly lower use of physical collateral and a higher rate of covenant inclusion.

Just as the lending technologies that foreign banks and domestic banks employ to extend credit to firms in EMEs differ, so do the "products" that they produce also differ. Specifically, examining micro-level data on cross-border loan deals, we find that domestic banks tend to allocate a much higher portion of cross-border capital to tangible sector firms and unlisted firms than foreign banks. Furthermore, we find that domestic banks respond more in the

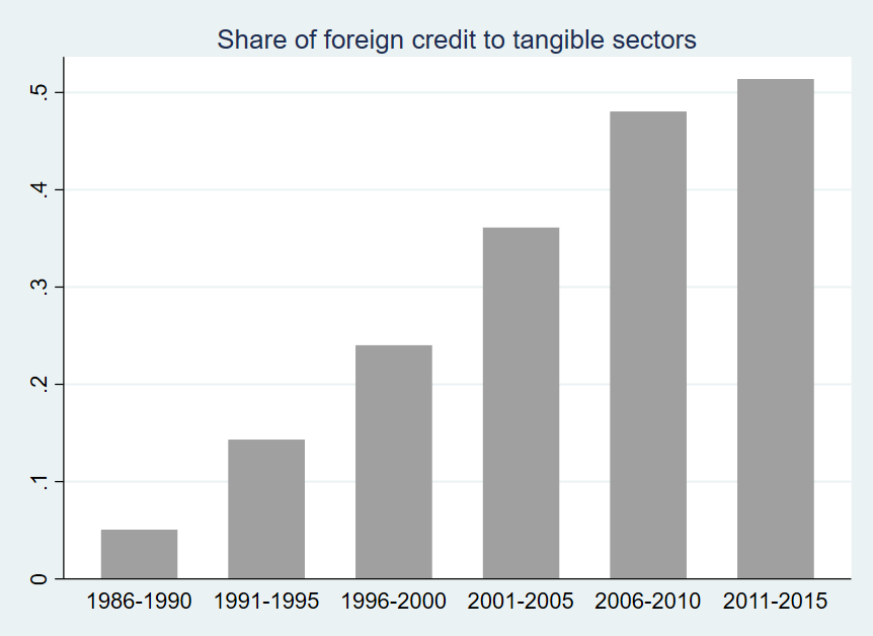
credit allocation to changes in the global financial market condition than foreign banks. During the easing phase of the global financing cycle, the share of cross-border capital that domestic banks allocate toward tangible industries significantly increases, while the credit allocation of foreign banks barely changes.

Having documented the micro-level differences between foreign and domestic banks' behavior in lending to EME borrowers, we then investigate the aggregate-level impact of the rise of domestic global banks in EMEs. In a time trend analysis, we find that along with upward trend in the share of domestic bank-channeled cross-border credit, emerging markets around the world become 1) more tilted toward tangible industries and 2) more susceptible to external shocks in the global financial market. The reshaped industry structure and increased sensitivity to the global financing cycle are consistently observed in many emerging markets around the world.

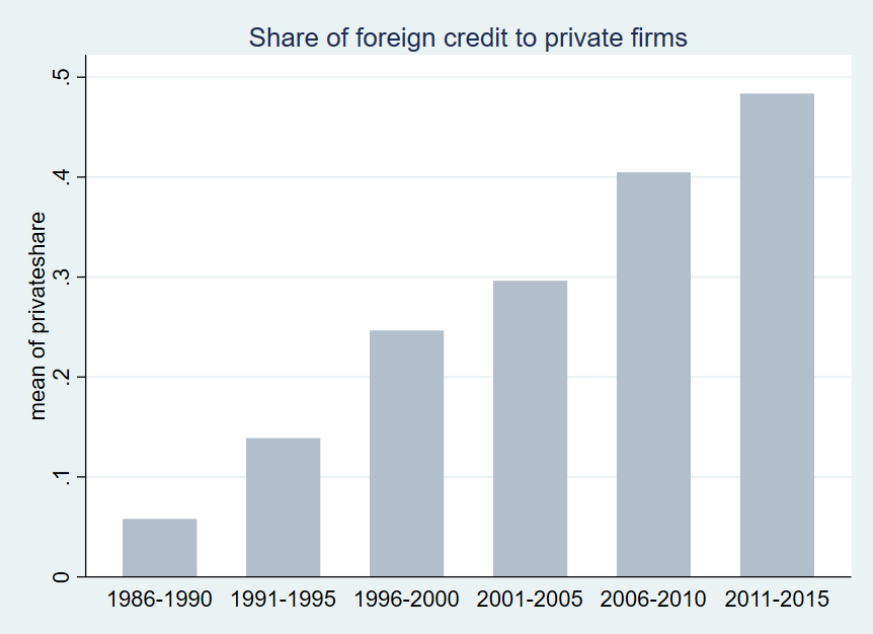
Finally, in a cross-country analysis we exploit country-wise heterogeneity in the share of cross-border capital channeled by domestic banks. Using measures of a country's financial literacy as an IV to construct the exogenous components in country-wise variation, we find that the above aggregate real impacts are more pronounced if a larger fraction of cross-border credit is channeled by domestic banks. Our analysis suggests that the ongoing replacement of foreign lenders by domestic lenders in the cross-border loan market can have a profound impact on emerging market economies.

4.5 Appendix

Figure 4.1: Over-time trend: Foreign currency cross-border credit to High-tangibility industries and to unlisted firms

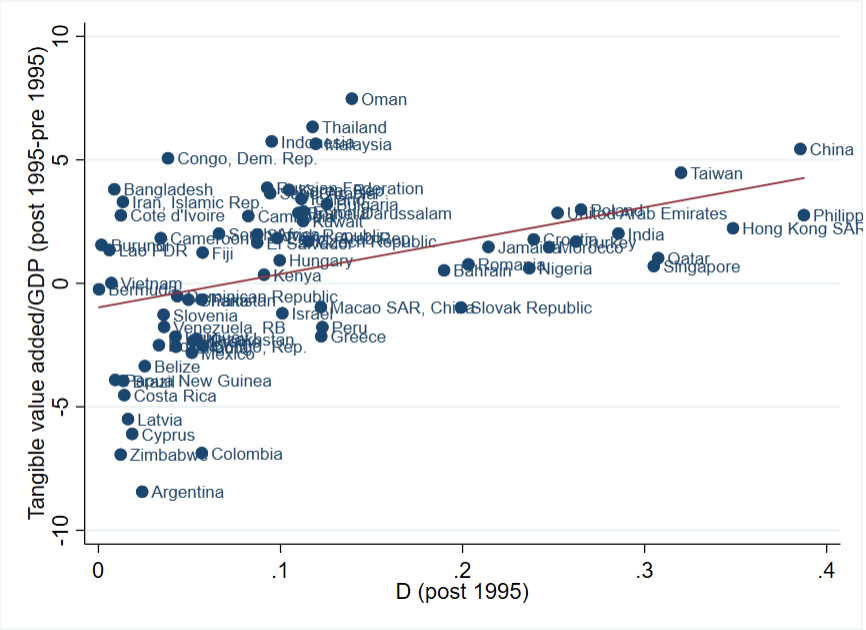


(a) Share of USD cross-border credit to tangible sectors



(b) Share of USD cross-border credit to private firms

Figure 4.2: Reshaping of Industrial Structure: Cross-sectional Evidence



The figure shows the cross-sectional correlation between changes in EME's tangible sector value-added/GDP (post 1995-pre 1995) and the proportion of cross-border credit that was channeled by domestic banks post 1995. D(post 1995) is defined as $\frac{\sum_b \sum_{t>1995} C_{b,t}^{USD} \times 1[\text{Domestic bank}_b]}{\sum_b \sum_{t>1995} C_{b,t}^{USD}}$, where $C_{b,t}^{USD}$ is the amount of a USD cross-border loan by bank b.

Table 4.1: Matching between banks and firms

	High-tangibility	Low-transparency
	(1)	(2)
% Domestic bank share	3.127***	2.153***
	(0.0211)	(0.0342)
Maturity	1.003***	1.005***
	(0.000232)	(0.000238)
1[Secured]	1.179***	1.354***
	(0.0378)	(0.0438)
1[Takeover]	0.991	1.258***
	(0.0616)	(0.0798)
1[Trade finance]	0.959	2.204***
	(0.0469)	(0.111)
No. of lenders	0.988***	0.985***
	(0.00179)	(0.00204)
Observations	77596	77596
Firm FE	Yes	Yes
Country-time FE	Yes	Yes

Exponentiated coefficients; Standard errors in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

This table estimates the following regression equation:

$$Ln(\frac{P(\text{High tangibility/Low-transparency})}{1 - P(\text{High tangibility/Low-transparency})})_{i,c,t} = \alpha_i + \theta_{c,t} + \beta(\text{Domestic bank share}(\%)) + \gamma X + \epsilon_{i,c,t}$$

A borrower is from a high-tangibility industry if the average tangibility (defined by PPE/total assets) of borrower's two-digit SIC industry is above the 75th percentile of all the two-digit industries in its economy. A borrower is classified as low-transparency firm if it is a private firm. A 10% percent increase in domestic bank share leads to increase in the probability of the credit going to high-tangibility firm/ low-transparency firm by around 30%/20%.

Table 4.2: Lender types and firm characteristics

	Ln[Loan amount]					
	(1)	(2)	(3)	(4)	(5)	(6)
% Domestic bank share	-0.157*	-0.111	-0.111	-0.179*	-0.114*	-0.114
	(0.0616)	(0.0652)	(0.0684)	(0.0890)	(0.0544)	(0.0591)
% Domestic bank share× 1[Low-transparency]	0.175***	0.116***	0.116***			
	(0.0261)	(0.0256)	(0.0314)			
% Domestic bank share× 1[High-tangibility]				0.186***	0.120***	0.120***
				(0.0285)	(0.0279)	(0.0267)
Maturity		0.00204***	0.00204***		0.00204***	0.00204***
		(0.000144)	(0.000296)		(0.000152)	(0.000292)
1[Secured]		-0.0210	-0.0210		-0.0214	-0.0214
		(0.0209)	(0.0257)		(0.0209)	(0.0260)
No. of lenders		0.0322***	0.0322***		0.0322***	0.0322***
		(0.000961)	(0.00168)		(0.000961)	(0.00170)
1[Takeover]		0.609***	0.609***		0.609***	0.609***
		(0.0406)	(0.0684)		(0.0406)	(0.0681)
1[Trade finance]		-0.0566	-0.0566		-0.0567	-0.0567
		(0.0311)	(0.0495)		(0.0311)	(0.0493)
Observations	41684	41684	41684	41684	41684	41684
Adjusted R^2	0.590	0.607	0.607	0.590	0.607	0.607
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes	Yes	Yes
Deal FE	Yes	Yes	Yes	Yes	Yes	Yes
Clusters (year)			34			34

Standard errors in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

The table presents the following regression equation:
$Ln(Amount)_{i,c,t} = \alpha_i + \theta_{c,t} + \beta_1(\text{Domestic bank share\%}) + \beta_2(\text{Domestic bank share\%}) \times 1[\text{High tangibility/Low transparency}] + \gamma X + \epsilon_{i,c,t}$
No. of lender is the total number of lending banks in a tranche, 1[Takeover] is a dummy variable that equals 1 if the purpose of the deal is for merger and acquisition. 1[Trade finance] is a dummy variable that equals 1 if the purpose of the deal is trade finance. 1[secured] is a dummy variable that equals 1 if the tranche is secured. A firm is defined to be of high-tangibility if its industry's above the top 25-th percentile of tangibility measured by PPE/Total assets in its country. And a firm is low-transparency if it is unlisted.

Table 4.3: Matching between banks and firms

	Ln[Loan amount]			
	(1)	(2)	(3)	(4)
% Domestic bank share	-0.110*	-0.108	-0.119*	-0.122
	(0.0511)	(0.0584)	(0.0489)	(0.0589)
% Domestic bank share×1[Low-transparance]	0.0246***	0.0375***		
	(0.00444)	(0.00423)		
% Domestic bank share× 1[Low transparency× 1[Fixed-value asset]	0.156***	0.172***		
	(0.0358)	(0.0376)		
% Domestic bank share×1[High-tangibility]			0.0368***	0.0354***
			(0.0109)	(0.0105)
% Domestic bank share× 1[High tangibility]× 1[Fixed-value asset]			0.116***	0.124***
			(0.0325)	(0.0331)
Maturity	0.00211***	0.00211***	0.00413***	0.00414***
	(0.000144)	(0.000304)	(0.000144)	(0.000303)
No. of lenders	0.0322***	0.0303***	0.0314***	0.0325***
	(0.000958)	(0.00166)	(0.000959)	(0.00167)
1[Takeover]	0.605***	0.612***	0.609***	0.614***
	(0.0406)	(0.0685)	(0.0406)	(0.0680)
1[Trade finance]	-0.0563	-0.0498	-0.0568	-0.0535
	(0.0311)	(0.0494)	(0.0311)	(0.0493)
Observations	31684	31684	31684	31684
Adjusted R^2	0.607	0.610	0.605	0.611
Firm FE	Yes	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes
Deal FE	Yes	Yes	Yes	Yes
Clusters (year)		34		34

Standard errors in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Note: The table shows the OLS The table presents the following regression equation:

$$
\begin{aligned}
&Ln(\text{Amount})_{i,c,t} = \alpha_i + \mu_{c,t} + \beta_1(\text{Domestic bank share\%}) \\
&+ \beta_2(\text{Domestic bank share\%}) \times 1[\text{High tang/Low trans}] \\
&+ \beta_3(\text{Domestic bank share\%}) \times 1[\text{High tang/Low trans}] \times 1[\text{Fixed-value }] + \gamma X + \epsilon_{i,c,t}
\end{aligned}
$$

No. of lender is the total number of lending banks in a tranche, 1[Takeover] is a dummy variable that equals 1 if the purpose of the deal is for merger and acquisition. 1[Trade finance] is a dummy variable that equals 1 if the purpose of the deal is trade finance. 1[secured] is a dummy variable that equals 1 if the tranche is secured. A firm is defined to be of high-tangibility if its industry's above the top 25-th percentile of tangibility measured by PPE/Total assets in its country. And a firm is low-transparency if it is unlisted.

Table 4.4: Overtime susceptibility to global financial condition: Real GDP

	GDP growth							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
NFCI	-0.275	-1.693***	-0.490	-1.892***	-0.435	-1.741***	-0.452	-1.985***
	(0.162)	(0.260)	(0.253)	(0.300)	(0.482)	(0.374)	(0.517)	(0.345)
REER			-0.00323*	-0.0126			-0.0299	-0.0119
			(0.00128)	(0.00683)			(0.0314)	(0.0133)
Net Export/GDP			0.0538	0.0152			0.0487	0.0204
			(0.0382)	(0.0125)			(0.0550)	(0.0158)
FDI			0.142	0.0148			0.0466	0.0435
			(0.144)	(0.0134)			(0.0241)	(0.0305)
Unemployment					-0.771**	-0.160	-0.803**	-0.128
					(0.251)	(0.0815)	(0.250)	(0.0795)
Inflation					-0.000867	-0.00787	0.000624	-0.0451
					(0.000877)	(0.0255)	(0.00329)	(0.0231)
Deposit rate					0.000261	-0.117**	-0.000149	-0.0781
					(0.000898)	(0.0386)	(0.00113)	(0.0437)
Observations	998	1203	353	707	262	584	195	424
R^2	0.031	0.035	0.055	0.066	0.088	0.089	0.260	0.156
Economy FE	✓	✓	✓	✓	✓	✓	✓	✓
Year range	before 1995	after 1995	before 1995	after 1995	before 1995	after 1995	before 1995	after 1995

Standard errors in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Note: The table shows the OLS regression of annual GDP growth rate of emerging market economies to NFCI, which is Chicago Fed's National Financial Conditions Index (NFCI) and also a set of economy-level control variables. The coefficient on the NFCI after 1995 is tested to be significantly more negative than before 1995.

Table 4.5: Overtime susceptibility to global financial condition: Domestic Credit Growth

	Domestic credit growth							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
NFCI	-0.263	-1.002***	-0.278	-1.172***	-0.307	-1.062***	-0.421	-1.236***
	(0.166)	(0.187)	(0.203)	(0.235)	(0.262)	(0.263)	(0.295)	(0.249)
REER			0.00401	0.00579			-0.0251	-0.0885
			(0.00491)	(0.00531)			(0.0180)	(0.0967)
Net Export/GDP			0.0305*	0.0254*			0.0625	0.0348**
			(0.0148)	(0.00985)			(0.0314)	(0.0114)
FDI			0.162**	0.0214*			0.367**	0.0573**
			(0.0557)	(0.0104)			(0.138)	(0.0220)
Unemployment					-0.511***	-0.126*	-0.569***	-0.0910
					(0.140)	(0.0592)	(0.149)	(0.0594)
Inflation					-0.00112	0.00837	0.00222	-0.00836
					(0.00476)	(0.0200)	(0.00188)	(0.0186)
Deposit rate					0.00672	-0.0701*	0.00129	-0.0312
					(0.00487)	(0.0289)	(0.00648)	(0.0333)
Observations	800	1104	305	676	256	580	190	420
R^2	0.021	0.027	0.103	0.154	0.161	0.158	0.179	0.127
Economy FE	✓	✓	✓	✓	✓	✓	✓	✓
Year range	before 1995	after 1995	before 1995	after 1995	before 1995	after 1995	before 1995	after 1995

Standard errors in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Note: The table shows the OLS regression of annual domestic credit growth rate of emerging market economies to NFCI, which is Chicago Fed's National Financial Conditions Index (NFCI) and also a set of economy-level control variables. The coefficient on the NFCI after 1995 is tested to be significantly more negative than before 1995.

Table 4.6: Overtime susceptibility to global financial condition: Industrial Value Added Growth

	Industrial value-added growth							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
NFCI	-0.135	-3.217***	0.103	-3.695***	-0.933	-4.031***	0.857	-3.856***
	(0.272)	(0.440)	(0.483)	(0.549)	(0.680)	(0.602)	(0.909)	(0.635)
REER			-0.0117	-0.0124			-0.113	-0.0275
			(0.00979)	(0.0128)			(0.0615)	(0.0258)
Net Export/GDP			0.0981	0.0532*			-0.0223	0.0664*
			(0.0747)	(0.0249)			(0.0908)	(0.0323)
FDI			0.115	0.0301			0.934*	0.0670
			(0.367)	(0.0245)			(0.410)	(0.0563)
Unemployment					-0.381	-0.114	-0.0568	0.0769
					(0.338)	(0.132)	(0.425)	(0.150)
Inflation					-0.00194	-0.0346	-0.0916	-0.0769
					(0.00159)	(0.0451)	(0.0653)	(0.0472)
Deposit rate					0.00240	-0.105	0.0538	-0.0395
					(0.00324)	(0.0657)	(0.0375)	(0.0861)
Observations	571	1023	227	641	226	531	172	391
R^2	0.023	0.052	0.029	0.081	0.075	0.109	0.240	0.142
Economy FE	✓	✓	✓	✓	✓	✓	✓	✓
Year range	before 1995	after 1995	before 1995	after 1995	before 1995	after 1995	before 1995	after 1995

Standard errors in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Note: The table shows the OLS regression of annual annual industrial sector's value added growth rate of emerging market economies to NFCI, which is Chicago Fed's National Financial Conditions Index (NFCI) and also a set of economy-level control variables. The coefficient on the NFCI after 1995 is tested to be significantly more negative than before 1995.

Table 4.7: Trend change in tangible sector growth in EME: OLS

Panel A: Baseline				
	Δ Tang. value added/GDP	Δ Tang. growth	Δ Tang. Emp	Δ Tang investment
	(1)	(2)	(3)	(4)
Δ D	0.213**	0.377**	0.298*	0.562**
	(0.0738)	(0.133)	(0.116)	(0.179)
Observations	65	48	62	59
R^2	0.015	0.021	0.034	0.033
Panel B: With controls				
	Δ Tang. value added/GDP	Δ Tang. growth	Δ Tang. Emp	Δ Tang investment
	(1)	(2)	(3)	(4)
Δ D	0.199**	0.309**	0.376**	0.467**
	(0.0598)	(0.109)	(0.127)	(0.167)
Observations	65	48	62	59
R^2	0.114	0.122	0.144	0.165

Standard errors in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

The table presents the results of the following regression:

$$\Delta Y_{1996-2010,i} = \alpha + \beta D_i + \phi \mathbf{X} + \epsilon_i$$

$\Delta Y_{1996-2010,c}$ is change in (average) outcome real economic variables of interest of country i during 1996-2010 compared with the (average) outcome variable before 1995. In this specification, it could be industrial sectors' share of output value added in GDP, the annual growth of industrial sector's output value added, the share of employment in industrial sector,and the average investment rate of tangible sector firms.

Table 4.8: Trend change in tangible sector growth in EME: 2SLS

Panel A: Baseline				
	Δ Tang. value added	Δ Tang. growth	Δ Tang. Emp	Δ Tang investment
	(1)	(2)	(3)	(4)
D	0.258**	0.407**	0.392*	0.702**
	(0.0883)	(0.123)	(0.141)	(0.234)
Observations	65	48	62	59
R^2	0.017	0.013	0.025	0.022
Panel B: With controls				
	Δ Tang. value added	Δ Tang. growth	Δ Tang. Emp	Δ Tang investment
	(1)	(2)	(3)	(4)
D	0.201**	0.336**	0.424**	0.655**
	(0.0652)	(0.113)	(0.136)	(0.223)
Observations	65	48	62	59
R^2	0.102	0.112	0.123	0.142

Standard errors in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

The table presents the results of 2SLS the following regression equations:

$$D_i = \mu + \beta_1 Z_i + \beta_2 \bar{X}_{i,1990-1995} + \epsilon_i$$
$$\Delta Y_{1996-2010,i} = \alpha + \beta \hat{D}_i + \phi \mathbf{X} + \epsilon_i$$

The instrumental variable is "Ave. secondary edu (20-24)". $\Delta Y_{1996-2010,c}$ is change in (average) outcome real economic variables of interest of country i during 1996-2010 compared with the (average) outcome variable before 1995. In this specification, it could be industrial sectors' share of output value added in GDP, the annual growth of industrial sector's output value added, the share of employment in industrial sector,and the average investment rate of tangible sector firms.

Table 4.9: First-stage regression

	IV-1		IV-2	
	(1)	(2)	(3)	(4)
Three-bank concentration	-0.121**			
	(0.0326)			
Five-bank concentration		-0.152**		
		(0.0501)		
Ave. secondary edu (20-24)			0.0276***	
			(0.00669)	
Ave. tertiary edu (25+)				0.0327***
				(0.00625)
Unemployment	0.00360	0.00381	0.00278	0.00346
	(0.00266)	(0.00263)	(0.00263)	(0.00272)
Net export/GDP	0.000837*	0.000908*	0.000388	0.000779*
	(0.000349)	(0.000363)	(0.000318)	(0.000348)
Inflation	-0.00112	-0.00337	-0.000393	-0.00103
	(0.00160)	(0.00286)	(0.00137)	(0.00160)
Observations	65	65	65	65
R^2	0.256	0.249	0.238	0.245

Standard errors in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

The table shows the first-stage regression for the 2SLS analysis.
$D_i = \mu + \beta_1 Z_i + \beta_2 \bar{X}_{i,1990-1995} + \epsilon_i$
The left-hand side variable D_i is the fraction of cross-border foreign currency loan to economy i that's lent by domestic banks. Three-bank concentration and five-bank concentration are the market share of the biggest three banks or five banks of an economy i. *Secondary_24* is the Barro-Lee average years of secondary education of workers of age 20-24; and *Tertiary_25* the Barro-Lee average years of teritary education of workers of age 25+.

Table 4.10: Second-stage regression: GDP-1

	OLS	IV			
	(1)	(2)	(3)	(4)	(5)
1[Post 1995]	-1.330***	-1.616***	-1.664***	-1.598***	-1.636***
	(0.324)	(0.336)	(0.344)	(0.333)	(0.344)
NFCI	-0.454*	-0.184	-0.172	-0.140	-0.210
	(0.208)	(0.229)	(0.232)	(0.230)	(0.225)
1[Post 1995]$\times D\times$ NFCI	-0.0887**				
	(0.0303)				
1[Post 1995]$\times \widehat{D_{\text{Secondary 24}}}\times$ NFCI		-0.186***			
		(0.0381)			
1[Post 1995]$\times \widehat{D_{\text{Tertiary 25}}}\times$ NFCI			-0.191***		
			(0.0414)		
1[Post 1995]$\times \widehat{D_{\text{3-bank}}}\times$ NFCI				-0.218***	
				(0.0453)	
1[Post 1995]$\times \widehat{D_{\text{5-bank}}}\times$ NFCI					-0.193***
					(0.0409)
D	7.114				
	(6.190)				
$\widehat{D}$		11.85	12.15	12.33	12.40
		(8.268)	(7.206)	(9.395)	(9.511)
Net Export/GDP	0.00264	0.00683	0.00754	0.00470	-0.0105*
	(0.00363)	(0.00411)	(0.00500)	(0.00358)	(0.00471)
Inflation	-0.00240***	-0.00260***	-0.00257***	-0.00254***	-0.00247***
	(0.000517)	(0.000523)	(0.000524)	(0.000516)	(0.000507)
Unemployment	-0.251***	-0.235***	-0.237***	-0.240***	-0.204***
	(0.0279)	(0.0282)	(0.0282)	(0.0276)	(0.0283)
Observations	1107	1101	1101	1107	1029
R^2	0.130	0.126	0.123	0.130	0.147
Economy controls	✓	✓	✓	✓	✓

Standard errors in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

The table presents the OLS and 2SLS of the following regression:

First stage:

$D_i = \mu + \beta_1 Z_i + \beta_2 \bar{X}_{i,1990-1995} + \epsilon_i$

Second stage:

$Y_{i,t} = \alpha + \beta_1 1[\text{Post 1995}] + \beta_2 F_t^{U.S.} + \gamma \widehat{D_i} \times 1[\text{Post 1995}] \times F_t^{U.S.} + \phi \mathbf{X} + \epsilon_{i,t}$

The left-hand side variable is GDP growth rate. NFCI is the National Financial Condition Index constructed by Chicago Fed. Control variables include net export/GDP, inflation rate and unemployment rate.

Table 4.11: Second-stage regression: Domestic Credit Growth-1

	OLS	IV			
	(1)	(2)	(3)	(4)	(5)
1[Post 1995]	-0.231	-0.378	-0.366	-0.420	-0.556*
	(0.265)	(0.269)	(0.271)	(0.273)	(0.265)
NFCI	-0.607***	-0.311	-0.362*	-0.418*	-0.422**
	(0.146)	(0.159)	(0.162)	(0.163)	(0.153)
1[Post 1995]$\times D\times$ NFCI	-0.0502***				
	(0.0128)				
1[Post 1995]$\times \widehat{D_{\text{Secondary 24}}}\times$ NFCI		-0.129***			
		(0.0254)			
1[Post 1995]$\times \widehat{D_{\text{Tertiary 25}}}\times$ NFCI			-0.118***		
			(0.0277)		
1[Post 1995]$\times \widehat{D_{\text{3-bank}}}\times$ NFCI				-0.108***	
				(0.0308)	
1[Post 1995]$\times \widehat{D_{\text{5-bank}}}\times$ NFCI					-0.102***
					(0.0268)
D	9.308				
	(8.218)				
$\widehat{D}$		12.98	13.32	12.67	12.15
		(9.376)	(8.121)	(8.872)	(9.339)
Net Export/GDP	0.0246**	0.0200*	0.0201*	0.0251**	0.0263***
	(0.00806)	(0.00822)	(0.00826)	(0.00804)	(0.00793)
Inflation	-0.000119	-0.0000841	-0.0000824	-0.0000754	-0.000106
	(0.000350)	(0.000349)	(0.000350)	(0.000349)	(0.000331)
Unemployment	-0.246***	-0.239***	-0.239***	-0.243***	-0.217***
	(0.0363)	(0.0359)	(0.0360)	(0.0360)	(0.0346)
Observations	1021	1001	1001	1009	931
R^2	0.118	0.129	0.131	0.133	0.135
Economy controls	✓	✓	✓	✓	✓

Standard errors in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

The table presents the OLS and 2SLS of the following regression:

First stage:

$D_i = \mu + \beta_1 Z_i + \beta_2 \bar{X}_{i,1990-1995} + \epsilon_i$

Second stage:

$Y_{i,t} = \alpha + \beta_1 1[\text{Post 1995}] + \beta_2 F_t^{U.S.} + \gamma \widehat{D_i} \times 1[\text{Post 1995}] \times F_t^{U.S.} + \phi \mathbf{X} + \epsilon_{i,t}$

The left-hand side variable is domestic credit growth rate. NFCI is the National Financial Condition Index constructed by Chicago Fed. Control variables include net export/GDP, inflation rate and unemployment rate.

Table 4.12: Second-stage regression: Industrial Growth

	OLS	IV			
	(1)	(2)	(3)	(4)	(5)
1[Post 1995]	-3.854***	-4.325***	-4.519***	-4.735***	-4.873***
	(0.646)	(0.648)	(0.650)	(0.654)	(0.663)
NFCI	-0.874**	-0.252	-0.127	-0.0995	-0.249
	(0.337)	(0.367)	(0.371)	(0.372)	(0.368)
1[Post 1995]$\times D\times$ NFCI	-0.200***				
	(0.0491)				
1[Post 1995]$\times \widehat{D_{\text{Secondary 24}}}\times$ NFCI		-0.340***			
		(0.0573)			
1[Post 1995]$\times \widehat{D_{\text{Tertiary 25}}}\times$ NFCI			-0.391***		
			(0.0619)		
1[Post 1995]$\times \widehat{D_{\text{3-bank}}}\times$ NFCI				-0.461***	
				(0.0694)	
1[Post 1995]$\times \widehat{D_{\text{5-bank}}}\times$ NFCI					-0.429***
					(0.0633)
D	8.877				
	(7.677)				
$\widehat{D}$		10.89	11.99	12.37	11.78
		(7.533)	(8.565)	(9.102)	(8.563)
Net Export/GDP	0.0165	0.0204	0.0199	0.0188	0.0139
	(0.0202)	(0.0204)	(0.0204)	(0.0197)	(0.0207)
Inflation	-0.00210**	-0.00203**	-0.00200**	-0.00194*	-0.00202**
	(0.000777)	(0.000771)	(0.000769)	(0.000768)	(0.000768)
Unemployment	-0.199*	-0.175*	-0.176*	-0.173*	-0.173*
	(0.0811)	(0.0784)	(0.0782)	(0.0785)	(0.0791)
Observations	947	942	942	948	884
R^2	0.113	0.151	0.165	0.139	0.141
Economy controls	✓	✓	✓	✓	✓

Standard errors in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

The table presents the OLS and 2SLS of the following regression:

$$D_i = \mu + \beta_1 Z_i + \beta_2 \bar{X}_{i,1990-1995} + \epsilon_i$$

$$Y_{i,t} = \alpha + \beta_1 1[\text{Post 1995}] + \beta_2 F_t^{U.S.} + \gamma \widehat{D_i} \times 1[\text{Post 1995}] \times F_t^{U.S.} + \phi \mathbf{X} + \epsilon_{i,t}$$

The left-hand side variable is industrial value added growth rate. NFCI is the National Financial Condition Index constructed by Chicago Fed. Control variables include net export/GDP, inflation rate and unemployment rate.

Figure 4.3: Foreign and Domestic Bank Participation Industry in EME and Developed Market Economies

Figure 4.4: Foreign and Domestic Bank Lending Bases across Industry in EME and Developed Market Economies

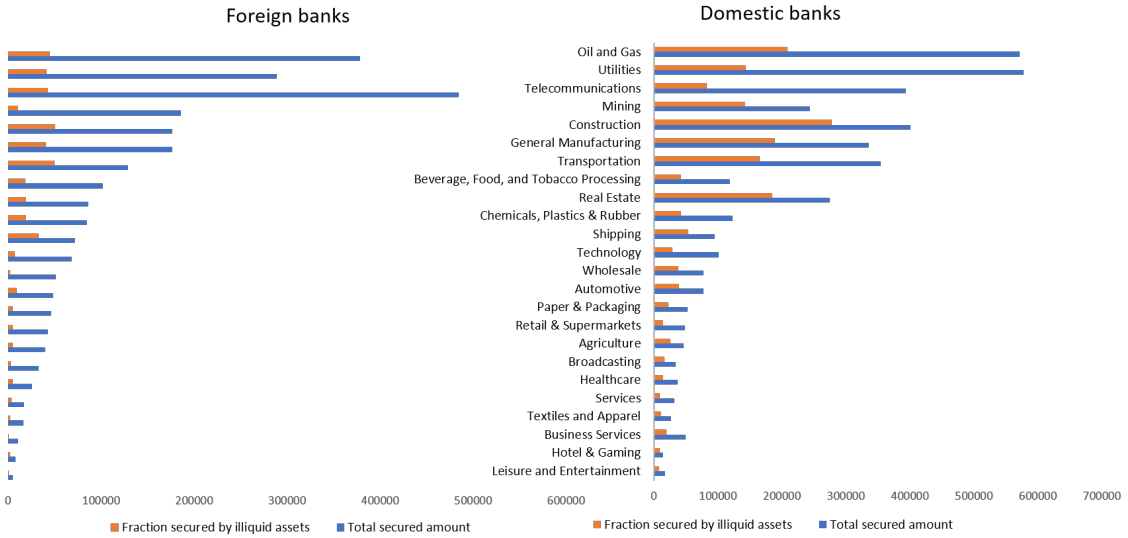


Figure 4.5: Foreign and Domestic Bank Lending Bases across Industry in EME and Developed Market Economies

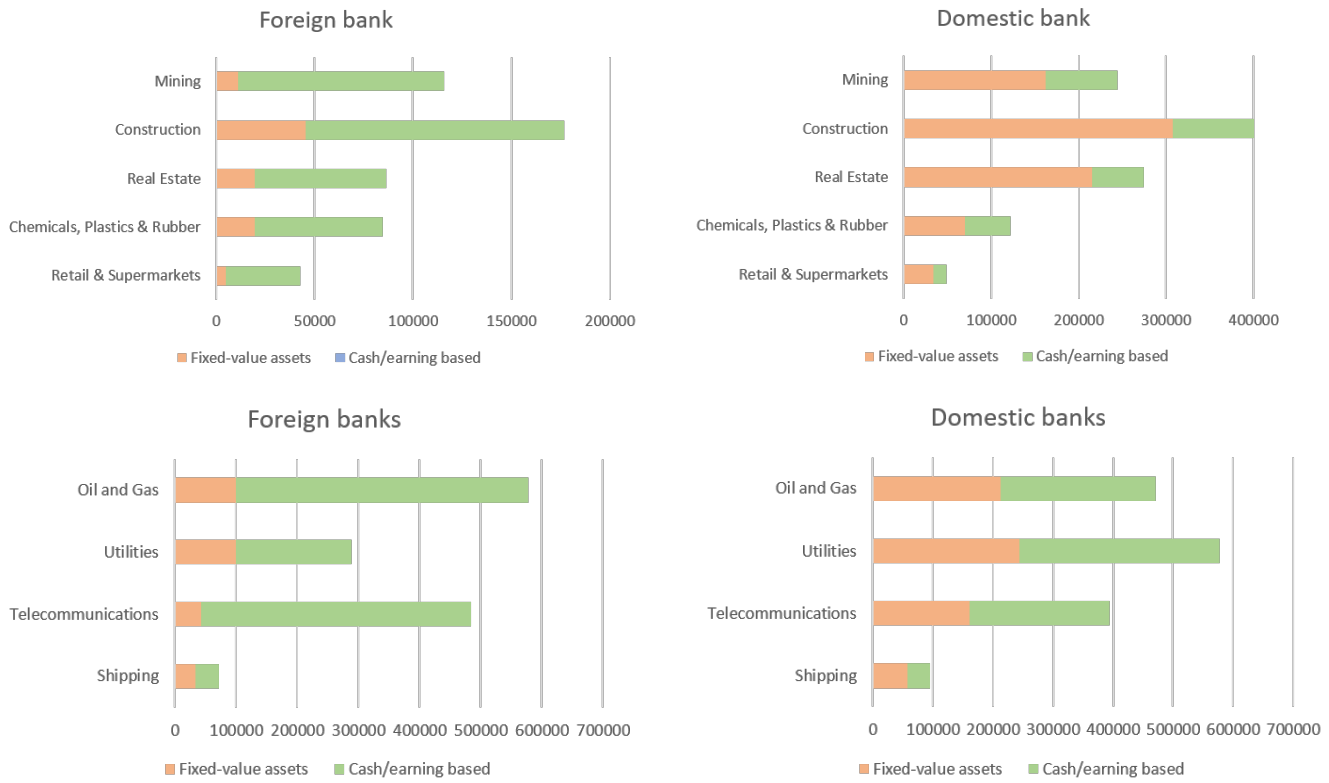
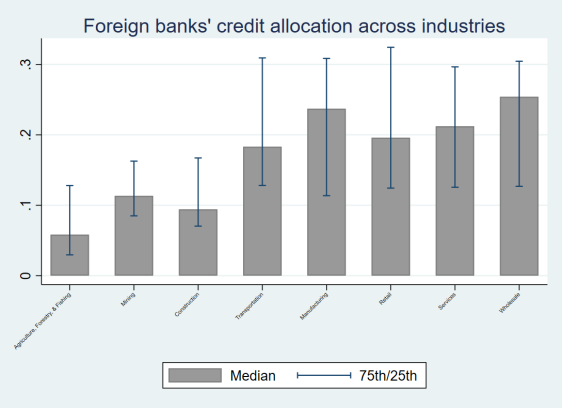
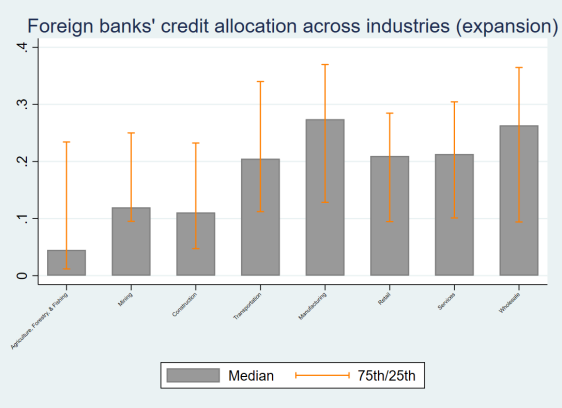


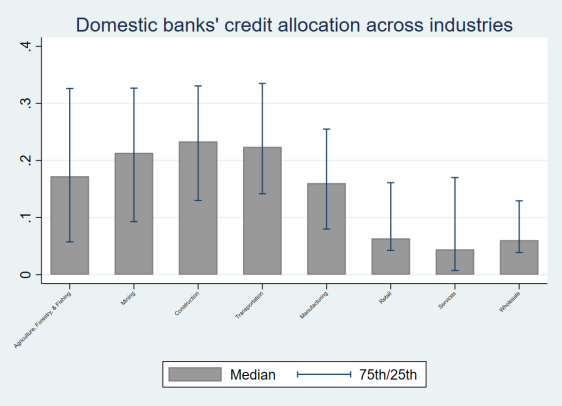
Figure 4.6: Foreign and domestic banks' USD credit portfolio and industry tangibility



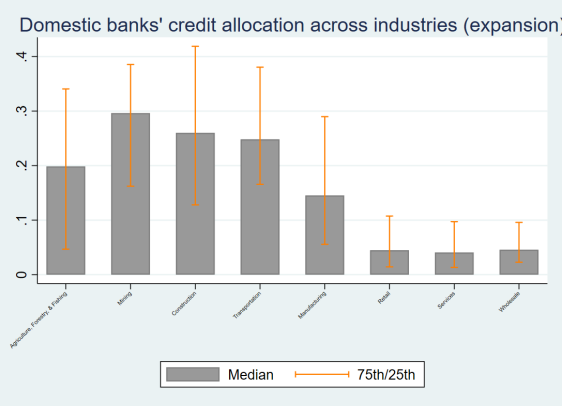
(a) Foreign bank portfolio across industries



(b) Foreign bank portfolio



(c) Domestic bank portfolio across industries



(d) Domestic bank portfolio across industries

2-digit SIC	Industry	Tangibility
00-09	Agriculture, Forestry, & Fishing	0.468
10-14	Mining	0.425
15-17	Construction	0.405
40-49	Transportation & Public Utilities	0.357
20-39	Manufacturing	0.336
70-89	Services	0.263
52-59	Retail Trade	0.251
50-51	Wholesale Trade	0.198

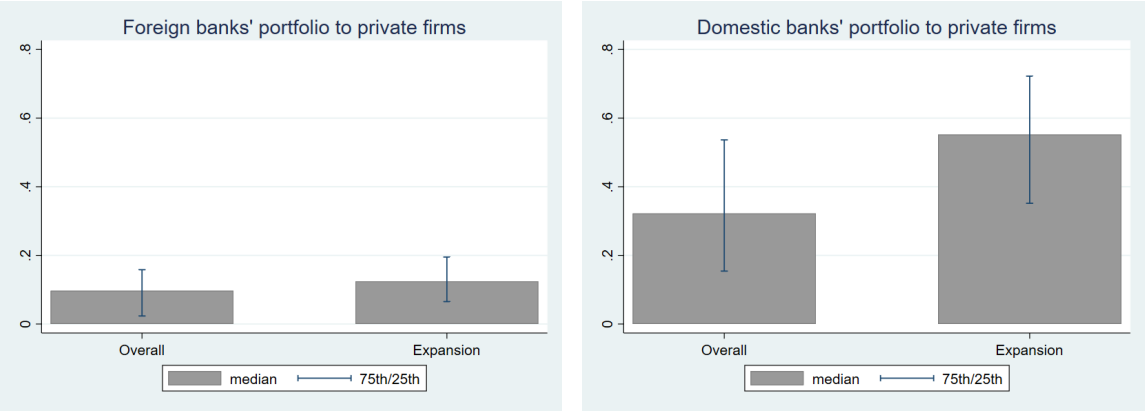
Table 4.13: Bank-level regression of lending bases choices

	1[Fixed assets secured]			
	(1)	(2)	(3)	(4)
Year resolve	-0.0193***			
	(0.00455)			
1[Foreign Lender]× Year resolve	-0.0527***			
	(0.0121)			
Cost (% of estate)		-0.00290**		
		(0.00103)		
1[Foreign bank]×Cost (% of estate)		-0.00578**		
		(0.00167)		
Time register			-0.0140***	
			(0.00295)	
1[Foreign bank]×Time register			-0.0325***	
			(0.00391)	
Procedures				-0.0127***
				(0.00321)
1[Foreign bank]× Procedure				-0.0252***
				(0.00555)
1[Foreign bank]	-0.163***	-0.155***	-0.201***	-0.204***
	(0.0330)	(0.0358)	(0.0432)	(0.0378)
Observations	249277	249277	250147	250147
Adjusted R^2	0.259	0.257	0.260	0.264
Bank FE	✓	✓	✓	✓
Bank role FE	✓	✓	✓	✓
Industry-year FE	✓	✓	✓	✓
Year FE	✓	✓	✓	✓
Industry FE	✓	✓	✓	✓
Bank country FE	✓	✓	✓	✓
Bank Type FE	✓	✓	✓	✓

Standard errors in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

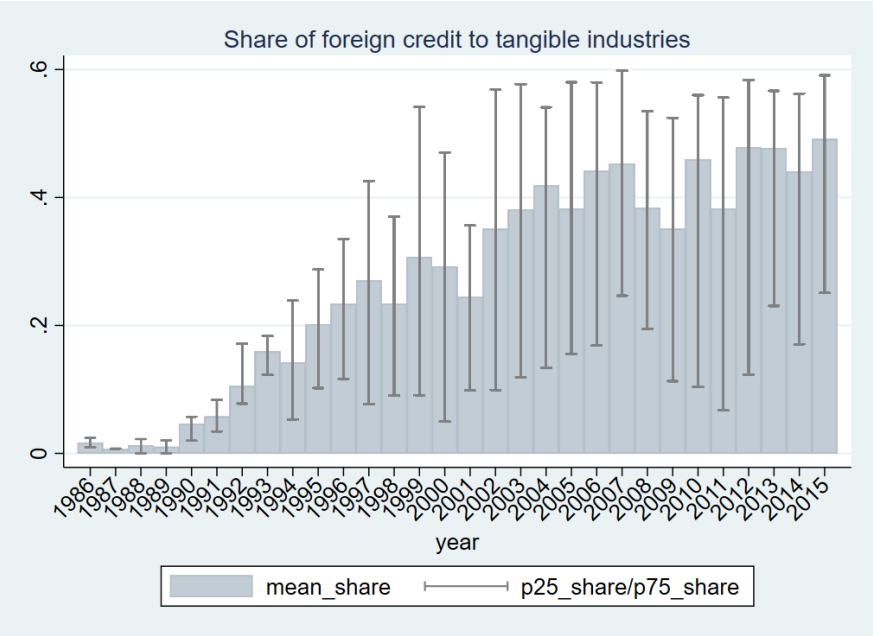
Figure 4.7: Foreign and domestic banks' USD credit portfolio and firm transparency



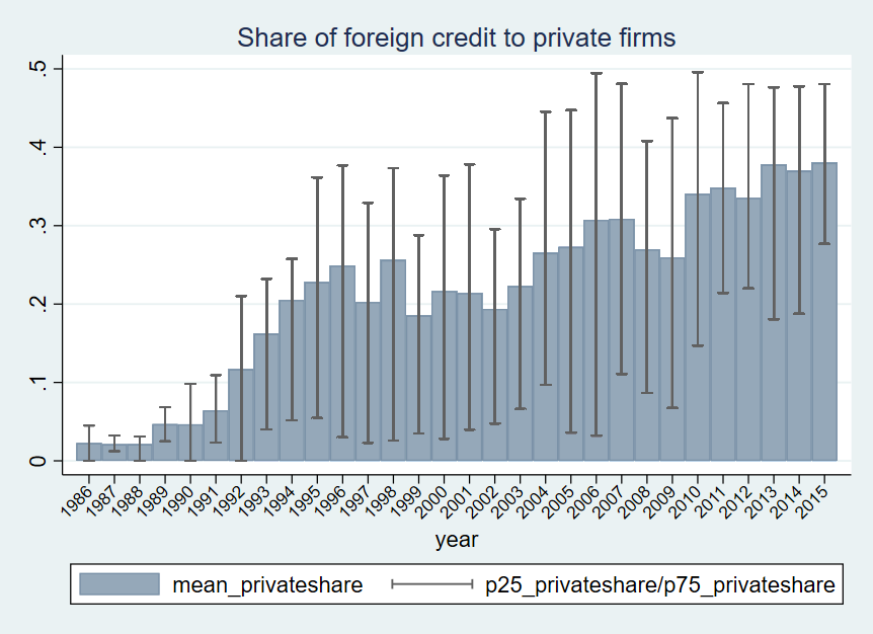
(a) Foreign bank portfolio allocating to private firms

(b) Domestic bank portfolio allocating to private firms

Figure 4.8: Cross-border credit to high-tangibility sector and to low transparency firms over time



(a) Share of USD cross-border credit to tangible sectors



(b) Share of USD cross-border credit to private firms

Table 4.14: Cross-country susceptibility to global cycle: Over time

	GDP growth							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
IMF_index	-0.461	-0.729***	-0.482	-0.841***	-0.463	-0.855***	-0.447	-0.784**
	(0.585)	(0.135)	(0.601)	(0.158)	(0.564)	(0.195)	(0.402)	(0.184)
REER			0.0112	-0.0133			0.0359	-0.0157
			(0.0294)	(0.00736)			(0.0632)	(0.0146)
Net Export/GDP			0.0308	0.00490			-0.0261	0.0144
			(0.0964)	(0.0139)			(0.0876)	(0.0171)
FDI			-0.142	0.0178			0.357	0.0500
			(0.176)	(0.0149)			(0.238)	(0.0333)
Unemployment					-1.408	-0.118	-2.067*	-0.0786
					(0.788)	(0.0873)	(0.747)	(0.0875)
Inflation					-0.0144	-0.0145	-0.0198	-0.0503*
					(0.0213)	(0.0264)	(0.0267)	(0.0245)
Deposit rate					0.00815	-0.0932*	0.0114	-0.0581
					(0.0124)	(0.0406)	(0.0153)	(0.0474)
Observations	745	1103	326	654	268	554	139	401
R^2	0.016	0.027	0.011	0.028	0.085	0.073	0.614	0.109
Coutry FE	✓	✓	✓	✓	✓	✓	✓	✓
year range	before 1995	after 1995	before 1995	after 1995	before 1995	after 1995	before 1995	after 1995

Standard errors in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 4.15: Cross-country susceptibility to global cycle: Over time

	Domestic credit growth							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
IMF_index	-0.247	-0.465***	-0.130	-0.366**	-0.222	-0.536***	-0.330	-0.524***
	(0.370)	(0.0963)	(0.519)	(0.123)	(0.322)	(0.135)	(0.325)	(0.131)
REER			0.00605	0.00655			-0.0249	0.00773
			(0.0102)	(0.00569)			(0.0660)	(0.0104)
Net Export/GDP			0.00958	0.0191			0.0202	0.0317**
			(0.0363)	(0.0109)			(0.0639)	(0.0122)
FDI			-0.0297	0.0207			0.158	0.0611*
			(0.0599)	(0.0115)			(0.194)	(0.0237)
Unemployment					-0.658*	-0.0919	-0.910	-0.0578
					(0.319)	(0.0626)	(0.614)	(0.0646)
Inflation					-0.00877	0.00186	-0.0574	-0.0140
					(0.00913)	(0.0204)	(0.0829)	(0.0195)
Deposit rate					0.00626	-0.0470	0.0340	-0.00827
					(0.00530)	(0.0301)	(0.0474)	(0.0358)
Observations	799	1012	307	625	266	550	137	397
R^2	0.032	0.024	0.050	0.029	0.226	0.156	0.195	0.109
Economy FE	✓	✓	✓	✓	✓	✓	✓	✓
Year range	before 1995	after 1995	before 1995	after 1995	before 1995	after 1995	before 1995	after 1995

Standard errors in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 4.16: Cross-country susceptibility to global cycle: Over time

	Industrial sector growth							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
IMF_index	-0.790	-1.159***	-0.0736	-1.241***	-0.0839*	-1.450***	-0.0928	-1.344***
	(0.731)	(0.237)	(1.096)	(0.289)	(1.108)	(0.338)	(1.682)	(0.353)
REER			0.00205	-0.00923			-0.0288	-0.0474
			(0.0214)	(0.0200)			(0.0655)	(0.0347)
Net Export/GDP			0.0840	0.0736*			0.0836	0.0743
			(0.0898)	(0.0310)			(0.117)	(0.0381)
FDI			0.262	0.0203			0.514	0.0765
			(0.296)	(0.0260)			(0.382)	(0.0607)
Unemployment					0.212	-0.0523	0.00814	0.184
					(0.326)	(0.179)	(0.387)	(0.200)
Inflation					-0.0243	-0.0243	-0.0541*	-0.160
					(0.0148)	(0.0938)	(0.0211)	(0.0960)
Deposit rate					0.0167	-0.189	0.0342**	-0.131
					(0.00893)	(0.118)	(0.0124)	(0.188)
Observations	317	755	207	468	241	410	193	306
R^2	0.004	0.033	0.012	0.064	0.069	0.076	0.135	0.131
Economy FE	✓	✓	✓	✓	✓	✓	✓	✓
Year range	before 1995	after 1995	before 1995	after 1995	before 1995	after 1995	before 1995	after 1995

Standard errors in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 4.17: Second-stage regression: GDP-2

	OLS	IV			
	(1)	(2)	(3)	(4)	(5)
after1995	-0.602	-0.437	-0.445	-0.449	-0.576
	(0.359)	(0.366)	(0.366)	(0.361)	(0.367)
IMF_index	-0.315*	-0.145	-0.143	-0.136	-0.135
	(0.129)	(0.145)	(0.147)	(0.147)	(0.146)
1[Post 1995]×D× IMF_index	-0.0335***				
	(0.0102)				
1[Post 1995]×$\widehat{D_{\text{Secondary 24}}}$× IMF_index		-0.0654**			
		(0.0203)			
1[Post 1995]×$\widehat{D_{\text{Tertiary 25}}}$× IMF_index			-0.0687**		
			(0.0220)		
1[Post 1995]×$\Delta\widehat{D_{\text{3-bank}}}$× IMF_index				-0.0776**	
				(0.0243)	
1[Post 1995]×$\widehat{D_{\text{5-bank}}}$× IMF_index					-0.0815***
					(0.0222)
D	6.983				
	(6.544)				
$\widehat{D}$		10.31	12.88	13.14	12.65
		(8.655)	(8.993)	(8.763)	(9.272)
Net Export/GDP	-0.0115	-0.0157	-0.0151	-0.0164	-0.0136
	(0.0115)	(0.0117)	(0.0117)	(0.0114)	(0.0117)
Inflation	-0.00206***	-0.00202***	-0.00202***	-0.00203***	-0.00204***
	(0.000520)	(0.000525)	(0.000526)	(0.000518)	(0.000517)
Unemployment	-0.286***	-0.297***	-0.292***	-0.285***	-0.275***
	(0.0512)	(0.0506)	(0.0507)	(0.0501)	(0.0506)
Observations	1065	1061	1061	1066	993
R^2	0.119	0.133	0.131	0.142	0.149
Economy controls	✓	✓	✓	✓	✓

Standard errors in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 4.18: Second-stage regression: Domestic Credit Growth-2

	OLS	IV			
	(1)	(2)	(3)	(4)	(5)
1[Post 1995]	0.103	0.300	0.273	0.196	0.0876
	(0.265)	(0.269)	(0.270)	(0.269)	(0.259)
IMF_index	-0.339***	-0.143	-0.172	-0.211	-0.159
	(0.0926)	(0.105)	(0.107)	(0.108)	(0.101)
1[Post 1995]×D× IMF_index	-0.0760***				
	(0.0137)				
1[Post 1995]×$\widehat{D\_\text{Secondary}}$ 24× IMF_index		-0.0477***			
		(0.0143)			
1[Post 1995]×$\widehat{D\_\text{Tertiary}}$ 25× IMF_index			-0.0433**		
			(0.0155)		
1[Post 1995]×$\widehat{D\_\text{3-bank}}$× IMF_index				-0.0396*	
				(0.0174)	
1[Post 1995]×$\widehat{D\_\text{5-bank}}$× IMF_index					-0.0503***
					(0.0150)
D	8.521				
	(6.533)				
$\widehat{D}$		11.32	11.93	12.59	13.14
		8.213)	(7.984)	(9.092)	(9.415)
Net Export/GDP	0.0206*	0.0147	0.0156	0.0195*	0.0227**
	(0.00839)	(0.00859)	(0.00859)	(0.00839)	(0.00820)
Inflation	-0.0000980	-0.0000490	-0.0000587	-0.0000724	-0.0000744
	(0.000357)	(0.000357)	(0.000358)	(0.000356)	(0.000337)
Unemployment	-0.240***	-0.234***	-0.232***	-0.234***	-0.205***
	(0.0377)	(0.0375)	(0.0376)	(0.0376)	(0.0360)
Observations	981	963	963	968	895
R^2	0.117	0.122	0.124	0.135	0.138
Economy FE	✓	✓	✓	✓	✓

Standard errors in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 4.19: Second-stage regression: Industrial Growth

	OLS	IV			
	(1)	(2)	(3)	(4)	(5)
1[Post 1995]	-3.063***	-2.835***	-2.796***	-2.712***	-2.770***
	(0.652)	(0.656)	(0.655)	(0.657)	(0.658)
IMF_index	-0.483*	-0.149	-0.0740	-0.0755	-0.0548
	(0.212)	(0.239)	(0.243)	(0.247)	(0.242)
1[Post 1995]$\times D\times$ IMF_index	-0.0540				
	(0.0276)				
1[Post 1995]$\times \widehat{D_{\text{Secondary 24}}}\times$ IMF_index		-0.123***			
		(0.0321)			
1[Post 1995]$\times \widehat{D_{\text{Tertiary 25}}}\times$ IMF_index			-0.146***		
			(0.0350)		
1[Post 1995]$\times \widehat{D_{\text{3-bank}}}\times$ IMF_index				-0.162***	
				(0.0395)	
1[Post 1995]$\times \widehat{D_{\text{5-bank}}}\times$ IMF_index					-0.180***
					(0.0357)
D	10.092				
	(8.763)				
$\widehat{D}$		12.03	12.87	13.15	13.77
		(9.662)	(9.792)	(9.033)	(9.236)
Net Export/GDP	0.00750	0.00639	0.00757	0.00168	0.00263
	(0.0213)	(0.0215)	(0.0214)	(0.0209)	(0.0217)
Inflation	-0.00201*	-0.00194*	-0.00194*	-0.00195*	-0.00194*
	(0.000798)	(0.000793)	(0.000792)	(0.000793)	(0.000790)
Unemployment	-0.192*	-0.174*	-0.164*	-0.150	-0.153
	(0.0853)	(0.0826)	(0.0825)	(0.0828)	(0.0831)
Observations	908	905	905	910	850
R^2	0.123	0.137	0.136	0.128	0.129
Economy controls	✓	✓	✓	✓	✓

Standard errors in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

CHAPTER 5

DOMESTIC BANK-CHANNELED FOREIGN CREDIT – A BLESSING OR A CURSE: EVIDENCE FROM CHINA

5.1 Introduction

Over the past three decades, emerging market economies (EMEs) around the world having been witnessing a deepening integration of their banking sector with the international funding market.[1] Along with the increasingly important role that domestic banks from EMEs play in transmitting cross-border capital, increased real economic co-movements with cycles in the global funding market and susceptibility to external shocks are widely seen in many EMEs around the world, as illustrated in Figure 5.1.[2]

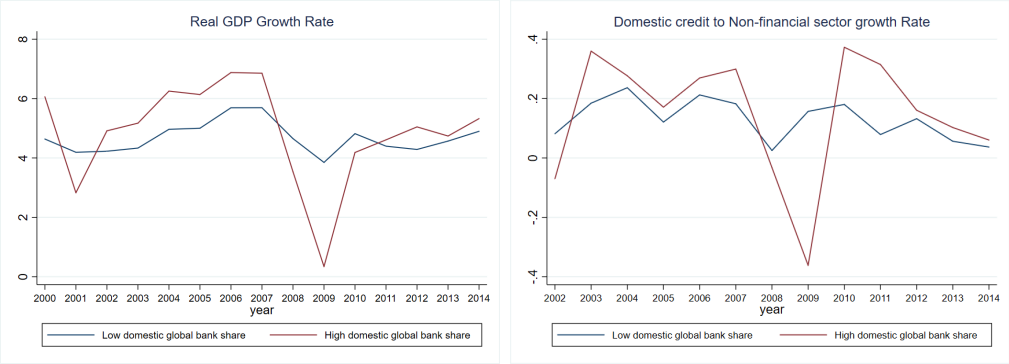


Figure 5.1: Banking Globalization and Macroeconomic Volatility

Many research and policy works have paid attention to the increasing degree of inter-connectedness in the global economy (Miranda-Agrippino and Rey (2015b)). Some have expressed concerns that the financial inter-connection between an emerging market econ-

1. See detailed documentation in Jiang and Xu (2019).

2. The fast and slow domestic banking sector globalization is defined based on the percentage of cross-border foreign currency credit that was lent by domestic banks after 1995. The fast banking globalization emerging market economies in the figure include Czech Republic, China, South Korea, Poland, Turkey, and Indonesia; and the slow banking globalization emerging market economies include Brazil, Chile, South Africa, Vietnam, Iran, and Ukraine.

omy's banking sector and the global funding market could be a mixed blessing (Martin and Rey (2006), Bekaert et al. (2005), Prasad et al. (2004), Edison et al. (2002), Mishkin (2007)). A common theme, for example, is that the potential extra volatility and fragility could outweigh the benefits of more credit.[3] However, very few of the previous works have been able to determine whether a greater involvement of domestic banks in the intermediation of cross-border credit could lead to more volatile real economic conditions, and very few have identified the exact channels through which the greater involvement of an EME's own banking sector in the cross-border credit intermediation could bring about real economic outcomes. Without a comprehensive understanding of the potential benefits and pitfalls of allowing domestic banks to play a more significant role in the transmission of cross-border capital, policies that regulate domestic banks' access to foreign capital cannot be completely justified.

This paper proposes and empirically identifies a novel channel through which structural differences in cross-border credit translate into real outcomes to EMEs. Exploiting a unique cross-region heterogeneity in the domestic global bank distribution in China, from which exogenous variations in the structure of cross-border credit are extracted, we find that regions in which a larger share of foreign credit was channeled by domestic banks was associated with more volatile real outcomes during the 2003-2009 global financing cycle. We further find that a more susceptible domestic credit intermediation is behind the excess real fluctuations– the evidence suggests that the global financing cycle gets localized. An examination of disaggregated firm-level data reveals that channeling a higher share of foreign credit by domestic banks has a mixed effect; specifically, it brings more flexibility to cross-border debt contracting and greater the efficiency to foreign and credit allocation, but at the same time,

3. As an illustration, Figure 1 compares two groups of economy's GDP and domestic banking sector credit volatility. One group of economies has a low domestic bank loan making share in the cross-border market, while the other group has a high domestic bank loan share in the cross-border loan market. While the group with the higher domestic global bank presence tends to grow faster when the global financing cycle is in the easing phase, this group also dips deeper during the tightening phase. The high cyclicality of the real economic outcomes in EMEs is also seen in various works, including Aguiar and Gopinath (2007).

it might expose the domestic economy towards a collateral externality. We now elaborate.

One salient feature of emerging market economies is their relatively weak legal infrastructure and low average corporate transparency. Foreign banks and domestic banks employ drastically different lending technologies in extending credit to borrowers from EMEs, as documented by Jiang and Xu (2019). In particular, while domestic banks often accept domestic fixed-value assets (primarily land and properties) as collateral for credit extension, foreign banks rarely conduct collateralized lending against physical assets in emerging markets, presumably due to extra difficulties in monitoring and seizing these assets. Instead, the credit extended by foreign banks to EME borrowers is largely covenant-based and earning transparency-based.

Differences in lending technologies map onto different contingency spaces of cross-border debt contracts when foreign credit is being channeled into an EME by distinctive types of lenders. The replacement of foreign banks by domestic lenders from EMEs in the cross-border credit transmission marks the completion of one crucial dimension of the contracting space: it allows credit agreements to be written against domestic hard assets as collateral. Thus, the increased contingency in cross-border debt contracting offers additional flexibility in how borrowers from EMEs can get access to credit in the global funding market.

The main insights of this paper rest on a mixed effect of this newly added flexibility in cross-border debt contracting. In particular, this flexibility in the contracting of cross-border credit agreement can help the economy achieve a more efficient allocation of credit during easing phase of the global financing cycle. Yet it can also induce domestic industrial firms to over-stretch their debt capacity by acquiring excessive tangible collateralizable assets, which would dampen asset prices and impair the intermediation of domestic credit during the tightening phase.

During the easing phase of a global financing cycle, if an economy's cross-border credit is only transmitted by foreign banks, which offer limited contracting space, only the high cash flow transparency firms will get the foreign credit. This often means that the marginal social

value of the last dollar of global credit could have been higher than the marginal productivity of the firm that actually received it. Thus, the economy is not reaping the full benefit of the abundant foreign credit supply. Yet in an economy whose cross-border credit flows are all channeled by domestic banks (and because of the enlarged flexibility in contracting), more firms that have domestic fixed assets can get financed from their lenders. This helps the economy reap the benefits of easy money, boosting real economic growth.

Increased flexibility in cross-border credit contracting, however, could induce firms to stretch their debt capacity by piling up too much land during the easing phase. When the increased demand for industrial land as collateral drives up the economy's industrial land prices, the higher value of the domestic collateral generates a multiplier effect, enabling firms borrowing *domestic* credit to also enlarge their debt capacity. But when the global financial condition suddenly reverses, firms find it no longer necessary to maintain a high debt capacity and hence high asset tangibility is no longer needed. Downward pressure is suddenly placed on the domestic collateral price, impairing firms that borrow domestic credit based on the same set of domestic collateral. As such, the global financing cycle gets localized in EMEs, through this collateral channel.

However, empirically identifying the exact channel through which the structure of cross-border credit could affect real outcomes is not an easy task. The most convenient variation to deploy would be differential shares of cross-border credit channeled by domestic banks across countries; through these one could investigate how this difference correlates with real economic outcomes at the country level. But claims made by cross-country exercises that use only aggregate variables are often limited. Greater involvement of domestic banking sector in cross-border credit market could be driven by unobserved country-specific factors that may simultaneously affect real outcomes. In these cases, the channel underneath a correlation is obscured.

Our empirical identification leverages a unique within-country cross-city heterogeneity of China's domestic global bank distribution and disaggregated data at different scales to

identify this channel, over one single global financing cycle: 2003-2009. The global financial cycle pushed a large volume of foreign credit from global funding market towards China. What's more, domestic banks are replacing foreign banks in the intermediation of foreign credit towards the non-financial corporate sector during this episode.[4] In 2000, foreign banks' total lending balance in China's domestic banking market reached as high as 16%.[5] By 2007, the total lending balance of foreign banks in the entire banking industry had declined to less than 6.7%.

The key institutional setting that makes this episode a perfect laboratory for studying our research question question is one particular domestic bank, the Bank of China, which plays a unique and dominant role in international capital intermediation in China. It plays this role because of its special institutional and political background. For a long time the Bank of China was the country's only authorized bank, and within China's economy it was also the only bank specializing in intermediating foreign credit. Because its branching network is sticky and uncorrelated with the global financial cycle, we can construct exogenous variation in the exposure (or access) of industrial companies to the foreign credit that is channeled by domestic global banks.

We first examine aggregate patterns at the city level. Our findings suggest that *conditional on the same level of foreign credit*, cities that have a higher fraction of foreign credit flowing into their industrial firms channeled by local domestic banks experienced faster growth in real GDP, a faster growth of employment in industrial sectors, and a faster industrial firm TFP growth during the period 2003-2007. This episode of the global financing cycle features a drastic inflow of hot money. Yet these cities also experienced a more severe slowdown in their real GDP, industrial employment, and firm TFP growth during the

4. In Jiang and Xu (2019), we show that this replacement of foreign banks by domestic lenders from EMEs in cross-border credit transmission could be related to the growing market share of shadow banking institutions in the U.S. money market.

5. The percentage is calculated among all types of commercial bank assets, including loans to the household sector and to the agricultural sector, conditional on the percentage of the credit balance to the industrial sector, the percentage will be more than 30%.

2008-2009 episode, when global funding markets tightened and hot money suddenly left.

Empirically, we find that when the volume of foreign credit is controlled, a 10% increase in the share of domestic bank-channeled foreign credit is associated with a 2.6% faster real GDP growth at the city level, a 5.57% higher growth in industrial sector employment growth, and a 2.08% increase in local firms' TFP growth rate during the 2003-2007 easing period. However, when the global financing condition suddenly tightened in 2008-2009, a 10% higher share of domestic bank-channeled foreign credit during the easing phase (2003-2007) of the global financing cycle was associated with a 2.20% slower real GDP growth, a 1.12% slower industrial sector employment growth, and a 2.47% slower TFP growth during the downturn, holding the level of total foreign credit flow controlled. Overall, all else being equal, cities that received a higher de facto percentage of foreign credit channeled by domestic banks were associated with a higher real economic volatility during the 2003-2009 global financial cycle.

To obtain a causal claim from the correlation, we instrument for the de facto percentage of foreign credit that local industrial firms received from local domestic banks with the pre-cycle market share of the Bank of China in the local area. The existence of a single dominant domestic global bank in China, the Bank of China, gives us an ideal source of within-country regional heterogeneity in firms' access to domestic bank-channeled foreign credit during the 2003-2009 global financial cycle. We find that the pre-cycle presence of BOC across cities in China strongly predicts the de facto percentage of foreign credit that was channeled by local domestic banks during the 2003-2009 cycle, but is less significantly correlated with the level of total foreign credit received by firms in the city.[6] Furthermore, we provide multiple checks on the exclusion restriction and find that pre-cycle market share of BOC across cities does not exhibit significant correlations with pre-cycle firm- and city-levels characteristics that were likely to affect real economic outcomes during the 2003-2009 cycle. Adopting this

6. A 10% increase in the pre-cycle BOC lending balance market share is associated with a 22.7% increase in the domestic channeled foreign credit during the easing phase of the cycle. and a 10% increase in the number of branches in the city's commercial bank branches is associated with a 6.31% higher domestic channeled foreign credit during the easing phase of the financial cycle.

IV strategy, we find that the structure of foreign credit had an economically and statistically significant effect – the share being channeled by domestic banks – on the real outcomes in each local economy during the 2003-2009 global financing cycle.

Having documented that cities that had a higher share of foreign credit channeled by domestic banks experienced higher volatility in their real economic outcomes during the global financing cycle, we now go one step further to examine how the allocation of credit varied across cities. Using disaggregated firm-level data, we find that the aforementioned impact on aggregate economic outcomes of the structural difference in foreign credit flow across cities is likely to be driven by its impact on the allocation of credit across firms. In particular, we find that when a higher share of foreign credit is channeled by domestic banks, an increased fraction of credit is received by firms in high-tangibility industries, young firms, and firms with high a pre-cycle ROA during the easing phase (2003-2007) of the global financing cycle.[7] Thanks to a more efficient allocation of the hot money, this distortion in the allocation of credit contributes to a higher growth rate in the local real outcomes. However, when global financing tightens, these types of firms also suffer more in cities, where a higher fraction of foreign credit is channeled by domestic banks. This outcome is reflected in a larger cut in credit and a more severe slowdown in TFP and output growth.

If one city experiences a considerably higher volatility in its real outcomes than another city that has the same amount of hot money, then the explanation must lie in the intermediation of domestic credit.[8] Inspired by this intuition, we probe the underlying source of the amplification effect of domestic bank-channeled foreign credit on local economic fluctuations. We find that underneath the excess volatility in the local real economy is a more affected domestic credit intermediation. To this end, we examine a 1999-2013 firm-bank pair lending

7. We find that a 10% increase in the city-level domestic bank-channeled foreign credit is associated with an average 3.6% increase in credit (compared with these types of firms in other cities) that is allocated to firms in high-tangibility industries; an average of 1.45% in credit that is allocated to firms whose age is less than 7 years; and an average increase of 1.06% in credit that is allocated to firms that have a high pre-cycle ROA.

8. This is particularly true during the tightening phase of the global financing cycle, when hot money leaves and the intermediation and allocation of domestic credit becomes particularly relevant.

panel that provides detailed information about the borrowing firm, its relationship bank, all of the loans the firm gets from a given relationship bank, the collateral it pledged for the loans, and the location of borrowers. Importantly, we focus on the lending relationship of banks that lacked access to the international financing market. For a better measure of debt capacity, we also conduct a sub-sample analysis that focuses on revolving credit loans and examines changes in the limits of these credit line facilities.

We find that during the global financial cycle, lending relationships in cities that experienced higher industrial land price volatility tended to display more drastic expansion and shrinkage in the volume of credit issuance. Moreover, this expansion and shrinkage in borrowing limits was especially severe for firms that relied on commercial and industrial land and properties to get financing. Empirically, we find that while on average the borrowing capacity of firms increased 2.3% during the easing phase of the global financing cycle, firms from the high-tangibility sector that were located in cities that underwent significant commercial land price appreciation saw an additional 13.2% increase in the borrowing capacity of their relationship lenders. Similarly, during the tightening phase, while the borrowing capacity of firms shrank 12.1% on average, firms from the high-tangibility sector located in cities that experienced a steeper decline in local land prices saw an extra 36.9% reduction in their borrowing capacity.

In the next part of our analysis, we examine the behavior of firms over the global financing cycle. In particular, we investigate changes in firms' tangible asset holdings during the easing phase of the credit cycle. We find that holding the total volume of foreign credit to a city controlled, firms located in cities that received a higher share of domestic bank-channeled foreign credit significantly increase their asset tangibility (measured by PPE/Total assets), make more investments in cumulative fixed assets, and become more levered, as measured by their total debt.[9] Moreover, we show that within the same city, the differences in asset

9. Empirically, we find that although all firms on average increase their tangibility by 2.1% during the easing phase of the global financial cycle, a 10% higher domestic bank-channeled foreign credit in the local city is associated with a 13.7% higher tangibility growth in the local firms' balance sheet.

structure change are more substantial for firms in high-tangibility industries and that have a lower cash flow transparency ex-ante.

To make the identification cleaner, we conduct a time-dependent Diff-in-Diff analysis, which uses the firms' city-level 2002 BOC presence before the initiation of the cycle to measure the local exogenous exposure of firms to domestic bank-channeled foreign credit and estimate the year-by-year coefficient. Consistent with the channel depicted in the cross-sectional analysis, we find that compared to a low-BOC presence city, a high local presence of BOC does not explain differences in local firms' tangibility, fixed asset investment rate, and total debt, until the cycle happened.

Next, we conduct an empirical test of changes in local land prices and local land transaction dynamism. We find that variations in the share of domestic bank-channeled foreign credit can explain the cross-sectional difference in the volatility of C&I land prices across cities throughout the entire cycle. Furthermore, we find that from 2003 to 2007, cities that had a high pre-cycle BOC presence experienced a larger appreciation in industrial land prices and higher growth in annual commercial mortgage issuance. Moreover, when the global financing cycle suddenly reversed in 2008 - 2009, the cities that featured high pre-cycle exposure to BOC experienced a particularly pronounced drop in industrial land prices and commercial mortgage issuance dynamism.

Related Literature This paper studies how completion of contracting space by domestic banks when intermediating cross-border credit flows during a global financial cycle could translate the global financial cycle into a local financial cycle. This issue is closely related to and related and contributes to several strands of literature.

First, on the macroeconomics side, this study is broadly related to works that examine financial sector development and real macroeconomic and asset price volatility. Focusing on the international macroeconomic setting, Wei (2018) and Kose et al. (2009) provide a survey of literature that examines the correlation of financial account liberalization and real economic growth. **?** make the point that international resource liquidity should be

more seriously taken into concern. Numerous previous works, including McKinnon and Pill (1997), Prasad et al. (2004), Mishkin (2007) have demonstrated that financial globalization or banking globalization could introduce risk to emerging market economies. Moreover, a large set of recent works has documented that spillovers of the center economy's monetary policy affect emerging market economies through bank lending, risk-taking, asset price volatility and exchange rate pass-through: Miranda-Agrippino and Rey (2015b), Bruno and Shin (2014), Rey (2013), Bruno and Shin (2015), Ivashina et al. (2015),Brauning and Ivashina (2019), Kalemli-Ozcan et al. (2018), Baskaya et al. (2017), Alfaro et al. (2019), Morais et al. (2019), etc. Our work contributes to this strand in literature through making the point in an EME, the global financial cycle can be transmitted to a local financial cycle using a within-country event-study framework and we provide a novel channel through which the cycle is transmitted by domestic banks.

Second, this paper is closely related to corporate finance works that examine incomplete contracting, pecuniary externality, and collateralized lending and its real implications in an emerging market setting. In theoretical frameworks, Stulz (2005) and Broner and Ventura (2016) have shown that the effectiveness and scope of financial globalization is crucially dependent on the emerging market economies' institutional strength, corporate ownership structure, and debt enforcement quality. Farhi et al. (2007), Caballero and Krishnamurthy (2003), Caballero and Krishnamurthy (2001), Lorenzoni (2008), and Bianchi (2011) qualitatively and quantitatively study how over/under collateralized borrowing due to contracting frictions can lead to amplified financial cycles. More recently, Diamond et al. (2020) and Diamond et al. (2018) demonstrate that easing financing conditions can systemically tilt firms towards their debt capacity resource to the asset-sale-based financing and neglecting the cash-flow-based borrowing. More broadly, our paper is also related to theoretical research that stresses that, in contrast to a first-best benchmark in which financial frictions are absent, such frictions can amplify macroeconomic shocks: Aoki et al. (2007), Kiyotaki and Moore (1997), Bernanke and Gertler (1989), etc. Our paper empirically joins this strand

of literature by concretely illustrating how completing contracting space by domestic banks' intermediating of cross-border credit flows could result in more volatile real local economic outcomes throughout the cycle.

A third strand in the literature to which our paper is relevant is applied macroeconomics and applied microeconomics work that aims to identify the real effect on the economy of structural change or shocks to the banking sector. These papers include Khwaja and Mian (2008), Mian et al. (2020), Mian and Sufi (2014), Chodorow-Reich (2014), Calomiris et al. (2017), etc. Calomiris et al. (2017) finds that weak movable collateral laws create distortions in the allocation of resources that favor immovable-based production and investment, and they verify the finding in an experimental setting following Slovakia's collateral law reform. Mian et al. (2020) shows that credit supply expansion boosts non-tradable sector employment and the price of non-tradable goods, thus amplifing local business cycle through the household demand channel. Our paper enriches this strand of literature by using detailed firm-level data to determine how pure financial market differences across cities–here differences in the ease with which firms can reach hot money from domestic banks that can write debt contracts based on physical assets–could result in drastically different real economic outcomes.

The rest of the paper is organized as follows. Section 2 discusses the empirical and institutional background. Section 3 describes data construction and summary statistics. Section 4 lays out the theoretical framework and the relevant empirical hypothesis to be tested. Section 5 conducts a cross-sectional analysis of the real impact of domestic bank-channeled foreign credit at the city level. In Section 6 we show that impaired domestic credit intermediation underlies the cross-sectional high volatility. Section 7 conducts analysis of local firm behavior during the global financial cycle. Section 8 concludes.

5.2 Empirical and Institutional Background

5.2.1 A Natural Experiment: The 2003-2009 Global Financing Cycle

In this paper, we explore the real economic effect of having domestic bank-channeling foreign credit from the international money market during the global financial cycle of 2003-2009; during which 2003-2007 was the easing period of the global financing cycle and 2008-2009 was the tightening period of the cycle. The cycle has been documented in several studies that have focused on the international financial cycle and banking (Miranda-Agrippino and Rey (2015b) and Borio (2013), Lane (2012) etc.). Following the loosening of monetary policy in the U.S, economic conditions in various advanced economies started to go through a large-scale expansion in 2002 (Calomiris et al. (2017)). The expansion was driven largely by the households sector (Mian et al. (2013)), which was strengthened by borrowing against rising house prices. The burgeoning debt-financed economic boom pushed up asset prices and fueled the decrease in global risk aversion in global banks and institutional investors. These forces jointly pushed investment towards the emerging market economies (Bruno and Shin (2015), **?**). [10]

This financial cycle, which originated in developed economies, was soon widely transmitted to emerging market economies, resulting in a fast accumulation of cross-border debt, climbing asset prices, and corporate leverage. When the house price suddenly plummeted in 2008-2009 period, the sudden contraction in the credit supply also transmitted to the emerging market world, leading to a "sudden stop" in the cross-border capital flow and a drop in asset prices there. This drastic reversal in global funding market conditions even impaired many emerging market economies' domestic credit intermediation, even though the occurrence and ending of the cycle had purely external origins and was largely uncorrelated to emerging market economies' own real economic conditions.

Figure 5.2 depicts the initiation and ending of the entire global financial cycle. The

10. The real monetary policy rate stayed negative over the period of 2002-2005.

solid grey line plots the Global Financial Condition Index (FCI), which is constructed from IMF's GFSR 2018, and the scale is shown on the right-axis. Higher values in the Financial Condition Index means tighter financial conditions, and vice versa. Starting in 2003, the FCI decreased to below zero. Synchronizing this loosening in financial conditions, we see that EME's cross-border credit/GDP ratio increased by nearly 20%. In 2008-2009, when the FCI suddenly tightened from below zero to more than 4, the cross-border credit flow/GDP to the whole emerging market world suddenly dropped to below 35%. This push-factor-driven global financial cycle provides a natural experimental setting in which to explore two issues: how a cycle that is initiated externally (relative to any single emerging market economy) is transmitted to an emerging market economy; and how its leaving affects the emerging market economy afterwards.

Figure 5.3 and Figure 5.5 depict the growth of foreign credit in China and the evolution of the total percentage share of the foreign credit balance of the total credit balance in China, respectively, against the backdrop of the global financial cycle. We measure the total volume of foreign credit in China using the sum of two variables. The first variable is the foreign-currency denominated loan balances issued by all financial intermediaries within the border of China. This variable is available annually from the Almanac of China's Banking and Finance. The second variable is the total cross-border loan balances of the intermediaries that are located outside of China. This variable is available from BIS's Locational Banking Statistics. The total domestic currency-denominated loan balances are also available from the Almanac of China's Banking and Finance. As illustrated in Figure 5.5, starting in 2003, the total amount of the foreign credit balance in China grew faster than domestic credit. And Figure 5.3, between 2003 and 2007, the total foreign credit balance divided by the sum of the total foreign and the domestic credit balance increased from 6.5% to over 13%. The evolution of foreign credit in China not only conforms to the external driven global financial cycle, it also indicates that foreign credit was quantitatively important for the Chinese economy during that period. Similarly, during the 2008-2009 period, the foreign

credit balance decreased dramatically to less than 7.5%, marking the left of hot money.

5.2.2 Institutional Background in China during this Cycle

Aside from the aggregate financial condition changes in the global financing market that function as the external engine that pushes credit from the global market towards emerging market economies, China for two reasons provides an ideal environment for studying the role that domestic banks play in channeling foreign credit and for studying the real impact of that role. First, China's financial market has gone through a big wave of financial globalization since its admission into the WTO. In fact, domestic banks have started to replace foreign banks and become the major role players in channeling foreign credit to domestic firms. Second, for a long time in China only the Bank of China–among the four big state-owned banks–has specialized in foreign currency lending, and this can be attributed to certain political factors. The geographic distribution of Bank of China's branches and its lending market share are pre-determined and sticky relative to the global financing cycle, this gives us exogenous variation in the accessibility of foreign credit that domestic banks provide to local industrial corporations, and that, in turn, allows us to investigate the real impact on local economic outcomes of having access to more domestic bank-channeled foreign credit.

The post-WTO financial opening-up not only includes the further opening-up of foreign banks' operations in China; more importantly, during this process major domestic banks obtained significantly greater access to the global financing market (Garcia-Herrero et al. (2006), Leng (2006), and Branstetter and Lardy (2008)). In 2003, Bank of China became the first state-owned Chinese commercial bank to be selected by the government to be transformed into a publicly-listed shareholding commercial bank. Its transformation into a shareholding company greatly broadened the its funding channels, enabled it to gain ratings

and acquire funding in the international market.[11] [12] More importantly, due this wave of financial globalization, during the 2001-2007 episode, domestic banks in China started to replace foreign banks in the foreign currency lending business. Figure 5.6 compares the percentage of domestic banks and foreign banks' foreign currency lending foreign currency commercial and industrial lending in China. The sum of the dashed and the solid line represent total share of foreign currency lending balance in total commercial and industrial lending balance. At the end of the 1990s, total foreign currency lending balance was around 22% in total C&I lending balance, and nearly 80% of the FX C&I lending was done by foreign bank. Starting in 2000, the lending balance of foreign banks started to gradually decrease, while the foreign currency lending of domestic banks quickly moved to replace it. By 2003, even foreign banks were overrun. [13]

Moreover, this pattern is also true for second-tier cities and for local firms that are associated with multinational entrepreneurs. Research in 2004 carried out by People's Bank of China, Lianyungang branch, investigated borrowing behavior of 580 joint-ventures in the city (Dong (2004)). Joint ventures are firms that are jointly funded by foreign and domestic partners. These firms are naturally tied to foreign banks at their founding, and, thus, they are more likely to borrow from foreign banks than other firms. Consistent with the situation reviewed by aggregate-level data, the new loan issuance from foreign banks to local joint-ventures decreased by 32.4% in 2003, while the new loan issuance from local domestic banks to these local joint ventures increased by 15%. Among the 68 new joint-ventures established

11. Accounting information disclosure at international standard was first employed by Bank of China in 2003, detailed information about the balance sheet and income statements by regions, employees compensation plan, investment plans by industry and asset holdings etc.

12. In 2003, domestic banks' foreign funding balance was only around 0.26 billion USD, when it came to the end of 2007, the foreign funding balance reached 66.8 billion USD. With the public listing, major domestic banks speed up their overseas funding paces through bond and loan issuance. during the episode of 2003-2007, the growth rate of USD bond and loan issuance by domestic commercial banks reached an average of 15.6%.

13. Foreign banks' declining business in foreign currency lending was not compensated by their RMB lending business during the same period, even though China lifted the restrictions on foreign banks' RMB and deposit taking in China when admitted to WTO, data from Almanac of China's Banking and Finance show that foreign currency lending is still the major lending currency of foreign banks.

in 2003, none borrowed from foreign banks as their initiation founding. The reason for this replacement is exactly consistent with the findings presented in Jiang and Xu (2019). While foreign banks were only able to take the guarantee of the parent firms of foreign partners—a guarantee normally issued in the form of promissory notes that assign future earnings to the lender–domestic banks can accept many more categories of collateral, including land, plants, and equipment. Before domestic banks obtained adequate access to the global funding market, this contracting flexibility was not deployable. As domestic banks became more and more globalized, this flexibility became available and Local firms quickly adopted it.

5.2.3 Specialty of China: A Single Dominant Domestic Global Bank

The dominance of the Bank of China in the country's foreign exchange market was driven by special political and institutional background. The Bank of China is the only bank in China that has been operated for more than one hundred years.

Established in 1912, the BOC initially functioned China's central bank under the approval of the provisional president, Mr. Sun Yat-Sun. At that time, the main task of the Bank of China was to transfer and maintain public funds, print money, and act as a fiscal agency. From 1928 to 1949, China went through a series of social revolutions as well as two world wars and internal wars, and the Bank of China was designated to be China's special foreign exchange bank. The bank opened branches in international financial centers, such as London, Singapore, New York, and this greatly helped the Bank of China accumulate experience in foreign exchange and market management. Since 1949, due to its special expertise in foreign exchange trading and loan making, which it accumulated following its establishment and during the war period, the Bank of China began to serve as China's only authorized foreign exchange bank.

By 2003, the Bank of China had opened branches in 27 countries with a total of 549 overseas branches, which makes it the most globalized bank in China. Due to the institutional and historical formation of the Bank of China, its dominant role in external funding and the

channeling of foreign credit to Chinese firms has been unparalleled among China's commercial banks. The total foreign currency lending balance of the Bank of China reached an historical high of 51.37 billion USD. In 2003, the Bank of China's foreign currency lending balance was about 45.7% of its total lending balance (RMB and foreign currency).[14]

5.3 Framework of Empirical Tests

In this section, we lay out the framework for our empirical analysis, from which we draw the predictions that will be tested empirically. At the big-picture level, we are interested in the following two questions: 1) Economically, what does the replacement of foreign banks by domestic lenders in cross-border capital transmission boil down to? 2) What does this replacement mean to emerging market economies?

5.3.1 Rise of Domestic Banks in Cross-border Credit Transmission: A Completion of Contracting Space

A salient feature of emerging market economies is their relatively weak legal infrastructure and low average corporate transparency. Based on these facts, (Jiang and Xu (2019)) document that foreign banks and domestic banks have drastically different lending technologies in extending credit to borrowers from EMEs. In particular, while domestic banks often accept domestic fixed assets (primarily land and properties) as collateral for credit issuance, foreign banks rarely conduct collateralized lending against physical assets in emerging markets. This difference in the lending technologies of distinct types of lenders is shown to be related to the challenge that foreign lenders in monitoring and seizing domestic fixed

14. The Bank of China also is the sole supplier of foreign currency funding in the domestic inter-bank market, allocating foreign currency funding to other domestic commercial banks in China. However, the sum of the foreign currency lending balance of all of the other next largest banks (CBC, ICBC and ABC) was only 20.7 billion USD. In 2003, their foreign currency lending balance was only about 4% of the total lending balance of the other big domestic banks.

assets.[15] As a result, the credit extended by foreign banks to EME borrowers is largely covenant-based and earning transparency-based.[16]

Differences in lending technologies translate into differences in the contingency space of cross-border debt contracts when foreign credit is intermediated towards an economy. The replacement of foreign banks by EME domestic lenders in the cross-border credit transmission marks a completion of the *contracting* space that allows credit agreements to be written against domestic hard assets as collateral. In other words, when domestic banks play a major role in channeling cross-border credit, the debt capacity of borrowing firms in EMEs can be made contingent on their choice of asset structure. This option is not available to firms when only foreign banks intermediate external credit; in this case the only acceptable collateral is 1) agency guarantee notes and promissory notes of firms or the firms' parent companies with financial covenants, or 2) the assignment of future cash flows etc (Dong (2004)). [17]

In effect, the increasing role that domestic banks from EMEs play in the transmission of cross-border credit to these economies gives greater flexibility to how the contracts for these credit agreements can be written.

15. The difficulties that foreign banks have in seizing the physical collateral is reflected in multiple facts. Anecdotal evidence in China's "ghost collateral" cases indicates that domestic steel firms used fraudulent collateral to cheat foreign banks that were unable to conduct frequent monitoring on collateral, and this resulted in big losses from the loan. Furthermore, it has been shown (Jiang and Xu (2019)) that within the emerging market economies, economies that have lower resolving insolvency scores (those economies where it takes longer to register property or longer to resolve insolvency) rarely see foreign bank participation in cross-border loans collateralized by domestic tangible assets. The reasoning is that the more complex and time-consuming the property registration or insolvency process it takes, the higher the cost for foreign lenders relative to domestic lenders it is to make sure the value of the tangible collateral is still guaranteed.

16. The work of Jiang and Xu (2019), who examine the same loan package granted to a same borrower, demonstrates that foreign and domestic lenders tend to sort into different tranches that are collateralized by different assets. Furthermore, each 10% increase in the presence of foreign banks in a given tranche decreases by about 23.4% the likelihood that the tranche is secured by land, properties. or real estate, yet it increases the financial covenant inclusion by 13.5%.

17. According to World Bank Doing Business Survey, physical-assets-secured debt in EME is about 75.8% of total non-financial corporate debt. In contrast, Lian and Ma (2018) find that 80% of the debt of U.S. non-financial firms are based on their cash flows, while Benmelech et al. (2019) find that the secured debt on U.S. non-financial firms' balance sheets is steadily declining and the issuance of hard asset secured debt is counter-cyclical.

5.3.2 Mixed Blessing to the Real Economies

Increased flexibility in the contracting of cross-border credit agreements can help the economy acquire a more efficient allocation of credit during the easing phase, but it may induce domestic industrial firms to over-reach credit by acquiring domestic hard collateral (land). This dampens asset prices and impairs domestic credit intermediation more during the tightening phase.

During the easing phase of a global financing cycle, if an economy's cross-border credit can only be intermediated by foreign banks, with the limited contracting space they are willing to offer, only the high cash flow transparency firms will get the credit. Consequently, a wedge is likely to emerge between the marginal social value of the last dollar of foreign credit and the marginal productivity of the firm that received it. In this sense, the economy does not fully benefit from the foreign credit supply because the last unit of cross-border capital could have been allocated to the borrowers with a higher marginal product of capital. On the other hand, in an economy in which all cross-border credit flows are channeled by domestic banks, a larger set of borrowers would be eligible to compete for the foreign credit, thanks to the enlarged flexibility in the contracting space. This increased contingency in debt contracting allows firms that have a high marginal productivity of capital to compete for cheap cross-border capital. As such, the economy can reap more benefits from the booming global financial market and boost more of its real economic growth.

However, too much contracting flexibility could induce firms to stretch for debt capacity by overly piling up tangible assets such as C&L land during the easing phase.[18] The increased demand for industrial land as collateral drives up the economy's industrial land prices. The higher value of domestic collateral can further generate a multiplier effect, enabling firms that borrow domestic credit to also enlarge their debt capacity. This amplification effect boosts economic growth during the easing phase. But when the global financial condition suddenly

18. The interplay between easing financing conditions and firms' debt capacity stretching behavior has been studied in several previous works, including Calomiris et al. (2017), Almeida and Campello (2007), etc.

reverses, firms find that high tangibility is no longer desirable because there is no need to maintain debt capacity and, thus, they attempt to dump some of the tangible assets they accumulated during the easing phase purely for debt capacity purposes. In this scenario, downward pressure will be exerted on the price of domestic collateral, which impairs firms that borrow domestic credit on the basis of the same set of domestic collateral.[19]

5.3.3 Hypothesis for Testing

From the above discussion, which concerns the potential real impact of the rise of domestic banks in cross-border credit transmission to EMEs, some readily testable predictions can be drawn.

Consider two otherwise identical cities A and B. Suppose that during the global financing cycle the volume of foreign credit that the two cities receive is identical. In city A foreign banks channel all foreign credit, whereas in city B domestic banks are in charge of transmitting foreign credit. Based on our discussion in section 4.2, we would expect the real economic outcomes in city B to be more volatile than those in city A during the global financing cycle.

Put formally, in the following empirical analysis, we test the following hypothesis:

Hypothesis: *Conditional on the same volume of foreign credit inflow, a city with a higher fraction of foreign credit flowing into its industrial firms channeled by local domestic banks would*

- *enjoy faster real GDP growth, faster growth of employment in industrial sectors, faster industrial firm TFP growth, and faster overall domestic credit growth during the episode of 2003-2007;*
- *but it also would experience a more severe slow-down in their real GDP,industrial employment and firm TFP growth during the 2008-2009 tightening period.*

19. The negative effect of collateral price drop on corporate financing capacity has been investigated by numerous works, such as Gan (2007), Chaney et al. (2012), Cvijanović (2014), etc.

Throughout the global financing cycle we also expect that cities that have a higher share of domestic bank-channeled foreign credit will be associated with a more volatile price of domestic collateralizable assets, such as C&L land. Furthermore, firms in such areas tend to respond in their asset structure choice when they seek to issue more foreign credit during the easing phase of the financing cycle. In what follows, we empirically test the implications generated by this mechanism using a natural experiment in China during the global financing cycle of 2003-2009.

5.4 Real Impact of Domestic Bank-Channeled Foreign Credit at city level

In this section, we investigate how the structure of cross-border credit can impact real outcomes. By exploiting variations at the city level, we examine how the share of domestic bank-channeled foreign credit affects a city's real GDP growth, employment growth, and firm TFP growth during the global financing cycle. We conduct the analysis for the boom period, 2003-2007, and the downturn period, 2008-2009.

5.4.1 Measuring Domestic Bank-Channeled Foreign Credit

The goal of this section is to establish causal correlations between local access to domestic bank-channeled foreign credit and local real economic outcomes. We start by constructing the key variable in our analysis, which is the share of foreign credit that was channeled by domestic banks in each city during 2003-2007.

Before constructing a measure of domestic bank-channeled foreign credit, we document a series of characteristics of foreign credit borrowing by industrial firms in China. We find the following three properties of Chinese industrial firms' domestic (proxied by RMB borrowing) and foreign credit borrowing (proxied by FX borrowing):

1. Firms' domestic credit and domestic relationship lending tend to be local;

2. Firms' foreign credit **from foreign banks** tend to be given from foreign banks outside city where the firms is located;[20]

3. Firms' foreign credit **from domestic banks** tend to be from local branches of a domestic global bank (BOC).

Utilizing lending relationship and bond issuance information for 2916 firms from CSMAR, Datastream and iFindD, we construct a panel of firm-bank paired lending (or bond issuance) with information on the firms' location, the lenders' location, and the loan's currency of denomination over time.[21] On average, for each firm there are 5.89 RMB-loan relationship domestic banks. Of these, 4.56 are located in the same city as the firms for which they arrange loans; for each firm in a given year, 87.2% of total RMB borrowing is acquired through banks located in the firm's home city. Finally, of the 1073 (out of 2916) companies' with USD borrowing, 622 companies borrowed from foreign banks outside their own city location; among those who borrowed USD from local banks in their own city, 80.4% of the borrowing amount came from a BOC branch in that city. An extreme case is the bond issuance behavior of some large industrial firms: Feihe Diary is a big diary manufacturer headquartered in Qiqiha'er, a prefecture-level city, in the province of Heilongjiang. In 2005, the company tried to issue USD debt, but because the presence of Bank of China branches in the city is low, the company ended up issuing USD bond.[22]

Given these documented lending patterns, we utilize the de facto measure to capture the share of domestic bank-channeled foreign credit. That is, we calculate the percentage of total foreign credit flow into the city's industrial sector firms that's lent directly by domestic

20. Here we exclude four big cities in which there is a high presence of foreign bank offices: Beijing, Shanghai, Guangzhou and Shenzhen.

21. We restrict the sample to firm-bank pairs that have lending relationships that span at least 3 years.

22. Another real-world example is that of Fuyao Glass and Luoyang Glass, each of which is a major glass product producers in China. Fuyao Glass is located in Fuqing city, in the province of Fujian. In 2006, the firm tried to borrow USD debt, but because there were no BOC branches in the city at that time, the firm borrowed from Citibank Beijing and Citibank Guangzhou. In contrast, that same year, Luoyang Glass, which is located in Luoyang, a city in which BOC has a market share of over 21.1% in 2006, borrowed USD directly from BOC.

banks:

$$\%\text{Domestic foreign credit} = \frac{\Delta D_c^{\text{FX},03-07,\text{domestic banks}}}{\Delta D_c^{\text{FX},03-07}} \tag{5.1}$$

$$= \frac{\Delta D_c^{\text{FX},03-07,\text{domestic banks}}}{\Delta D_c^{\text{FX},03-07,\text{foreign banks}} + \Delta D_c^{\text{FX},03-07,\text{domestic banks}}} \tag{5.2}$$

where c indexes city. The numerator is the total foreign credit flow into the industrial sector that is lent out by domestic banks, while the denominator is total foreign credit flow to the local industrial sector of city c. Throughout our analysis, we proxy the foreign credit using the foreign currency denominated loan and the domestic credit using the RMB denominated loan.

We construct the measure through three steps. First, we aggregate the local industrial firms' total net debt increase from 2003-2007 using the AIS firm balance sheet data. This gives us the measure of total credit flow, including that of domestic credit and foreign credit, into the local industrial sector during the 2003-2007 period.

$$\Delta D_c^{total,03-07} = \underbrace{\sum_i \text{Total debt}_{2007}^{i,c} - \sum_i \text{Total debt}_{2003}^{i,c}}_{\Delta D_c^{FX,03-07} + \Delta D_c^{RMB,03-07}}$$

where i indexes firm i in the industrial sector and c indexes the city. The above expression measures total credit flow into the industrial sector of city c, including both foreign currency denominated and RMB denominated credit.

In the second step, we utilize the data from the city level statistical yearbooks, which gives us the total RMB lending balances to the city's industrial sector of the local banks. We subtract from $\Delta D_c^{total,03-07}$ to get the total foreign credit flow to the industrial sector

in city c– i.e., the denominator in 5.1. To be more precise, we construct

$$\widetilde{\Delta D_c^{FX,03-07}} = \Delta D_c^{total,03-07} - \left[\sum_b (\text{RMB loan balance}_{2007}^{b,c}) - \sum_b (\text{RMB loan balance}_{2003}^{b,c})\right]$$

where b indexes banks and c indexes the city. In other words, we subtract the total incremental of a firm's debt balance by the incremental of the local banks' RMB lending balance. Noting the empirical pattern wherein the RMB borrowing of firms tend to be from local banks while foreign currency borrowing tends to be from banks located outside of the firm's city, we estimate the firms' total foreign credit issued during the 03-07.

In the third step, while still utilizing the data from city level statistical yearbook, we extract the total foreign currency loan balance increase of local domestic banks through 2003-2007. In other words, we carry out the following approximation:

$$\widetilde{\Delta D_c^{\text{FX},03-07,\text{domestic banks}}} = \sum_b (\text{FX loan balance}_{2007}^{b,c}) - \sum_b (\text{FX loan balance}_{2003}^{b,c})$$

Combining the above three steps, our measurement for domestic bank-channeled foreign credit in city c is:

$$\%\text{Domestic channeled foreign credit} = \frac{\widetilde{\Delta D_c^{\text{FX},03-07,\text{domestic banks}}}}{\widetilde{\Delta D_c^{FX,03-07}}}$$

Summarizing the constructions just described, to construct measures for the total foreign credit that is channeled by local domestic banks at the city level, we combine AIS firms' balance sheet data and local domestic banks' annual year-end lending balance data from city-level statistical yearbook. The construction is based on the fact that the domestic credit of Chinese industrial firms tends to come from local domestic banks, while foreign currency credit tends to come either from a foreign bank outside of the city or a local domestic global

bank.

5.4.2 Baseline Correlations

Having constructed the measure for our key economic variable, We start the analysis with the following set of baseline regression equations that correlate the percentage of domestic global bank-channeled foreign credit with city-level real economic outcome variables.

$$\begin{aligned}\Delta(Y_{03-07})_c &= \alpha + \beta^{\text{easing}}(\%\text{Domestic share of foreign credit}_{03-07}) + \gamma\mathbf{X}_c + \epsilon_c \\ \Delta(Y_{08-09})_c &= \alpha + \beta^{\text{downturn}}(\%\text{Domestic share of foreign credit}_{03-07}) + \gamma\mathbf{X}_c + \epsilon_c\end{aligned} \tag{5.3}$$

where c indexes a prefecture-level city. Y, the main outcome variable, includes real GDP, the total number of employees in the industrial sector, and the average TFP growth rate of local industrial firms. $\Delta(Y)_c$ is constructed to reflect the average growth rate of the outcome variable between 2003-2007. We calculate the ΔGDP as $Ln(\text{ GDP}_{04-07}) - Ln(\text{GDP}_{00-03})$, we construct ΔEmp as $Ln(\text{Emp}_{04-07}) - Ln(\text{Emp}_{00-03})$ and we construct ΔTFP growth as TFP growth$_{04-07}$ − TFP growth$_{00-03}$. GDP is the real GDP, and GDP$_{04-07}$ is the average GDP of a city between 04-07. Emp is the total number of employees in the industrial sector of the city, and Emp$_{04-07}$ is the average indusrial sector employees in the city from 04 to 07. TFP growth is the city-level average of all industrial firms' TFP growth in a given year, while TFP growth$_{04-07}$ is the average city-wide industrial TFP growth from 2004-2007. $\mathbf{X}$ is a vector of city-level control variables that include the total foreign credit to the city scaled by the city's total credit, the agricultural labor share, the industrial sector labor share, the financial sector labor share, the real estate sector labor share, the average labor wage, unemployment rate, total fixed asset investment scaled by GDP, total population, total land resource, and total foreign-owned firms' value-added scaled by total value-added by all firms.

The coefficients of interest are β^{easing} and β^{downturn}, which capture the effect of having a higher percentage of domestic banks that channel foreign credit towards the local industrial firms, holding other variables fixed. Importantly, to maximize the explanation power of the

coefficient, we must control for the level of foreign credit to the city (as a share of total credit to local firms). Otherwise the observed strong correlation between domestic banks-channeled foreign credit share and the real local economic outcome variables could simply be driven by the effect of the differential volume of foreign credit to different cities.

Table 5.4 and Table 5.5 show the results of the baseline regression. In Table 5.4, we find that holding the volume of foreign credit, a 10% increase in the share of domestic bank-channeled foreign credit is associated with 2.6% faster real GDP growth at the city level, a 5.57% higher industrial sector employment growth rate, and a 2.08% increase in the TFP growth rate of local firms. One the other hand, Table 5.5 indicates that when global financing suddenly tightened in 2008-2009 (and holding the level of total foreign credit flow), a 10% higher share of domestic bank-channeled foreign credit during the easing phase of global financing cycle was associated with a 2.20% reduction in real GDP growth during the downturn, a 1.12% decrease in industrial sector employment growth, and a 2.47% decrease in TFP growth.

These results show that, on the one hand, having a higher share of foreign credit channeled by domestic banks can boost the local real economy growth more during the easing phase of global financial cycle; but on the other hand, it can also result in more severe real sluggishness when the foreign credit suddenly leaves exogenously. Overall, our results suggest that when everything else remains the same, cities that have a higher share of foreign credit channeled by domestic banks experience more volatile real economic outcomes during the global financing cycle.

5.4.3 Identification Challenges

Although telling, the analysis just described focuses on the documentation of novel correlations. Identifying the causal effect of having a high share domestic bank-channeled foreign credit on local real economic outcomes is challenging for two reasons.

First, the de facto measures of the share of foreign credit received by local industrial

firms from domestic banks are equilibrium outcome variables, and these would be determined jointly by credit demand factors and credit supply factors. In this situation, equation 5.3 will not satisfy $E[\%\text{Domestic foreign credit}_{2003-2007}\epsilon_c] = 0$ because there might be unobserved local factors that are driving up the channeling of foreign credit by domestic banks. This would result in an upward bias of the coefficient of estimation and, more importantly, the estimation would become meaningless. This is so because the ultimate driving force of the observed volatility in real outcome would reside on the demand side and could not be attributed to the role that domestic banks play in transmitting foreign credit during the global financial cycle.

The second challenge is a reverse causality issue. Consider, for example, the boom phase of the financing cycle. Suppose in a city there are many firms that have a high growth potential. In this situation, local domestic banks might find that to meet the demand for credit they need to reach out to the international financing market. In this case, the high share in foreign credit channeled by domestic banks for this city is actually the outcome of the high growth potential of firms in the city. In other words, it would be logically incorrect to attribute the high real growth rate in this city during the boom period to a relatively high share of domestic bank-channeled foreign credit.

In the remainder of this section, we conduct an IV analysis to construct the exogenous component in city-wise variation for identification.

5.4.4 Instrumental Variable Analysis

The ideal experiment would be as follows. Consider otherwise identical cities A and B. During the easing years of the global financial cycle 2003-2007, industrial firms in both cities received \$100 USD foreign credit. But for some completely exogenous reasons, for city A \$80 of the \$100 USD was lent by local domestic banks; while for city B only \$20 was lent by local domestic global banks and the other \$80 was lent by foreign banks. In this setting, differences in real outcomes in the two cities are likely to be driven by the distinctive

character of the foreign credit flow to each city.

That said, to obtain the composition differences in the percentage of cross-border credit flows that domestic banks channel into the region, we need exogenous variation in some factors across cities that will precipitate the equilibrium differences seen in the compositional difference. In the case of China, what allows us to conduct this exercise is the fact that a single specialized bank–the Bank of China (BOC)— supplies foreign currency lending and provides access to the global funding market for non-financial firms in China.

The existence of a single dominant domestic global bank provides a perfect source of withincountry regional heterogeneity in the access of domestic industrial firms to foreign credit during the 2003-2009 global financial cycle. Figure 5.8(b) displays the distribution of Bank of China branches across China's 316 cities. The figure shows the number of Bank of China branches per 10 local commercial bank branches in 2002. The cities marked in red are located in areas that have the densest distributions of Bank of China branches, with an average of more than 2 BOC branches in 10 local commercial banks. Although the eastern and coastal regions of China are traditionally regarded as especially developed and open, many cities in the inland regions also have an intensive Bank of China branch distribution. In every province that contains on average 13-16 prefecture cities, there are red-, orange-, and blue-shaded cities, indicating rich within-province heterogeneity. Similarly, in Figure 5.8(a), we display Bank of China's market share in local commercial banks' lending market across the 316 prefecture-level cities in China in 2002. The rich heterogeneity is also apparent in and consistent with the distribution of BOC branching intensity.

(I) Construction of Instrumental Variables

To approximate this ideal setting and overcome the challenges mentioned above, we employ an instrumental variable and utilize the stickiness in the branch network structure of the dominant domestic global bank, the Bank of China. The network structure of the Bank of China across cities fits our purposes well for two reasons. First, as described section 2.2, of the four largest banks in China, the Bank of China plays the most substantial role

in the foreign currency credit market. That being said, firms located in cities where the Bank of China has a relatively high market share can access to domestic bank channeled foreign credit more easily, if lending is local. Second, the branching structure of the Bank of China across cities, as measured by the Bank of China's market share among all commercial banks in each city, was formed over the long run in the past and has been sticky over years.[23] Therefore, when the 2003-2009 global financing cycle arrived, Bank of China's local branching concentration and local market share were likely to be orthogonal with both the external financial cycle and local demand-side factors that could interact with the global financial cycle.

Combined together, the variation Bank of China's local market share across cities can provide us with a source of exogenous variation in the city-level foreign credit structure that we need for identification purpose. Therefore, by instrumenting the de facto share of domestic bank-channeled foreign credit **flow** with the pre-cycle share of the total lending **stock** balance of the Bank of China among all commercial banks in the city, we are able to extract the component of the domestic channeled foreign credit that is exogenously determined. In particular, we construct two instrumental variables using the Bank of China's total loan balance market share in city c during the year 2000-2002 $Z_c = Ave.\sum_{t=2000}^{2002}(\frac{\text{Bank of China loan balance}_{c,t}}{\text{Total loan balance financial institution}_{c,t}})$, and BOC's branching intensity in different cities before the financial cycle in 2002:

$$\text{(IV-1) } Z_c^1 = Ave.\sum_{t=2000}^{2002}(\frac{\text{BOC loan balance}_{c,t}}{\text{Total loan balance financial institution}_{c,t}})$$

$$\text{(IV-2) } Z_c^2 = (\frac{\#\text{of BOC branches}_{c,2002}}{\text{Total \# of bank branches}_{c,2002}})$$

(II) Validity of Instrument

23. China's banking market was concentrated and was not deregulated until after the 2009 crisis. Before deregulation, domestic commercial banks could open only a limited number of branches in each city (Gao et al. (2017)).

Our reduced form estimation will causally identify the effect that having more domestic bank-channeled foreign credit has on local real economic outcomes if the geographical concentration of domestic global banks across cities is not sorted on the basis of local characteristic variables that affect the economic variables of the global financial cycle. One example of the problematic sorting would be that the Bank of China is particularly concentrated in cities that host higher-than-average numbers of exporting firms or FDI projects. Where this is the case, the easing phase of the global financial cycle will lead to a higher demand because of local exporting firm demand and local FDI demand. These special demand-side factors drive up the relative percentage of domestic bank-channeled foreign credit during the easing phase, and these variables will also drive up other local real economic outcome variables, such as real GDP and employment. The regression results thus cannot be interpreted as the causing effect of having a higher domestic bank-channeled foreign credit on local real outcomes.

We establish the exogeneity of the Bank of China's city-specific distribution measure by both the intensity of its branch offices and the loan market share in the city to a rich set of pre-cycle city-level observable characteristic variables. First, we consider the city-level employment distribution across major economic sectors. City-level observable characteristics in this category includes local employment in industrial sectors, real estate sectors, service sectors and financial sector. The second category of local characteristic variables consist of a set of variables that measure a city's basic economic development speed. We include in this category local real GDP growth rate, GDP per capita growth rate, transportation capacity growth rate, city-level construction land areas, and arable land areas. The third category of local variables to be tested consists of measures of city-level FDI and export exposure. We include local FDI/GDP, local export income/GDP, % of local industrial firms that are exporters % of local industrial firms that have foreign ownership, and the output value/GDP

of local joint-venture firms. Specifically, I test the following correlation

$$Ave.X_{c,1999-2002} = \alpha + \beta \text{BOC}_{c,2002} + \epsilon_c$$

The left-hand-side variable is the average city-level characteristic variable during the 1999-2002 period, while the right-hand-side variable measures BOC presence in the city; it is either the number of BOC branches per 10 local commercial bank branches in 2002 or the BOC's year-end loan balance in the city in 2002.

The results of the test are reported in Table 5.30 and Table 5.31. In Panel A of Table 5.30 and Table 5.31, we find that the presence of the Bank of China is slightly positively correlated with local GDP per capita. In all baseline specifications, we include the local GDP per capital as a baseline control variable. Other than this variable, the BOC's local branching intensity is not correlated with other indicators that measure pre-cycle local economic potential and resource endowment. In Panel (B), we report the correlation between measures of BOC presence and local labor force structure by sector. We find no statistical significance between measures of local BOC presence and the percentage of local employees who work in the industrial sector, which is the main focus of this paper.

We also find no significant correlation between local BOC presence and local employment in the real estate sector. The weak correlation between the local BOC presence and the sectoral distribution of labor employment helps us enhance the strength of IV in the respect that the local presence of BOC is unlikely to be correlated to the geographic distribution of specific sectors. Thus any potential reasons that global financial cycle might favor growth of specific sectors is not likely to be correlated with the relative supply of domestic channeled foreign credit by the BOC in the local area.

Finally, in Panel (C), we establish a correlation between local FDI exposure and local BOC presence. In Panel (C) of Table 5.31, we find a slight positive correlation between the local BOC presence (measured by loan balance market share) and the output/ GDP of local foreign-owned firms. To address this concern, we include this variable in all of our baseline

controls.

(III) Baseline Results of IV Regressions

In our IV analysis, we estimate the following two-stage regression model:

First stage:

$$\Delta\%\text{Domestic share of foreign credit}_{c,03-07} = \alpha + \beta Z_c + \theta \mathbf{X} + \epsilon_c$$

Second stage: (5.4)

$$\Delta(Y_{03-07})_c = \alpha + \beta^{\text{easing}}(\%\text{Domestic share } \widehat{\text{of foreign credit}}_{03-07}) + \gamma \mathbf{X}_c + \epsilon_c$$

$$\Delta(Y_{08-09})_c = \alpha + \beta^{\text{downturn}}(\%\text{Domestic share } \widehat{\text{of foreign credit}}_{03-07}) + \gamma \mathbf{X}_c + \epsilon_c$$

Table 5.6 shows the results of first-stage regressions using the pre-cycle BOC market share and pre-cycle BOC branching intensity as the instrumental variable. A 10% increase in the pre-cycle BOC lending balance market share is associated with a 22.7% increase in the domestic channeled foreign credit during the easing phase of the cycle. A 10% increase in the number of branches in the city's BOC branch network is associated with a 6.31% higher domestic channeled foreign credit during the easing phase of the financial cycle.

Tables 5.7 and 5.8 show the results of the 2SLS regression of equations 5.4. Columns (1), (3) and (5) of Tables 5.7 and 5.8 provide the regression results of local real GDP growth with respect to the domestic channeled foreign credit using the pre-cycle BOC market share as the instrumental variable (IV-1). Columns (2), (4) and (6) show the results when BOC pre-cycle branching intensity is used as the instrumental variable (IV-2). Comparing the results with the cross-sectional regression results, we find that the 2SLS results hold robustly. A 10% higher domestic-channeled foreign credit leads to a real GDP growth that is 1.93% faster, a 4.08% higher industrial sector employment growth, and a 1.58% faster local TFP growth during the booming phase of the global financial cycle. But in accordance with ourcross-sectional analysis, we find that a 10% higher domestic-channeled foreign credit leads to a 1.99% decrease in the local real GDP growth rate, a 2.01% slowdown in local employment

growth in the local industrial sector, and a 1.78% slowdown in local TFP growth when global financial conditions tightened.

5.4.5 Allocation of Credit

In this subsection, we further investigate the real impact of having a higher share of domestic bank-channeled foreign credit in a city during the easing phase of the global financing cycle. In previous sections, we showed that cities that have a higher share of domestic bank-channeled foreign credit experience faster real output growth, faster employment growth, and higher TFP growth. Consider two cities that have comparable levels of foreign credit but a differential proportion of the foreign credit channeled by local domestic banks. If they display differences in real outcomes, it must be that in the two cities the same amounts of foreign credit are allocated differently. To create the mapping between the lender difference and the real outcome difference, the following must hold. First, more credit must have been allocated to firms that are more able to reach credit that is collateralized by hard assets, if they are located in cities that enjoy easier access to domestic banks that channel foreign credit. Second, these firms should experience a higher growth potential in terms of their production expansion and productivity; thus, they are able to create more employment and TFP growth at the city level. To test these two conjectures, we use disaggregated firm-level data across cities and examine two categories of firms: those that had already been operating; and those that were new entrants.

(I) Credit Allocated to Incumbent Firms

We start with our analysis of credit allocation among the incumbent firms. The regression specification is written as follows:

$$\Delta \mathrm{D}_{i,j,c} \;=\; \alpha + \gamma_j + \beta_0 \mathrm{DCFC}_c + \beta_1 \mathrm{DCFC}_c \times 1[\mathrm{Char}] + \theta X_{i,c} + \epsilon_{i,j,c} \qquad (5.5)$$

where i indexes firm i, j indexes industry j, and c indexes city. $\Delta D_{i,j,c}$ is defined as

Ave.$\frac{\text{Current Liabilities}}{TotalAssets}_{04-07}$ − Ave.$\frac{\text{Current Liabilities}}{TotalAssets}_{00-03}$, which is the *within-firm* incremental in leverage ratio post the financial cycle compared to its pre-cycle level. DCFC$_c$ stands for city c's domestic bank-channeled foreign credit for the 2003-2007 time period, which is defined above. 1[Char] is an indicator variable that specifies the features of the firm. It could be 1[High-tangibility], 1[Young firm], 1[High pre-ROA].[24]

Table 5.12 shows the regression results of the above specification. For all of the three dimensions of firm characteristics, we conduct both OLS regression and IV regression using the two instrumental variables constructed in section 5.4.4. We find that a 10% increase in the city-level domestic bank-channeled foreign credit is associated with an average 3.6% increase in credit (compared with other firms) allocated to firms in high-tangibility industries; an average 1.45% increase in credit allocated to firms that are less than 7 years old; and an average 1.06% more credit allocated to firms with high pre-cycle ROA.

In Figure 5.10, we demonstrate the dynamics of the credit growth of forms organized by firm characteristics and their pre-cycle exposure to BOC in the city.To display the comparison more clearly, we run the regression while separating firms according to whether their pre-cycle local BOC market share is above or below median, and we run the regression for young/old firms and high-ROA/Low ROA firms separately. The regression equation is specified as follows:

$$D_{i,j,c,t} = \alpha_i + \gamma_{j,t} + \sum_{q \neq 2003}^{q \in [2000-2007]} \beta_q 1[t = q] + \theta X_{i,c,t} + \epsilon_{i,j,c,t} \tag{5.6}$$

The coefficient estimates and 95th confidence intervals are plotted in Figure 5.10. Consistent with the static cross-sectional regression conducted above, the year-to-year credit growth of firms does not seem to be different across young/old groups or high-ROA/low-ROA groups before the initiation of the global financial cycle. This is true for both high-BOC exposure

24. "High-tangibility" is defined as firms that have average PPE/Assets of above 0.45 during 2000-2003 (or above the 75th percentile). "High pre-ROA" is defined as those firms that had an average annual ROA above 0.07 during 2000-2003 (or above the 75th percentile). A "young firm" is defined as those that in 2003 were less than 7 years old (the median of overall firm age distribution is 7).

and low-BOC exposure cities. However, following the initiation of the global financial cycle, young and high ROA firms located in cities that have strong BOC exposure started to display high credit growth on their balance sheet a higher credit growth than that experienced by older or less profitable, and the dispersion is statistically significant. When the tightening phase of the cycle was reached, however, the pattern was reversed: young and profitable firms in cities that had higher pre-cycle BOC exposure experienced a more drastic slowdown in their debt capacity.

(II) Credit Allocated to Newly Entered Firms

We now turn our analysis to new firms. To start, we run the city-level regression paralleling equation 5.4. The left-hand-side variable is the total number of newly entrant firms during 2003-2007, and on the right-hand side, the main regressor is the fraction of total foreign credit channeled by domestic banks. The control variables are those defined in regression equation 5.4:

$$\Delta\text{New firms} \quad = \quad \alpha + \beta\text{Domestic channeled foreign credit} + \gamma\mathbf{X}_c + \epsilon_c$$

Table **??** shows the result of this specification. Column (1) shows the OLS regression results and column (2) and (3) the results of 2SLS regressions using IV-1 and IV-2, as defined above. A 10% higher domestic bank-channeled foreign credit during the boom period is associated with a 4.04% increase in the total number of new firms that are entering the local industrial sector.

Why have more new firms in cities that have easier access to domestic global banks entered the industrial sector while fewer new firms have entered in cities that have parallel levels of total foreign credit but a poorer domestic global bank presence? Remember that a crucial difference between domestic banks (BOC) and foreign banks is that the former can complete the contracting space by writing debt contracts that are based on the tangible assets of local firms. By investigating the new entrant firms' tangibility property, we can

verify and strengthen our conjecture. Table 5.13 and Figure 5.11 visualize this part of the analysis.

In Table 5.13, we show the summary statistics of new entrant firm tangibility and compare it to that of pre-existing firms in the economy. We define tangibility as the total book value of PPE scaled by total assets. Consistent with our conjecture, new entrant firms are more tangible than incumbent firms on average: the median tangibility of existing firms is 0.309, while the mean tangibility of new entrant is 0.343. Furthermore, the median tangibility of new entrant firms in cities that have a high pre-cycle BOC market share (above the 75th percentile, or 33.2%) is 0.393.

In Figure 5.11, we compare the tangibility distribution of new entrant firms and incumbent firms in the economy overall and in cities with High and Low pre-cycle BOC market share. In the left panel of Figure 5.11, we compare the tangibility of new entrant firms located in cities that have a high pre-cycle BOC market share and the overall tangibility of pre-existing firms. The five bins are sorted on the basis of the corresponding industries' average tangibility during 1998-2003. The height of the bars represents the percentage of incumbent firms/new entrant firms that come from industries with representative tangibility within the range marked below the bar. It is apparent that the industrial tangibility of new entrant firms is significantly more distributed to the right than that of the incumbent firms. The right panel compares the new firms' tangibility distribution in high BOC-exposure cities and low BOC-exposure cities. The comparison remains sharp.

In Table 5.14, we conduct a regression analysis that parallels columns (3)-(6) of Table 5, which analyzes the credit growth of young firms in cities. The young firm here is an extreme case; these are new firms that entered between 2003 and 2007. The results are qualitatively and quantitatively similar to those presented in columns (3)-(6) of Table 5.5, new entrant firms located in cities that have a 10% higher share of domestic bank-channeled foreign credit see an average 2.68% increase in borrowing during the easing phase.

(III) From Credit Allocation to Real TFP Changes

In parts (I) and (II) of this section, we established the overall effects (direct and and indirect) on firm credit allocation of having a higher share of domestic bank-channeled foreign credit: (1) young firms from high-tangibility sectors that have a high pre-cycle ROA tend to be able to expand their debt capacity substantially if they are located in cities that provide greater domestic-channeled foreign credit; (2) new firms from high-tangibility sectors tend to be more able to enter the industry, while new firms located in cities that have high domestic-channeled foreign credit tend to have higher overall credit growth.

How does this map onto the differential cross-city differences in TFP growth that we demonstrated in Section 5.4? Figure 5.12 shows the overall aggregate TFP growth of firms and firms located in cities that have different pre-cycle BOC market shares. Consistent with the 2SLS regression analysis, firms in cities that have a high pre-cycle BOC market share did bring more volatility to the city's TFP during the cycle.

In Figure 5.13 and Figure 5.14, we demonstrate that the enlarged debt capacity of young and high-ROA firms from relatively tangible sectors drove up the TFP growth more in cities that had a higher share of domestic bank-channeled foreign credit. In Panel (a) of 5.13, we show that across all tangibility bins, young firms had a significantly (about 1.5%) higher TFP growth than old firms. In Panel (b), we show that because of their enlarged debt capacity, young firms located in cities that had a high domestic-channeled foreign credit saw significantly higher TFP growth than older local firms. Similar patterns hold for firms that had high pre-ROA.

In summary, our finding shows that during the study period, a high domestic banks presence led to higher domestic-channeled foreign credit, which translated into a higher debt capacity in new, young, and high ROA firms in tangible sectors. This was so because these firms generally had higher TFP growth, and their enlarged debt capacity contributed to higher city-level TFP growth during the easing phase.

5.5 Domestic Credit Intermediation during the Global Financing Cycle

In section 5.4, we demonstrate that given the same level of foreign credit exposure, cities in which a higher share of foreign credit was being channeled by domestic banks had more volatile real outcomes during the 2003-2009 global financing cycle. In particular, we find that these cities enjoyed a higher growth rate in local GDP, employment, and firm TFP during the boom period, but they experienced a more severe slowdown in these real economic outcomes when the hot money suddenly left. A question immediately comes to mind: When the same amount of foreign credit comes and leaves two cities, why is one city affected a lot while the other is considerably less affected?

In this section, we investigate the mechanism that underlies the linkages between more volatile real economic outcomes and higher shares of domestic bank-channeled foreign credit.

5.5.1 Lending relationship of domestic banks without global funding access

More volatile real economic outcomes are usually associated with more volatile credit issuance. Given that the comparison described above experiences the same level of exposure to foreign credit, one natural conjecture would be that volatility in domestic credit issuance drives the excessively volatile real outcomes.

It is not difficult to imagine that in all cities, the foreign currency borrowing of industrial firms will co-move closely with the dynamics of the global financial cycle. This is almost by definition how the supply of foreign currency credit is determined by the global financial market. However, it would be more surprising if the domestic currency borrowing also expands and shrinks sharply over the global financial cycle. After all, the funding cost in the domestic financial market should not be directly affected by changes in international financing market conditions.

In this section, we show that behind the excessive volatility in real economic outcomes

is a more affected domestic credit intermediation. In particular, we focus our attention on local firms' lending relationship associated with domestic banks that have no access to the global financing market. In principle these domestic local banks should be immunized to fluctuations in the global financing market because their stable funding source is the domestic financing market.

More precisely, we find that the credit issuance amount of firms that continually borrow from their domestic banks tended to increase during the 2003-2007 global financial cycle and decrease during the 2008-2009 downturn years. Moreover, the sudden expansion and shrinkage of loan amounts is more likely to happen in firms that borrow on the basis of their plant, land and property holdings and in firms located in cities that have highly volatile commercial and industrial land prices. Also, the borrowing capacity of firms that display sudden expansions and contractions in their borrowing constraints tend to be those that are from high-tangibility industrial sectors.

5.5.2 Empirical results

In this part, we display the empirical evidence that supports the argument outlined above.

(I) Empirical Specification

To construct the sample for our analysis, we use a panel of firm-bank pair dataset compiled from CSMAR and Datastream, and using a identification technique similar to the one used by (Khwaja and Mian (2008)), we study how loan amounts change within firm-bank pairs during the global financial cycle. We also examine how it interacts with whether the firm is located in a city that went through high land price changes during the financing cycle and whether the firm is from a high-tangibility sector. The summary statistics of the sample used in this section's empirical analysis are shown in Table 5.15. Our sample covers a total of 3287 firms in 60 major Chinese cities, most of which are listed firms. The average number of relationship banks of firms is 5.89, while the average number of relationship years is 4.6. The sample covers all firms' borrowing from their relationship banks during the 1999-2013

time period. We write down the following baseline specification to study how the firms' borrowing amount changes as the global financial cycle condition changes.

$$\begin{aligned} Ln(1+\text{Amount})_{f,b,t} &= \alpha_f + \mu_b + \beta_1 1[\text{Easing/Tightening}]_t \\ &+ \beta_2 1[\text{Easing/Tightening}]_t \times 1[\text{Land}]_{f,b,t} \\ &+ \beta_3 1[\text{Easing/Tightening}]_t \times 1[\text{Land}]_{f,b,t} \times 1[\text{High C-P}]_f + \gamma x + \epsilon_{f,b,t} \end{aligned} \tag{5.7}$$

where f indexes firm, b indexes bank and t indexes year. The left-hand side is the loan amount from bank b to firm f in year t. $1[\text{Easing}]_t$ is a dummy variable that switches to 1 if the year range is 2004-2007 and $1[\text{Tightening}]_t$ is a dummy variable that switches to 1 if the year range is 2008-2009. $1[\text{Land}]_{f,b,t}$ is an indicator variable that takes the value of 1 if firm f's borrowing from bank b is based on land, properties and real estate asset as collateral. $1[\text{High C-P}]_f$ is an indicator variable that takes the value of 1 if firm f is located in a city that has high commercial land price volatility during the global financial cycle. [25]

(II) Baseline results

Table 5.17 and Table 5.18 display the results of the above baseline specifications in the easing phase and tightening phase, respectively. Firm level fixed effects and bank level fixed effects are included to control for time-invariant factors that might be correlated with the dynamics of the credit amount on both the firms' and the bank's side. The industry-year fixed effect is included to capture time-varying industry-wide factors that might be systemically correlated with the cycle and, thus, systemically affect the loan issuance volume of firms in certain industries. Also, the firm-bank pair fixed effect is included so that we can remove variations driven by pair level invariant factors.

In column (1) of Table 5.17 we show the correlation between the indicator of easing phase of the global financial cycle and the average borrowing amount of firms without interaction

25. A city is defined as one with high commercial land price volatility if $\frac{\text{Commercial land price}_{08-09} - \text{Commercial land price}_{07}}{\text{Commercial land price}_{07}}$ is larger than or equal to 15.39%, which is the 75-th percentile of price jump among all the 214 cities.

terms. On average, during the easing phase, firms' borrowing amount increase by 18.5% from a given relationship domestic bank, despite the fact that these domestic banks do not have access to the booming global financing market. Similarly, shows that during the tightening phase in 2008-2009 of the global financing cycle, the amount that firms borrowed from their domestic relationship lenders in the local area shrank on average by 37.1%. These facts suggest that the lending relationship of domestic local banks, which are not directly affected by global financial conditions, also responded significantly to fluctuations in the global financing market.

(III) Which Types of Lending Relationships are More Affected?

In column (2) of Table 5.17, we include the interaction of easing-phase dummy variable and the dummy variable indicating whether the loan is secured by the firm's land-related assets. We find that after including the interaction between these two indicator variables, the interaction term absorbed more than half (a magnitude of 0.111) of the significant coefficient on the easing phase indicator itself. This indicates that the increase in the average borrowing amount during the easing phase was driven by firms that borrowed by pledging their land-related fixed assets. Quantitatively, firms that did not borrow on the basis of their fixed assets received on average only about a 5.21% increase in their loan amount, while firms that borrowed using their fixed assets received an additional 11.1% increase in their total loan amount during the same easing phase

(IV) Cross-city Analysis: C&I Land Price and Relationship Lending

In column (3), we add interaction terms between dummy variables that indicate whether the firm is located in a city that has a high commercial land price volatility during the global financial cycle and a dummy variable that indicates the easing phase. As in the pattern in column (2), we find that the added interaction term absorbs most of the quantity on the single easing phase dummy in column (1), indicating that the observed increase in the borrowing amount during the easing phase is driven mainly by firms located in cities whose whose commercial & industrial land prices rise quickly during the financial cycle. Finally

in column (4), we add triple interaction term to the easing phase dummy, the fixed-assets collateral dummy, and the high C& I land volatility city dummy. We find that the coefficient of the easing phase dummy goes to the triple interaction term. This indicates that, during the easing phase of the global financial cycle, *domestic* credit capacity gets stretched out the most by firms pledging their land and property type assets as collateral, and they are able to do so because they are located in cities where the commercial land prices are more pro-cyclical.

Paralleling the analysis with borrowing amount dynamics during the easing phase of the global financial cycle, we perform the same analysis for the tightening phase (2008-2009). The results are reported in Table 5.18. Symmetric with the results presented in Table 5.17, the amount that firms borrow on average from the same relationship bank during the 2008-2009 tightening phase shrinks by 37.1%, but most of the average treatment effect of the tightening phase on the debt capacity shrinkage is driven by firms that pledge their land-related fixed assets and that sit in cities that experience a deeper decline in local C&I property prices during the tightening phase. Quantitatively, the shrinkage of the credit capacity of those firms that pledge fixed assets and that are situated in a high C&I land price volatility city is nearly 4 times that of firms located elsewhere.

(V) Subsample Analysis: Revolving Credit Lending Relationships

In the above analysis, we utilize all firm-bank pair lending relationships to investigate (1) how the equilibrium loan amount within pairs changes during the easing and tightening periods of global financial cycles and (2) how the equilibrium loan amount changes with the collateral and collateral price volatility of the city in which the firm is located. The observed loan amount could be driven by both the credit demand side and the credit supply side, but it would not be sharp enough to allow us claim that the observed volatility in the loan amount is driven by the supply side rather than by some unobserved fundamental on the credit demand side. For example, during the tightening period, the observed stronger contraction in the amount borrowed by firms that pledged their office buildings could be simply because

the firm simply found it has no promising investment project to finance, thus the firm decides to borrow less. The observed contraction in the loan amount of these firms could not be attributed to impaired domestic credit intermediation driven by a deterioration of local asset price conditions. The reverse causality arises when less firms want to pledge their land thus we see lower land prices in that city.

To tighten our interpretation, we shrink our sample to firm-bank pairs of revolving credit line issuance during the global financial cycle. The loan amount reported in these types of lending refers to the upper bound of the line of credit rather than to the actual usage amount of credit by the firm. Focusing on the revolving credit sub-sample enables us to tease out unobservable demand side factors that are not a banks' credit supply to the firm. The results of the revolving-credit line sub-sample are reported in Table 5.19 and Table 5.20. All the results are qualitatively and quantitatively similar to the results obtained in the full sample analysis.

We next take one more step to determine which types of firms are most likely to stretch their debt capacity by pledging their land-related fixed assets during the easing phase. Table 5.21 and Table 5.22 report the results for this part of the analysis. Consistent with the findings in the previous tables, during the easing phase, the average borrowing amount tends to be 13.4% higher than during other period, after interacting with indicator variable whether the firm comes from high-tangibility industry, the magnitude of the coefficient on 1[Easing] was largely absorbed, indicating that the observed increase in average borrowing capacity was largely driven by firms from high-tangibility industries. In column (4), the triple interaction among 1[Easing] and 1[High-tangibility], and 1[High commercial land price volatility city] absorbed all the magnitude 1[Easing] on average. This indicates that the borrowing capacity of high-tangibility firms located in high-commercial price volatility cities were the main drivers of the observed increase in average borrowing capacity: while the borrowing capacity of firms increased on average by 2.3%, firms from the high-tangibility sector, which is located in cities that went through high commercial land price, see a 13.2% increase in borrowing

capacity within their relationship lender. Similarly, during the tightening phase, as shown in Table 5.21, while the borrowing capacity of firms shrank on average by 12.1%, firms from the high-tangibility sector located in cities that went through a deeper decline in local land prices saw an additional 36.9% reduction in borrowing capacity.

5.6 Firm behavior during the Global Financial Cycle

In the previous two sections, we show that cities with high domestic global bank (BOC) exposure will see a higher share of foreign credit channeled by local domestic global banks during the easing phase of the global financing cycle. Accompanying the more active role played by domestic global banks in the cross-border credit transmission, these cities experience a higher degree of volatility in real economic outcomes. We find that as a main driving force of the excess volatility in real outcomes, the intermediation of domestic credit is also affected during the global financing cycle, especially in areas that feature more volatile C&L land prices.

In this section, we address the following questions: 1) Why are C&I land prices in certain areas more volatile than in others? 2) Through what channel can the price of C&I land affect the intermediation of domestic credit when foreign credit leaves? 3) What role does domestic bank-channeled foreign credit play in this process?

5.6.1 What Firms can do about their Debt Capacity?

Our answers to the questions posed above hinge crucially on firm behavior during the global financing cycle. Consider an emerging market economy with no domestic global banks that can access the global funding market. For firms in this economy, the only possible source of foreign credit is borrowing directly from foreign banks. But as documented in (Jiang and Xu (2019)), foreign banks are generally unable to lend against fixed assets as collateral to extend credit to borrowers from emerging markets. Instead, in lending to these borrowers,

foreign banks rely heavily on the inclusion of covenants that guarantee the transparency of borrowers' cash flow. In this situation, during the easing phase of global financing cycle, although firms in this EME hope to enlarge their debt capacity in order to support more foreign credit issuance, playing with their asset tangibility is not a solution.

Let us now consider a scenario in which all foreign credit received by an emerging market is channeled by its domestic banks. Unlike foreign banks, which monitor closely and frequently, domestic banks in EMEs are more able to write debt contracts on tangible assets as collateral to extend cross-border capital. That said, the debt capacity of a firm could be made contingent on the firm's tangible asset holding if the firm is borrowing from a domestic bank. When domestic banks actively engage in the transmission of foreign credit to local industrial firms, one dimension of contracting contingency gets completed: cross-border credit agreements can now be written on domestic tangible assets as collateral. This newly emerged contracting contingency allows and incentivizes firms to actively increase their tangible asset holdings, allowing firms to enlarge their debt capacity and reap the benefit of cheap foreign credit during the easing phase of the global financial cycle.

The flexibility offered by this additional contracting contingency in cross-border capital transmission can be beneficial in that it allows the foreign credit to be more efficiently allocated to firms that need it most. Borrowers with a high marginal product of capital can now pledge their tangible input assets as collateral in order to support the amount of credit they want to borrow. As a by-product of such debt capacity stretching behavior by firms seeking to borrow foreign credit, C&I land prices increase during the easing phase, allowing firms that borrow against these assets to receive more domestic credit. But once the global financial condition reverses, high debt capacity no longer needs be maintained on the firms' side. Instead, firms want to get rid some of the tangible assets that they accumulated to increase their debt capacity. This exerts a downward pressure on local collateral prices, which then spreads out to negatively impact domestic credit intermediation because domestic credit and foreign credit are contingent on the common collateral base in the local economy

Mapping this reasoning onto this paper's empirical setting, one can easily imagine that in cities where the foreign credit supply of domestic banks is more elastic, firms would be more likely to engage in such debt-capacity reaching behavior. Firms' debt-capacity reaching behavior will lift up local domestic collateral prices, amplifying the foreign-credit-induced credit boom into the domestic credit market, thereby boosting real output, employment, and TFP growth. But when this amplification becomes large e n o ugh, the coming global financial cycle reversal will more negatively impact the local domestic collateral price, resulting in a more severe real outcome slow-down. This mechanism perfectly explains the cross-sectional general equilibrium findings noted in Section 5.4, and it is in line with the previous literature about financial liberalization and macroeconomic volatility in the non-tradable sector asset prices (Tornell and Westermann (2002)).

5.6.2 Changes in Firm Tangibility over Global Financing Cycle

In this section, we use firm and city-level dataset from China to empirically investigate changes in firms' asset structure during the global financing cycle. Specifically, the goal of this section is to characterize how firms will react differently in terms of their tangible asset accumulation when their city has a differential availability of domestic global banks that channel foreign credit. We also determine which types of firms engage in such asset structure distorting behavior during the global financing cycle.

(I) Differences in Firm Behavior across Regions

Consistent with the set-up in Section 5.4, we exploit the exogenous heterogeneity in the different shares of foreign credit that are channeled by domestic banks at the city level, and we examine whether firms located in different cities display different asset accumulation and debt issuance patterns. To measure a firm's leveraging behavior we examine its year-to-year change in short-term debt scaled by lagged total assets. We also measure the asset accumulation behavior of firms using the year-to-year change in fixed assets. Consistent with the measurement construction presented in Section 5.4, we we measure firms' exposure to

domestic bank-channeled foreign credit during the global financial cycle through the share of foreign currency credit that is lent by domestic banks in the city where the firm is located. The following equation specifies the regression for this part of analysis.

$$\Delta y_{i,c,2003-2007} = \alpha + \beta(\%\text{Domestic share of foreign credit}_{c,2003-2007}) + \gamma \mathrm{X} + \epsilon_{i,c} \quad (5.8)$$

where $\Delta y_{i,c,2003-2007}$ is the outcome variable, it is either $\frac{\text{Total Debt}_{2007}}{\text{Assets}_{2006}} - \frac{\text{Total Debt}_{2004}}{\text{Assets}_{2003}}$ or ΔTangibility is $\frac{\text{PPE}_{2007}}{\text{Assets}_{2006}} - \frac{\text{PPE}_{2004}}{\text{Assets}_{2003}}$ or $\frac{\text{Total fixed investment between 2004-2007}}{\text{Assets}_{2003}}$. i indexes firm, c indexes city, $\mathbf{X}$ is a vector of firm controls and city controls that takes out other firm and city level unobservables that may interfere with the effect of the domestic bank-channeled foreign credit. Table 5.23 shows the regression results in the specification above.

The estimation of interest is the coefficient of the interaction term between the easing-phase dummy and the city's domestic global bank exposure. Column (1) shows the regression without control variables and interaction terms. It shows that during the easing phase of global financial cycle, firms on average are 1.64% faster in their year-to-year short-term debt issuance. In column (2), we add the interaction term between the firm i's exposure to domestic bank-channeled foreign credit and the easing-phase dummy, and we find that the magnitude of the coefficient of the interaction term absorbs the coefficient of the easing-phase dummy. This means that the observed average treatment effect of the global financial cycle on the within-firm short-term debt growth is mostly driven by firms located in cities that have high domestic global bank exposure. 10% of the domestic bank-channeled foreign credit share in the city is correlated on average with a 12.4% higher annual short-term debt growth at the firm level.

Similarly, in column (3) and (4), we find that although all firms on average increase their tangibility by 2.1% during the easing phase of the global financial cycle, a 10% higher domestic bank-channeled foreign credit in the local city is associated with a 13.7% higher tangibility growth on the local firms' balance sheet. In other words, firms located in areas where a larger fraction of foreign credit is transmitted by domestic banks generally increase

more of their asset tangibility during the easing phase of the global financing cycle.

(II) Firm Behavior and Firm Types

Through the following cross sectional regression, we next investigate what types of firms are more likely to stretch for high debt capacity by distorting their asset structure during the easing phase of the global financial cycle:

$$\begin{aligned} Ave.\Delta y_{i,c,2003-2007} &= \alpha + \beta_1(\%\text{Domestic share of foreign credit}_{2003-2007}) \\ &+ \beta_2(\%\text{Domestic share of foreign credit}_{2003-2007}) \times 1[\text{High tangibility}] + \gamma X + \epsilon_{i,c} \end{aligned} \tag{5.9}$$

The unit of observation in this regression is firm i in city c. The left-hand side variable $Ave.\Delta y_{i,c,2003-2007}$ is either the firm i's average short-term liability growth or tangibility growth during the the easing phase in city c. On the right-hand side, we interact the share of domestic bank-channeled foreign credit with the indicator variable that takes value 1 if the firm is from a high-tangibility industry sub-category or if the firms' pre-cycle accounting transparency is low. The results of the specification are reported in Table 5.24. Paralleling the pattern of results in Table 5.23, and controlling for the level of foreign credit that flows into a city, firms that have a higher tangible asset structure and that are less transparent tend to have a faster short-term debt capacity growth if the higher percentage of the city's foreign credit is channeled by domestic banks rather than foreign banks.

5.6.3 C&I Land Price over Global Financing Cycle

Having examined the behavior at the firm end , we now study how the behavior of these firms affects local collateral prices during the global financial cycle , especially during its tightening phase (2008-2009).

We explore how the cross-sectional differences in city-level commercial and industrial land prices change across cities and how these changes are related to different levels in the share of domestic bank-channeled foreign credit. We investigate how different cities' collateral prices

change during both the easing and tightening phases of the global financial cycle. We write down the following cross-sectional regression specification:

$$\begin{aligned}\Delta(P^{\text{land}}_{2003-2007})_c &= \alpha + \beta_1(\%\text{Domestic share of foreign credit}_{2003-2007}) + \gamma X + \epsilon_c \\ \Delta(P^{\text{land}}_{2008-2009})_c &= \alpha + \beta_1(\%\text{Domestic share of foreign credit}_{2003-2007}) + \gamma X + \epsilon_c\end{aligned} \tag{5.10}$$

The unit of observation is the city. The left-hand side variable $\Delta(P^{\text{land}}_{2003-2007})_c$ and $\Delta(P^{\text{land}}_{2008-2009})_c$ are defined as $\frac{P^{land}_{2007}-P^{land}_{2003}}{P^{land}_{2003}}$ and $\frac{Ave.P^{land}_{2008-2009}-P^{land}_{2007}}{P^{land}_{2007}}$, which measures degree of the commercial and industrial land price decline between the tightening phase and the easing phase.

In columns (1) and (3), we run the OLS specification that relates the share of domestic bank-channeled foreign credit during 2003-2007 with to the degree of the land price drop in the city. And in columns (2) and (4), we run the same set of regressions using the 2SLS approach described in Section 5.4. We find that a 10% increase in the share of domestic bank -channeled foreign credit will lead to a 30% heavier decrease in the land price during the tightening period.

5.6.4 A Dynamic Diff-in-Diff Analysis

To further nail down the mechanism, we examine how the time-varying dynamics of city level industrial land transactions by firms and industrial land prices differ when the industrial firms in the cities are differently exposed to Bank of China at the beginning of the global financial cycle. We write down the following regression specifications:

$$y_{c,t} = \alpha_c + \mu_s + \sum_{t=1999, s\neq 2003}^{2009} \beta_s \text{BOC}^{pre}\mathbf{1}[s=t] + \theta(\frac{\text{Total FX credit}}{\text{GDP}}_{c,t}) + \gamma \mathbf{X}_{c,t} + \epsilon_{c,t} \tag{5.11}$$

where c indexes city, t indexes year, and BOC^{pre} is the measure of the city's exposure to the Bank of China. The specification is measured either in the market share of BOC in the city's lending market in 2002 or as the total number of BOC branches per 10 local commercial bank branches. We estimate the above specification for 214 cities.

We utilize four key variables related to local firm industrial land transactions. The first is the total value of financing collateralized by land in the city; the second is the industrial land price; the third is the total number of sums of industrial land transactions; and the fourth is the total number of pieces of industrial land that have been traded on the land market. Graphical illustrations of the results on β_s as well as the 95% confidence intervals are shown in Figure 5.17 and Figure 5.18. In Figure 5.17, the measure used to determine city-level exposure to domestic global banks before the initiation of global financial cycle is the city level BOC's market share in the local loan market in year 2002. In Figure 5.18, the city level BOC's branch network is measured by the number of BOC branches per 10 commercial bank branches.

In the years leading up to the initiation of the global financial cycle in 2003, there was no difference in local industrial land transactions in cities that had high relative to low domestic global bank presence. The insignificance of the estimation results during the pre-2003 period indicates that the observed ex-post effect that domestic global bank exposure had on the industrial land transaction behavior of industrial firms was probably not driven by local demand cycles, local firms' expectations switches, or corporate investment expansion that had started long before the global financial cycle. The local land transaction dynamism by local industrial firms started to become active in 2004. Cities that prior to 2003 had experienced a higher exposure to domestic global banks witnessed a faster turnover in land transactions, measured both by the number of transactions and the amount of land traded. Importantly, the city-level total value of loans secured by industrial land and the local industrial land prices climbed the most in cities that had experienced a high pre-cycle exposure to domestic global banks.

This upward tilting trend in cities that had experienced a high exposure to domestic global banks continued until 2007. In 2008, when the global financial cycle started to enter the tightening period, industrial land transactions and industrial land prices started to fall sharply in cities that had experienced high domestic global bank exposure during the pre-

cycle period. The sharp expansion and contraction in these cities that occurred at the beginning of the cycle is consistent with the amplifier effect of high domestic bank-channeled foreign credit on the collateralizable asset accumulation behavior of firms.

In Figure 5.16, we provide a sharper comparison of local industrial land prices and commercial mortgage issuance behavior by local firms between cities that had experienced either a high or low exposure to BOC. We normalize the industrial land price and commercial mortgage volume of the subsequent years by the industrial land price in 2003 and the number of total commercial mortgage issuance by local firms in 2003 respectively. In both panel (a) and panel (b), the darker gray dotted line plots the corresponding variable for cities within the top 25th percentile of pre-cycle BOC exposure, while the lighter gray dotted line plots the corresponding variables for cities within the lower 25-th percentile of pre-cycle BOC exposure.[26] For both variables, we find that in the years leading up to the start of the global financial cycle (in 2003), there was no significant difference in the trends of industrial land prices and commercial mortgage issuance by cities. Starting in 2003, cities that had experienced a high pre-cycle exposure to the BOC started to experience faster growth in industrial land prices and higher growth in the annual commercial mortgage issuance. Moreover, when the cycle suddenly reversed in 2008-2009, cities that had experienced a high pre-cycle exposure to BOC underwent a more severe decline in industrial land prices and commercial mortgage issuance dynamism.

5.7 Conclusion

The growing degree of the inter-connectedness between emerging market economies and the global financial market has caught the attention of policy makers around the world. A major transformation in this process is the increasingly important role played by domestic banks in the transmission of cross-border capital to EMEs. For these economies, having

26. Each dot in the figure corresponds to the weighted average of the indexed industrial land price and commercial mortgage issuance (indexed using 2003 as base year) of cities, weighted by the city's real GDP in 2003.

a larger share of foreign credit transmitted by domestic banks in EMEs can be a mixed blessing.

This paper proposes and empirically identifies a novel channel through which the replacement of foreign banks by domestic banks in the transmission of cross-border capital to EMEs impacts these economies. The replacement of foreign banks by domestic lenders from EMEs in the cross-border credit transmission marks a completion of the contracting space because it allows credit agreements to be written against domestic hard assets as collateral. Increased flexibility in the contracting of the cross-border credit agreement can help the economy acquire a more efficient allocation of credit during the easing phase, but it can induce domestic industrial firms to overreach on credit by acquiring domestic collateral, which dampens asset prices and impairs domestic credit intermediation, particularly during the tightening phase.

We leverage a unique within-country cross-city heterogeneity of domestic global bank distribution in China and disaggregate data at different scopes to identify this channel over a single global financing cycle (2003-2009). Our cross-city analysis reveals that cities that obtain a higher de facto percentage of foreign credit channeled by domestic banks demonstrated during the 2003-2009 global financial cycle a higher real economic volatility. These cities experienced a faster real GDP growth, a faster growth of employment in industrial sectors, a faster industrial firm TFP growth, and a faster overall domestic credit growth during the 2003-2007 episode. Yet these cities also experienced a more severe slowdown in their real GDP, industrial employment, and firm TFP growth during the 2008-2009 tightening period.

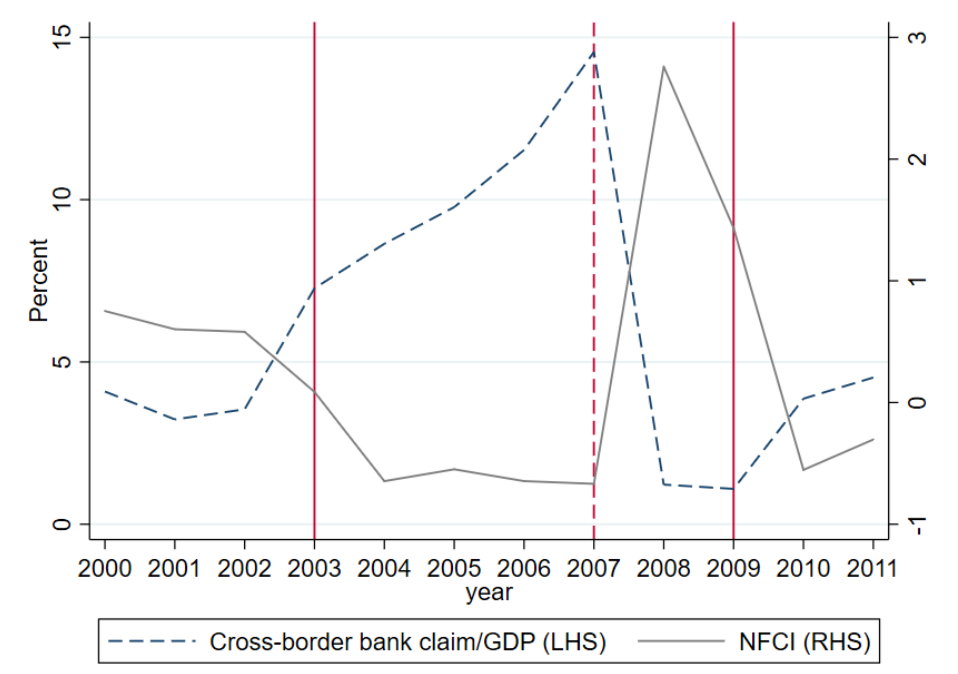
We find that beneath the excess volatility in the local real economy is a more affected domestic credit intermediation. In particular, we examine the lending relationships of banks that lack access to the international financing market. We find that lending relationships in cities that went through a higher industrial land price volatility also displayed drastic expansion and shrinkage in the total amount of credit issuance during the global financial cycle. Moreover, this expansion and shrinkage in the borrowing amount was especially severe for firms that used land and properties for commercial and industrial usage to obtain

financing.

Finally, we turn to behavior on the firm end. In particular, we investigate changes in firms' tangible asset holdings during the easing phase of the credit cycle. My key finding suggests that holding the total volume of foreign credit to a city controlled, firms located in cities that received higher domestic bank-channeled foreign credit significantly increased their asset tangibility (measured by PPE/Total assets), made higher cumulative fixed assets investments, and became more highly leveraged, as indicated by their total debt. Such asset structure distorting behavior during the easy phase of the global financing cycle had an impact on the local real economy during the tightening periods. This occurred because the behavior exerted an extra downward pressure on the price of domestic tangible assets.

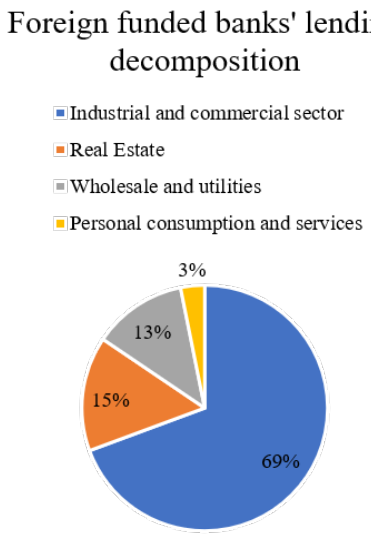
5.8 Appendix

Figure 5.2: Global Financing Cycle 2003-2009

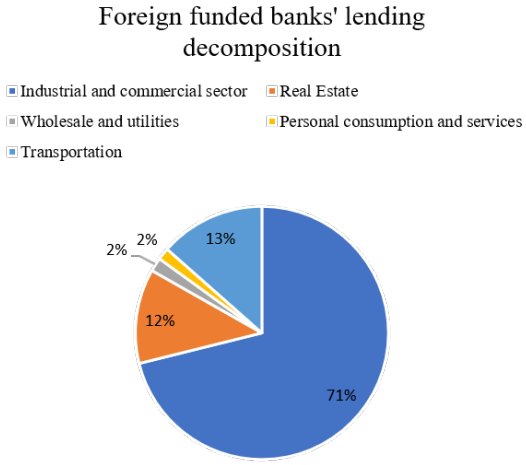


Notes: The above figure shows the global financial cycle of 2003-2009. The grey line shows the Financial Condition Index constructed by IMF, and the right-hand side shows the evolution of weighted average of cross-border claims/GDP from BIS.

Figure 5.8: Foreign banks' lending by industry in China



(a)



(b)

Notes: The above figure shows the industry decomposition of foreign banks' lending balance to Chinese borrowers. Panel (a) is extracted from PBOC's annual news report, and panel (b) is compiled using cross-border syndicated lending from 2000-2009 using data from Dealscan. In both figures, the darkest blue shaded area represents the share of foreign bank lending to industrial and commercial sectors.

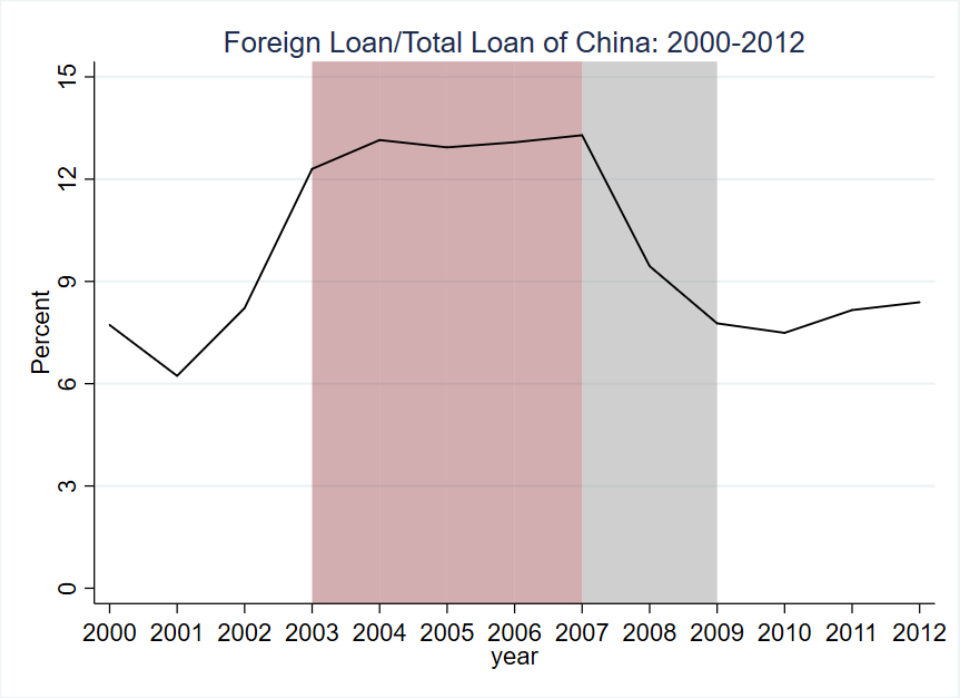


Figure 5.3: Share of Foreign Credit in Total Credit in China: 2000-2012
Notes: The above figure shows the evolution of foreign-currency lending balance as a share of total lending of China's financial institutions from 2000 to 2012. The figure is compiled by data from Almanac of China's Banking and Finance.

Figure 5.4: Share of cross-border liability of financial sector: China 2000-2012
Notes: The above figure shows the evolution of total cross-border liabilities of China's financial sector as a share of GDP. The cross-border liabilities of financial sector is from the Locational Banking Statistics, which report the claims of China's banking sector held by all BIS reporting foreign banks.

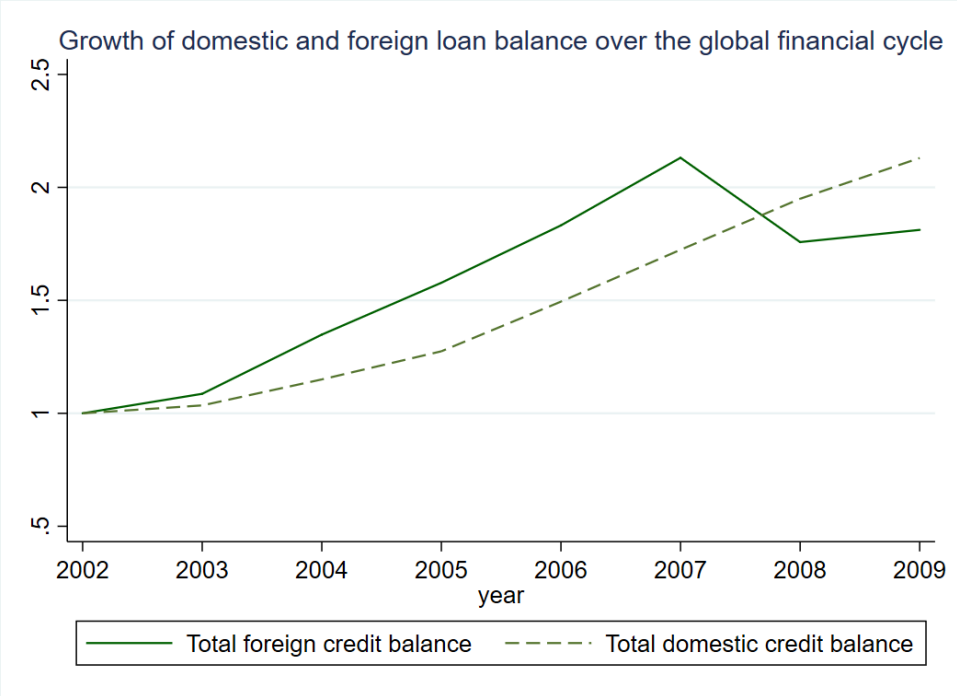


Figure 5.5: Growth of domestic credit balance and foreign credit balance

Notes: The above figure shows the growth of Bank of China's total foreign-currency lending balance and total RMB balance lending evolution from 2002-2009. The base year is 2002. The figure is compiled from data offered in Almanac of China's Banking and Finance.

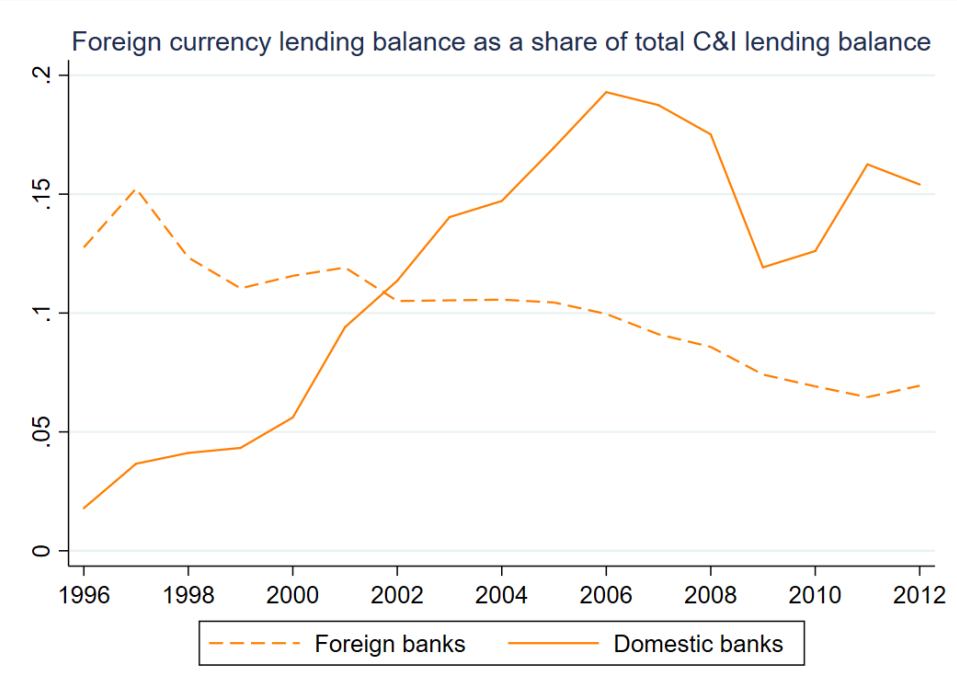
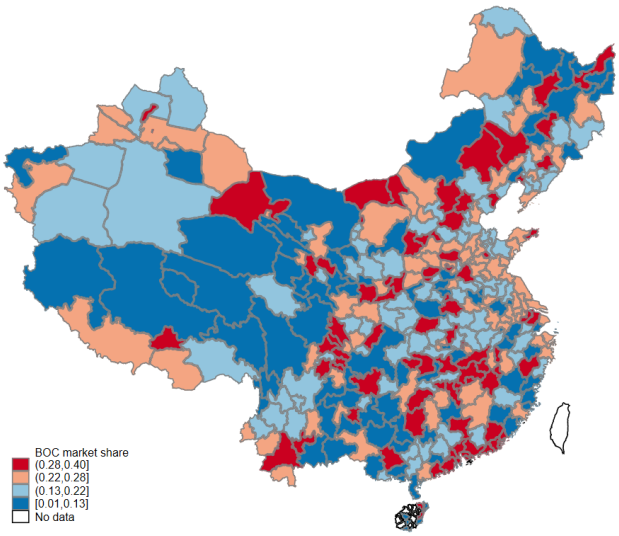


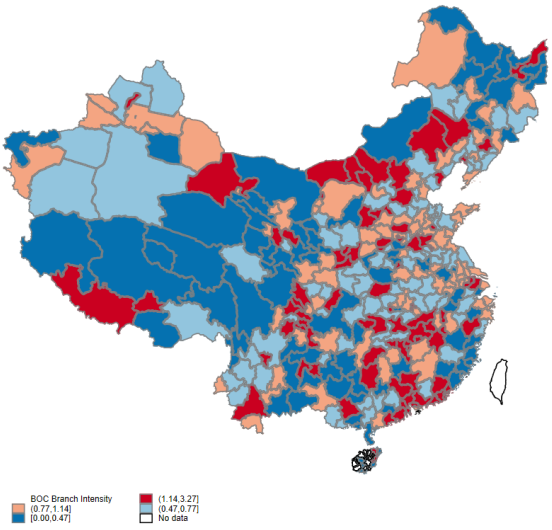
Figure 5.6: Share of Domestic banks' foreign currency lending in China

Notes: The above figure shows evolution of foreign banks' total lending balance and domestic banks' foreign-currency lending balance as a share of total C& I lending balance in China. The nominator is the total lending balance of foreign banks and the total foreign-currency lending balance of domestic banks. The denominator is the total C& I lending balance of financial institutions in China.

Figure 5.7: BOC Distribution in China



(a)



(b)

Notes: The above figure shows the industry decomposition of foreign banks' lending balance to Chinese borrowers. Panel (a) shows Bank of China's lending balance market share at prefecture-level cities in 2002. The areas are shaded total BOC lending balance as a share of local bank lending balances. And panel (b) shows Bank of China's branching distribution at prefecture-level cities in 2002. The areas are shaded by the total number of BOC branches per 10 local commercial bank branches.

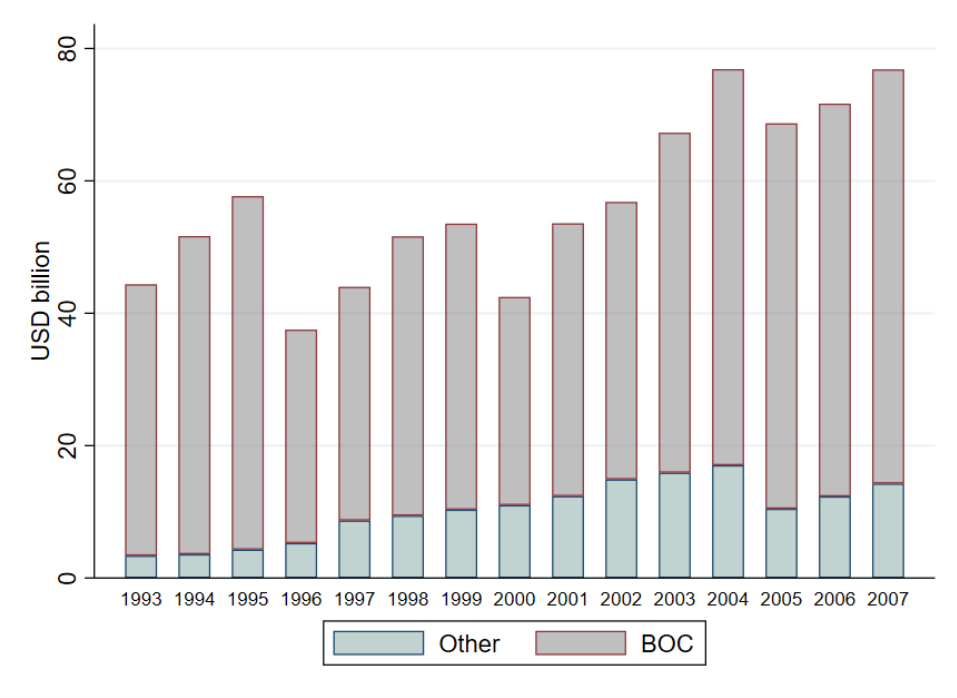


Figure 5.9: Bank of China's Dominance in FX Lending Market

Notes: The above figure shows evolution of foreign banks' total lending balance and domestic banks' foreign-currency lending balance as a share of total C& I lending balance in China. The nominator is the total lending balance of foreign banks and the total foreign-currency lending balance of domestic banks. The denominator is the total C& I lending balance of financial institutions in China.

Table 5.1: Summary Statistics of City-level characteristics

	Mean	Sd.	25-th	50-th	75-th
Population	1091.87	6616.13	239.32	369.57	592.05
Unemployment rate	0.07	0.04	0.05	0.06	0.08
Agriculture labor share	0.05	0.07	0.01	0.03	0.06
Industrial labor share	0.25	0.12	0.17	0.24	0.32
Construction labor share	0.07	0.04	0.04	0.06	0.08
Real estate labor share	0.01	0.01	0.00	0.01	0.01
Financial labor share	0.03	0.01	0.03	0.03	0.04
Commercial labor share	0.06	0.02	0.05	0.06	0.07
Land resource	36736.48	214471.03	6581.57	10610.96	18095.79
Arable land p/c	1.35	1.22	0.67	0.97	1.47
Transport capacity	18881.60	117017.78	2879.28	4898.52	9671.65
GDP	1079.15	5972.06	195.89	315.85	702.53
GDP p/c	15716.24	56549.32	6543.59	9849.91	14819.72
GDP growth	0.13	0.49	0.08	0.14	0.18
Ave. wage	12775.00	3936.50	10254.40	11921.82	13994.47
Agriculture value to GDP	18.59	9.58	10.63	17.76	26.23
Industrial value to GDP	45.22	10.15	37.84	45.86	51.93
Service value to GDP	36.18	6.52	32.79	35.83	39.52
no. Industrial firms	1711.85	10771.25	177.48	362.10	747.06
Value added domestic firm	0.57	0.28	0.35	0.53	0.72
Value added foreign firm	0.07	0.12	0.01	0.03	0.06
Fixed investment/GDP	0.32	0.11	0.24	0.30	0.36
FDI/GDP	0.03	0.03	0.00	0.01	0.03
no. FDI contracts	349.51	2283.84	12.21	30.86	115.43
No. of cities	316				

The above table shows the summary statistics of city-level characteristic variables during 2003-2007. The data are collected from City Statistical Yearbook of China from 2003-2007, CEIC and city-level statistical yearbook. Population is reported in 10,000 people, unemployment rate is calculated as the total number of people reported as unemployed scaled by total number of people in labor force. Agricultural, manufacturing, construction, real Estate and construction and commercial labor share are the total number of workers working in these sectors divided by total labor force. Land resource is the total area of land in square meters. Arable Land per capita is reported in acre/person. Transport capacity is the total number of passengers reported in 10,000 persons. GDP is the real GDP reported in 10,000 RMB, GDP per capita is reported in RMB per person and Real GDP growth is the average annual growth rate between 2003-2007, reported in percentage. Agriculture, industrial and service value to GDP are the sectors output value added scaled by GDP. no. industrial firms is the total number of industrial firms, value added domestic firms is the total of domestic non-state-owned firms' total value added scaled by total industrial sector value added, value added foreign firms is the share of total industrial sector value added made by foreign owned firms. Fixed investment/GDP is the total value of fixed investment scaled by GDP. FDI/GDP is the total value of actual FDI scaled by GDP. no. FDI contracts is the total number of FDI signed during the year.

Table 5.2: Summary Statistics of Firm-level characteristics

	N	Mean	Sd.	p(25)	p(50)	p(75)
Total assets	2406888	9.58	1.38	8.65	9.44	10.38
Age	2406888	8.06	8.69	3	6	10
Employees	2406888	204.26	712.84	50	95	188
Current debt outstanding	2406888	0.71	0.29	0.05	0.53	0.75
Long-term debt outstanding	2406888	0.11	0.87	0.02	0.08	0.14
Tangibility	2406888	0.53	0.67	0.16	0.31	0.52
Value-added	2406888	8.61	1.39	7.71	8.49	9.42
Cash flow	2126382	7.10	2.02	5.79	7.10	8.48
ROA	2406888	0.11	2.47	0.01	0.04	0.14
R&D expenses	998338	0.002	0.086	0	0.025	0.032
Investment rate	2406888	0.07	0.18	0	0.011	0.051
Labor productivity	2406888	3.95	1.14	4.21	3.89	4.65
Wage bill	2406888	7.08	1.22	7.08	7.22	7.83
TFP	2406888	0.01	0.25	0.002	0.008	0.09
TFP Growth	2406888	0.01	0.36	0.001	0.004	0.057

This table summarizes the main firm-level variables utilized in the empirical analysis. The data comes from NBS Annual Industrial Survey (AIS). Total assets is the log of total assets, and the variable total assets is reported in 1000 RMB. Age is the firm age, which is calculated as the current year minus the year when the firm registered. Employees is the total number of employees working in the firm. Current debt and Long-term debt are total current debt outstanding and total long-term debt outstanding scaled by lagged total assets. Tangibility is defined as total fixed assets (property, plants and equipment) scaled by total assets. ROA is defined as operating profit scaled by total assets, value added and cash flow are the log of industrial value added and cash flow of the firm respectively. Wage bill is the log of total payroll payable. Labor productivity is defined as the log of value added per worker.

Table 5.3: Summary Statistics of City-Lending

	Mean	Sd.	25-th	Median	75-th
Panel A: City-level summary					
Deposits	872.59	1384.63	206.40	425.90	725.30
Loans (RMB+Foreign currency)	597.58	823.27	129.00	267.50	503.00
Loans (RMB)	573.95	1024.90	118.00	223.50	461.00
C& I loan balance (RMB)	135.50	294.12	24.71	58.12	144.43
C& I loan share	0.27	0.42	0.16	0.24	0.32
Agricultural loan balance (RMB)	41.89	48.79	12.41	30.52	49.08
Agricultural loan share	0.14	0.09	0.07	0.13	0.19
Panel B: Firm-level aggregation					
C& I borrowing (RMB+Foreign currency)	177.27	348.49	27.27	70.19	89.57
ΔC& I borrowing (RMB+Foreign currency)	88.37	92.37	32.32	79.23	101.58
Panel C: Domestic channeled foreign credit					
Domestic channeled foreign credit (%)	0.52	0.38	0.12	0.39	0.58
Observations	316				

This table summarizes the ingredients utilized in the construction of the measure of domestic banks channeled foreign credit as a share of total foreign credit. Panel A provides the city-level summary statistics extracted from *China Statistical Yearbook for Regional Economy* and *China City Statistical Yearbook*. The table summarizes the 316 cities' average balances of deposits or loans during the 2003-2007 episode. Deposits are the total year-end deposits at the local banks, Loans (RMB+Foreign currency) are the total RMB-denominated and foreign currency-denominated loan balances outstanding at the local banks in the city. Loans (RMB) are the total RMB-denominated loan balances. C&I loan balance (RMB) is the total commercial and industrial loan balances on local banks' balance sheets that are denominated in RMB. Agricultural loan balance is the total RMB-denominated agricultural loan balance at the end of the year. Panel (B) provides the summary statistics the aggregated borrowing from the firms' side. C& I borrowing (RMB+Foreign currency) is the book value of total debt outstanding aggregating all firms in the city at the end of 2007. And ΔC& I borrowing (RMB+ Foreign currency) is the net increase in total book value of debt from 2003-2007, aggregating all firms' balance sheet in a city. Panel (C) presents the summary statistics of the share of domestic bank-channeled foreign credit at city level according to the calculation based on 5.4.1.

Table 5.4: Real impact of domestic bank channeled foreign credit

	Δ GDP		Δ Emp		Δ TFP	
	(1)	(2)	(3)	(4)	(5)	(6)
Domestic channeled foreign credit	0.287**	0.260**	0.576***	0.557***	0.246**	0.208**
	(0.0953)	(0.0872)	(0.639)	(0.627)	(0.0831)	(0.0695)
Foreign credit/Total credit	0.573**	0.569*	0.365*	0.173*	0.480**	0.461*
	(0.0189)	(0.0253)	(0.143)	(0.0703)	(0.154)	(0.198)
Observations	306	306	306	306	306	306
R^2	0.458	0.439	0.378	0.434	0.410	0.411
Province FE	✓	✓	✓	✓	✓	✓
City-level Controls	-	✓	-	✓	-	✓

Standard errors in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Notes: the table presents the results of regression in equation 5.3 for the easing period between 2003 and 2007. ΔGDP is $Ln(\text{ GDP}_{04-07}) - Ln(\text{GDP}_{00-03})$, which is the differences between average real GDP post the cycle during the easing phase of the cycle and the pre-cycle average GDP. ΔEmp is $Ln(\text{Emp}_{04-07}) - Ln(\text{Emp}_{00-03})$, where "emp" is the total number of employees in working industrial sector firms. ΔTFP growth is defined as TFP $\text{growth}_{04-07} - \text{TFP growth}_{00-03}$. TFP growth is the average TFP growth of firms in a given city during the specified episode. City -level control variables include the total foreign credit to the city scaled by the city's total credit, agricultural labor share, industrial sector labor share, financial sector labor share, real estate sector labor share, average labor wage, unemployment rate, total fixed asset investment scaled by GDP, total population, total land resource and total foreign-owned firms' value-added scaled by total value-added by all firms.

Table 5.5: Real impact of domestic bank channeled foreign credit: Tightening period

	Δ GDP		Δ Emp		Δ TFP	
	(1)	(2)	(3)	(4)	(5)	(6)
Domestic channeled foreign credit	-0.255***	-0.220**	-0.147**	-0.112**	-0.278**	-0.247**
	(0.0679)	(0.0718)	(0.0486)	(0.0356)	(0.0933)	(0.0827)
Foreign credit/Total credit	-0.456*	-0.536*	-0.174*	0.196*	-0.253*	-0.264*
	(0.221)	(0.223)	(0.0857)	(0.0918)	(0.104)	(0.0.108)
Observations	306	306	306	306	306	306
R^2	0.416	0.433	0.369	0.419	0.395	0.417
Province FE	✓	✓	✓	✓	✓	✓
City-level Controls	-	✓	-	✓	-	✓

Standard errors in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Notes: the table presents the results of regression in equation 5.3 for the tightening period between 2008 and 2009. ΔGDP is $Ln(\text{ GDP}_{08-09}) - Ln(\text{GDP}_{04-07})$, which is the differences between average real GDP post the cycle during the easing phase of the cycle and the pre-cycle average GDP. ΔEmp is $Ln(\text{Emp}_{08-09}) - Ln(\text{Emp}_{04-07})$, where "emp" is the total number of employees in working industrial sector firms. ΔTFP growth is defined as TFP growth_{08-09} − TFP growth_{04-07}. City -level control variables include the total foreign credit to the city scaled by the city's total credit, agricultural labor share, industrial sector labor share, financial sector labor share, real estate sector labor share, average labor wage, unemployment rate, total fixed asset investment scaled by GDP, total population, total land resource and total foreign-owned firms' value-added scaled by total value-added by all firms.

Table 5.6: First Stage Regression: DCFC and BOC Presence

Dependent Variable: Domestic channeled foreign credit		
	(1)	(2)
BOC-market share (IV-1)	2.274***	
	(0.641)	
BOC-branching (IV-2)		0.631***
		(0.182)
Foreign credit/Total credit	2.823	0.723
	(3.686)	(0.670)
Agriculture labor share	0.00659	-0.000557
	(0.535)	(0.0973)
Manufacturing labor share	0.223	0.0349
	(0.293)	(0.0533)
Financial labor share	4.724	1.391*
	(3.251)	(0.591)
Real estate labor share	-3.992	-0.450
	(4.634)	(0.842)
GDP/pc	0.00390	0.000657
	(0.00791)	(0.00144)
Unemployment rate	-0.332	-0.0522
	(0.718)	(0.130)
FDI/GDP	0.352	0.0689
	(0.413)	(0.0492)
$\frac{\text{Foreign-owned value added}}{\text{Total value-added}}$	-136.6*	-26.49*
	(60.93)	(11.08)
Transportation capacity	-0.0555	-0.0126
	(0.0563)	(0.0102)
Population	0.0400	0.0169
	(0.0713)	(0.0130)
Land	-0.0772	-0.0106
	(0.0440)	(0.00800)
Observations	306	306
R^2	0.108	0.134

Standard errors in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Notes: The table presents the first-stage regressions.

Table 5.7: Real impact of domestic bank channeled foreign credit: 2SLS

	Δ GDP		Δ Emp		Δ TFP	
	IV-1	IV-2	IV-1	IV-2	IV-1	IV-2
Domestic $\widehat{\text{Channeled}}$ Foreign credit	0.179**	0.193***	0.113**	0.108**	0.189***	0.158**
	(0.0598)	(0.0566)	(0.0444)	(0.0524)	(0.0547)	(0.0516)
Foreign credit/Total credit	0.197**	0.155*	0.127*	0.133**	0.175**	0.161*
	(0.0659)	(0.0665)	(0.0545)	(0.0532)	(0.0589)	(0.0605)
Observations	306	306	306	306	306	306
R^2	0.571	0.584	0.403	0.401	0.452	0.489
Province FE	✓	✓	✓	✓	✓	✓
City-level Controls	✓	✓	✓	✓	✓	✓

Standard errors in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Notes: the table presents the results of 2SLS regression specified in equation 5.4 for the easing period between 2003 and 2007. ΔGDP is $Ln(\text{ GDP}_{04-07}) - Ln(\text{GDP}_{00-03})$, which is the differences between average real GDP post the cycle during the easing phase of the cycle and the pre-cycle average GDP. ΔEmp is $Ln(\text{Emp}_{04-07}) - Ln(\text{Emp}_{00-03})$, where "emp" is the total number of employees in working industrial sector firms. ΔTFP growth is defined as TFP growth_{04-07} − TFP growth_{00-03}. TFP growth is the average TFP growth of firms in a given city during the specified episode. City -level control variables include the total foreign credit to the city scaled by the city's total credit, agricultural labor share, industrial sector labor share, financial sector labor share, real estate sector labor share, average labor wage, unemployment rate, total fixed asset investment scaled by GDP, total population, total land resource and total foreign-owned firms' value-added scaled by total value-added by all firms.

Table 5.8: Real impact of domestic bank channeled foreign credit: Tightening period 2SLS

	Δ GDP		Δ Emp		Δ TFP	
	IV-1	IV-2	IV-1	IV-2	IV-1	IV-2
Domestic $\widehat{\text{Channeled}}$ Foreign credit	-0.0928**	-0.0993**	-0.0872***	-0.0766***	-0.189**	-0.178**
	(0.0378)	(0.0389)	(0.0293)	(0.0269)	(0.0634)	(0.0585)
Foreign credit/Total credit	-0.189**	-0.158**	-0.105*	-0.124*	-0.185**	-0.146*
	(0.0703)	(0.0591)	(0.0522)	(0.0533)	(0.0606)	(0.0712)
Observations	306	306	306	306	306	306
R^2	0.455	0.434	0.312	0.299	0.426	0.463
Province FE	✓	✓	✓	✓	✓	✓
City-level Controls	✓	✓	✓	✓	✓	✓

Standard errors in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Notes: the table presents the results of 2SLS-regression in equation 5.4 for the tightening period between 2008 and 2009. ΔGDP is $Ln(\text{ GDP}_{08-09}) - Ln(\text{GDP}_{04-07})$, which is the differences between average real GDP post the cycle during the easing phase of the cycle and the pre-cycle average GDP. ΔEmp is $Ln(\text{Emp}_{08-09}) - Ln(\text{Emp}_{04-07})$, where "emp" is the total number of employees in working industrial sector firms. ΔTFP growth is defined as TFP growth_{08-09} − TFP growth_{04-07}. City -level control variables include the total foreign credit to the city scaled by the city's total credit, agricultural labor share, industrial sector labor share, financial sector labor share, real estate sector labor share, average labor wage, unemployment rate, total fixed asset investment scaled by GDP, total population, total land resource and total foreign-owned firms' value-added scaled by total value-added by all firms.

Table 5.9: Firms' TFP Growth and Domestic Channeled Foreign Credit

	Dependent Variable: ΔTFP					
	Easing phase			Tightening phase		
	OLS	IV-1	IV-2	OLS	IV-1	IV-2
Domestic channeled foreign credit	0.0361**	0.0210***	0.0365**	-0.0171**	-0.0132**	-0.0188***
	(0.0121)	(0.00594)	(0.0121)	(0.00576)	(0.00443)	(0.0505)
Foreign credit/Total credit	0.0588***	0.0704**	0.0754**	-0.0354*	-0.0382**	-0.0403**
	(0.0115)	(0.0235)	(0.0242)	(0.0144)	(0.0129)	(0.0134)
Observations	168633	158714	168494	158714	158714	158714
R^2	0.114	0.115	0.125	0.103	0.112	0.117
Province FE	✓	✓	✓	✓	✓	✓
Baseline Controls	✓	✓	✓	✓	✓	✓
Industry FE	✓	✓	✓	✓	✓	✓
Region FE	✓	✓	✓	✓	✓	✓
City controls	✓	✓	✓	✓	✓	✓

Standard errors in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Notes: The table presents regression analysis of firm asset tangibility adjustment behavior shown in equation 5.8. The left-hand side variable is the change in asset tangibility between 2004 and 2007 at firm level, and is calculated as $\frac{\text{PPE}_{2007}}{\text{Assets}_{2006}} - \frac{\text{PPE}_{2004}}{\text{Assets}_{2003}}$. The main explanatory variable on the right-hand side is the fraction of total foreign-currency denominated loans to local firms made by local domestic banks at the city level. Provincial fixed effects is controlled in column (1), column (2) add baseline controls which include GDP per capita, foreign-owned industrial firms output/GDP, industrial sector labor share, financial sector labor share and total construction land areas. Industry fixed effects are added in column (3), and region fixed effects are added in column (4). Finally, in the column (5), we explicitly control further for the city's export exposure by including the local industrial firms' total export value/GDP and fraction of industrial firms that are exporters. Standard errors are clustered at the city level.

Table 5.10: Firms' Employment Growth and Domestic Channeled Foreign Credit

	Dependent Variable: ΔEmp					
	Easing phase			Tightening phase		
	OLS	IV-1	IV-2	OLS	IV-1	IV-2
Domestic channeled foreign credit	0.174**	0.112**	0.125***	-0.103**	-0.122**	-0.142**
	(0.0584)	(0.0371)	(0.0353)	(0.0343)	(0.0392)	(0.0454)
Foreign credit/Total credit	0.0132**	0.0194*	0.0121***	-0.0143*	-0.0238*	-0.0252*
	(0.00441)	(0.00822)	(0.00323)	(0.00653)	(0.0155)	(0.0103)
Observations	169247	159249	169103	159249	159249	159249
R^2	0.142	0.159	0.162	0.099	0.133	0.146
Province FE	✓	✓	✓	✓	✓	✓
Baseline Controls	✓	✓	✓	✓	✓	✓
Industry FE	✓	✓	✓	✓	✓	✓
Region FE	✓	✓	✓	✓	✓	✓
City controls	✓	✓	✓	✓	✓	✓

Standard errors in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Notes: The table presents regression analysis of firm asset tangibility adjustment behavior shown in equation 5.8. The left-hand side variable is the change in asset tangibility between 2004 and 2007 at firm level, and is calculated as $\frac{\text{PPE}_{2007}}{\text{Assets}_{2006}} - \frac{\text{PPE}_{2004}}{\text{Assets}_{2003}}$. The main explanatory variable on the right-hand side is the fraction of total foreign-currency denominated loans to local firms made by local domestic banks at the city level. Provincial fixed effects is controlled in column (1), column (2) add baseline controls which include GDP per capita, foreign-owned industrial firms output/GDP, industrial sector labor share, financial sector labor share and total construction land areas. Industry fixed effects are added in column (3), and region fixed effects are added in column (4). Finally, in the column (5), we explicitly control further for the city's export exposure by including the local industrial firms' total export value/GDP and fraction of industrial firms that are exporters. Standard errors are clustered at the city level.

Table 5.11: Firms' Output Growth and Domestic Channeled Foreign Credit

	Dependent Variable: ΔOutput value-added					
	Easing phase			Tightening phase		
	OLS	IV-1	IV-2	OLS	IV-1	IV-2
Domestic channeled foreign credit	0.161**	0.145**	0.157**	-0.128*	-0.144**	-0.159**
	(0.0526)	(0.0458)	(0.0544)	(0.0605)	(0.0452)	(0.0607)
Foreign credit/Total credit	0.222***	0.191***	0.133***	-0.146**	-0.173***	-0.135**
	(0.0278)	(0.0439)	(0.0304)	(0.0448)	(0.0442)	(0.0413)
Observations	169307	159324	169164	159324	159466	159053
R^2	0.629	0.633	0.628	0.635	0.634	0.634
Province FE	✓	✓	✓	✓	✓	✓
Baseline Controls	✓	✓	✓	✓	✓	✓
Industry FE	✓	✓	✓	✓	✓	✓
Region FE	✓	✓	✓	✓	✓	✓
City controls	✓	✓	✓	✓	✓	✓

Standard errors in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Notes: The table presents regression analysis of firm asset tangibility adjustment behavior shown in equation 5.8. The left-hand side variable is the change in asset tangibility between 2004 and 2007 at firm level, and is calculated as $\frac{\text{PPE}_{2007}}{\text{Assets}_{2006}} - \frac{\text{PPE}_{2004}}{\text{Assets}_{2003}}$. The main explanatory variable on the right-hand side is the fraction of total foreign-currency denominated loans to local firms made by local domestic banks at the city level. Provincial fixed effects is controlled in column (1), column (2) add baseline controls which include GDP per capita, foreign-owned industrial firms output/GDP, industrial sector labor share, financial sector labor share and total construction land areas. Industry fixed effects are added in column (3), and region fixed effects are added in column (4). Finally, in the column (5), we explicitly control further for the city's export exposure by including the local industrial firms' total export value/GDP and fraction of industrial firms that are exporters. Standard errors are clustered at the city level.

Table 5.12: Allocation of Credit: Incumbent Firms

	Debt growth$_{04-07}$								
	OLS	IV-1	IV-2	OLS	IV-1	IV-2	OLS	IV-1	IV-2
DCFC	0.0108	0.0117	0.0114	0.0329	0.0323	0.0362	0.0286*	0.0237*	0.0252*
	(0.0272)	(0.0233)	(0.0277)	(0.0215)	(0.0215)	(0.0223)	(0.0111)	(0.0109)	(0.0105)
DCFC×1[High-tangibility]	0.361***	0.364**	0.366***						
	(0.121)	(0.119)	(0.103)						
1[High Tangibility]	-0.0145*	-0.0236*	-0.0210*						
	(0.00782)	(0.0103)	(0.00789)						
DCFC×1[Young firm]				0.145***	0.141***	0.155***			
				(0.0294)	(0.0325)	(0.0314)			
1[Young firm]				-0.0992	-0.0951	-0.0790			
				(0.0144)	(0.0144)	(0.0144)			
DCFC×1[High ROA]							0.106***	0.108***	0.0956**
							(0.0358)	(0.0332)	(0.0321)
1[High ROA]							-0.0300***	-0.0303***	-0.0282**
							(0.00878)	(0.00878)	(0.00878)
Foreign credit/Total credit	0.0714	0.0767	0.115*	0.121*	0.122*	0.111*	0.109*	0.0958	0.114*
	(0.0517)	(0.0572)	(0.0532)	(0.0517)	(0.0572)	(0.0532)	(0.0517)	(0.0622)	(0.0513)
Observations	169596	169596	169596	169596	169596	169596	169596	169596	169596
R^2	0.010	0.010	0.011	0.011	0.011	0.012	0.011	0.011	0.011
Province FE	✓	✓	✓	✓	✓	✓	✓	✓	✓
Baseline Controls	✓	✓	✓	✓	✓	✓	✓	✓	✓
Industry FE	✓	✓	✓	✓	✓	✓	✓	✓	✓
Region FE	✓	✓	✓	✓	✓	✓	✓	✓	✓
City controls	✓	✓	✓	✓	✓	✓	✓	✓	✓

Standard errors in parentheses

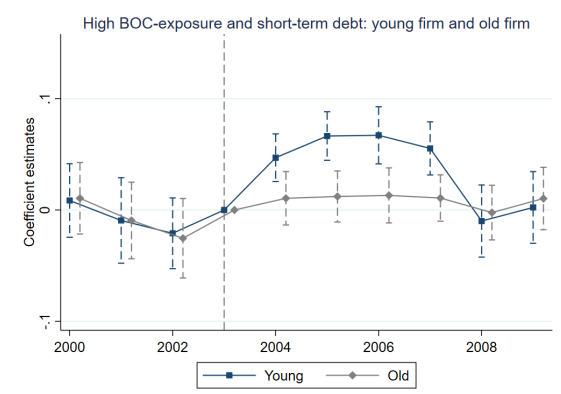
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Notes: The table shows feature of the Firm-level debt growth and how it correlates with city-level domestic bank channeled foreign credit:

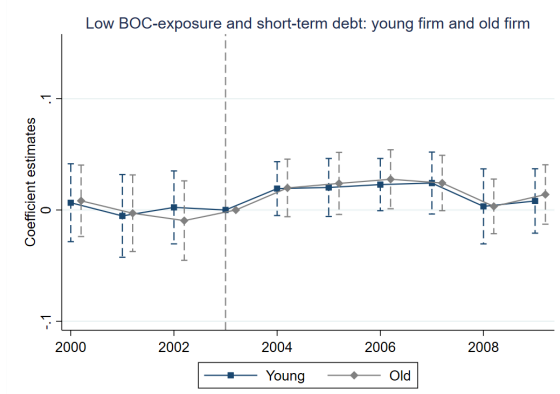
$$\Delta \mathrm{D}_{i,j,c} \quad = \quad \alpha + \gamma_j + \beta_0 \mathrm{DCFC}_c + \beta_1 \mathrm{DCFC}_c \times 1[\mathrm{Char}] + \theta X_{i,c} + \epsilon_{i,j,c} \tag{5.12}$$

$\Delta D_{i,j,c}$ is the *within-firm* incremental in leverage ratio post the financial cycle compared with its pre-cycle level. DCFC_c is abbreviated for domestic channeled foreign credit of city c during 2003-2007. 1[Char] is an indicator variable specifying the features of the firm, it could be 1[High-tangibility], 1[Young firm], 1[High pre-ROA]. IV-1 is the instrumental variable using BOC's pre-cycle loan market share in the city; and IV-2 is the instrumental using the BOC-'s pre-cycle branching intensity in the city.

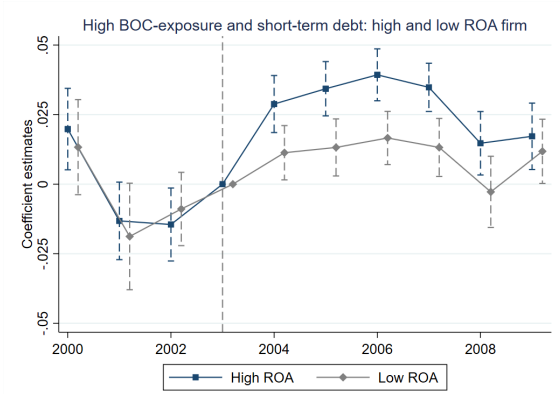
Figure 5.10: BOC exposure and Firm Credit Growth



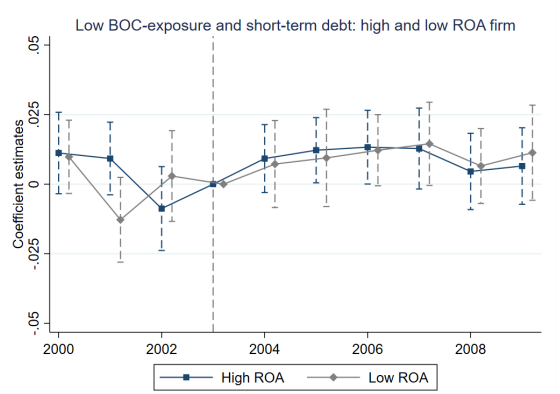
(a) High BOC exposure and firm debt growth: Young and Old firm



(b) Low BOC exposure and firm debt growth: Young and Old firm



(c) High BOC exposure and firm debt growth: High ROA and Low ROA firms



(d) High BOC exposure and firm debt growth: High ROA and Low ROA firms

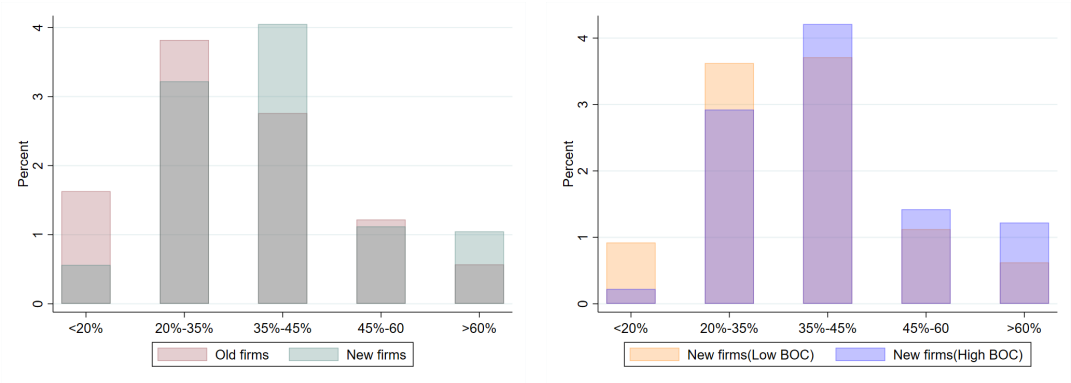
$$D_{i,j,c,t} = \alpha_i + \gamma_{j,t} + \sum_{q \neq 2003}^{q \in [2000-2007]} \beta_q 1[t = q] + \theta X_{i,c,t} + \epsilon_{i,j,c,t}$$

Notes: The above four figures shows the coefficient of estimates of equation 5.6. High BOC cities are defined defined as cities with above-median local BOC market share pre-cycle. Young firms are defined as firms under the age of 7. High ROA firms are defined as firms with above-median pre-cycle ROA in the city that they are located.

Table 5.13: Distribution of new firms' industrial tangibility across cities

Firm category	Mean	S.d	25-th	Median	75-th
New firms	0.385	0.204	0.216	0.343	0.521
New firms & High BOC exposure	0.421	0.203	0.217	0.402	0.576
Existing firms	0.359	0.126	0.188	0.309	0.451

Figure 5.11: Firm industry distribution and BOC exposure

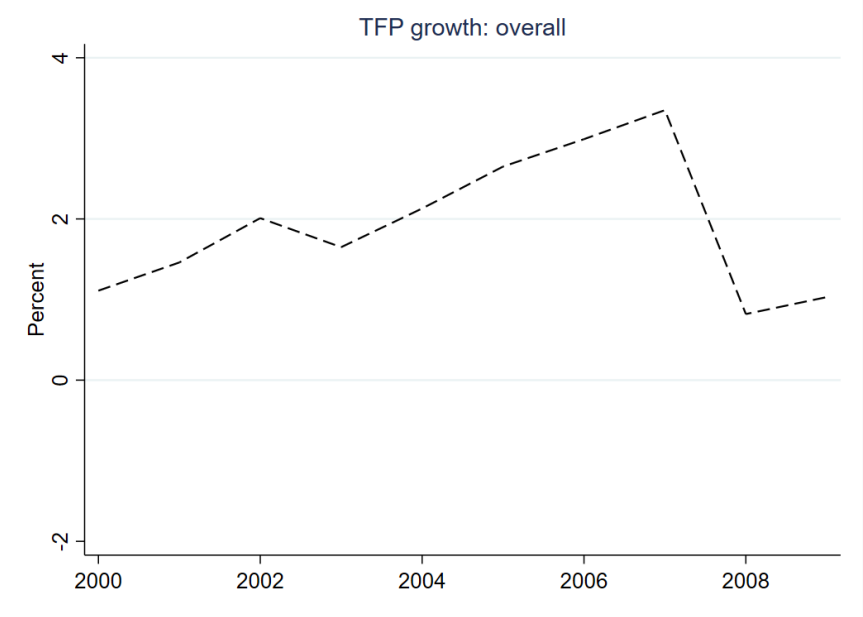


(a) New firm tangibility distribution

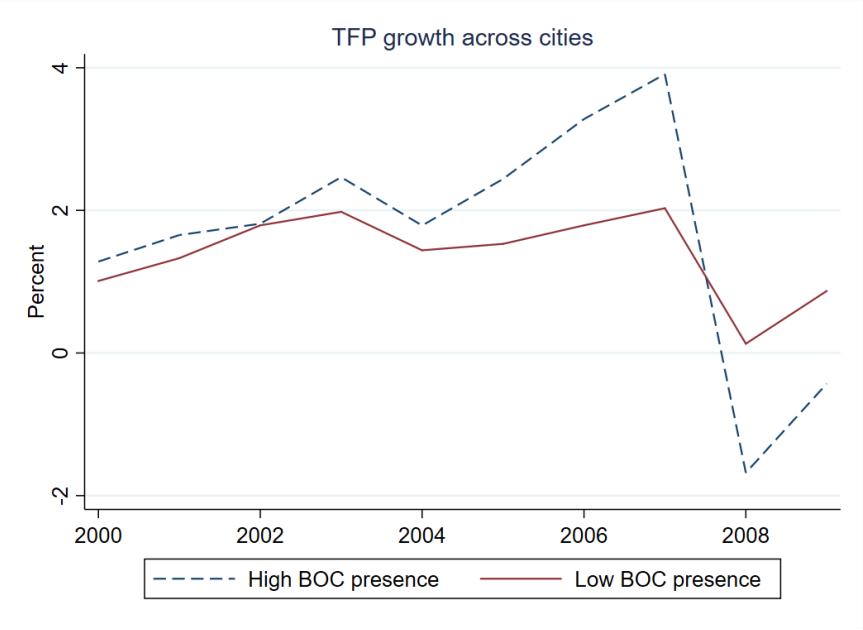
(b) New firm tangibility distribution and BOC exposure

Notes: The above figure shows the distribution of new entrant firms in terms of their tangibility. The five categories (from left to right) of industry are characterized by the industry's pre-cycle (1998-2002) average tangibility (PPE/Assets). For example, category 1 "<20%" means industries with pre-cycle average tangibility being less than 20%. The hight of the bar represents the percentage of new entrant firms from 2003-2007 that fall into a given category of industry group. Panel (a) compares the distribution of pre-cycle old firms' tangibility distributions and all the new entrant firms tangibility distributions. Panel (b) compares the tangibility distribution of new entrant firms that are located in high BOC exposure cities and those in low BOC exposure cities.

Figure 5.12: Distribution of Bank of China Lending Balance Market Share



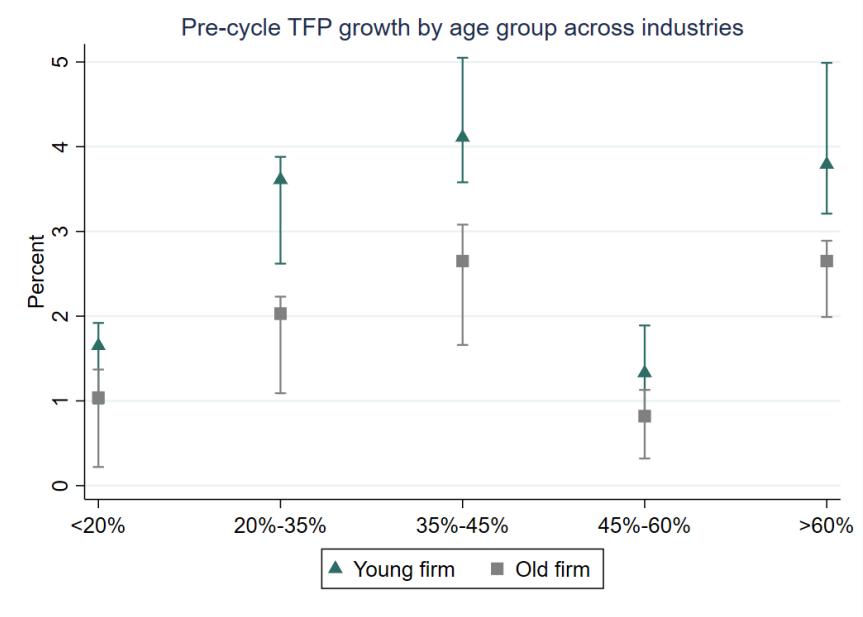
(a)



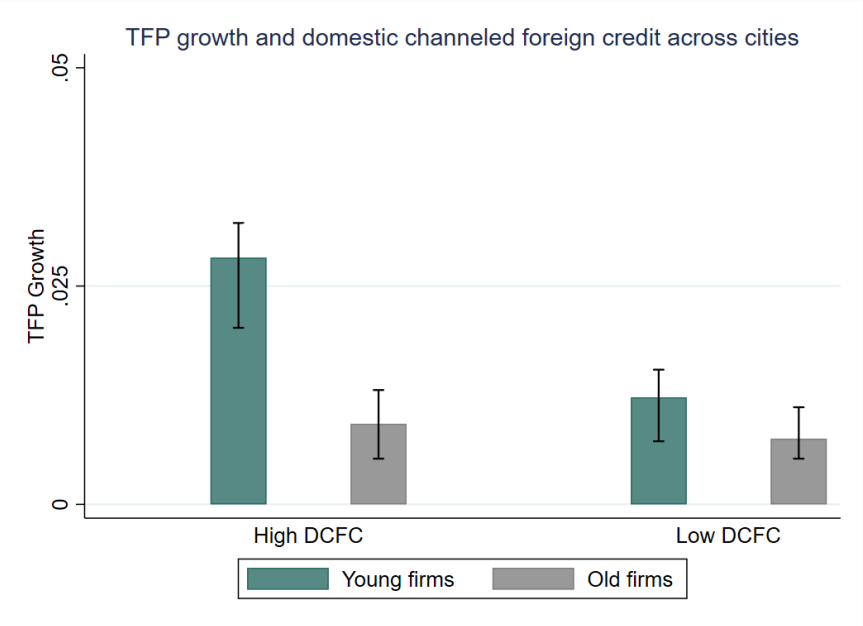
(b)

Notes: The figure compares firm-level TFP growth during 2003-2007 in cities with high and low domestic channeled foreign credit during the 2003-2007 period.

Figure 5.13: Distribution of Bank of China Lending Balance Market Share



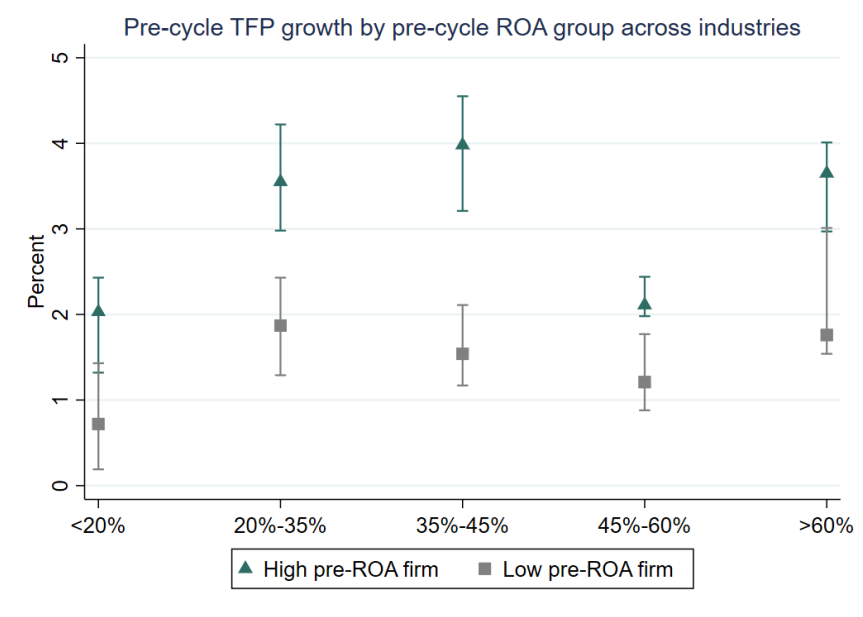
(a)



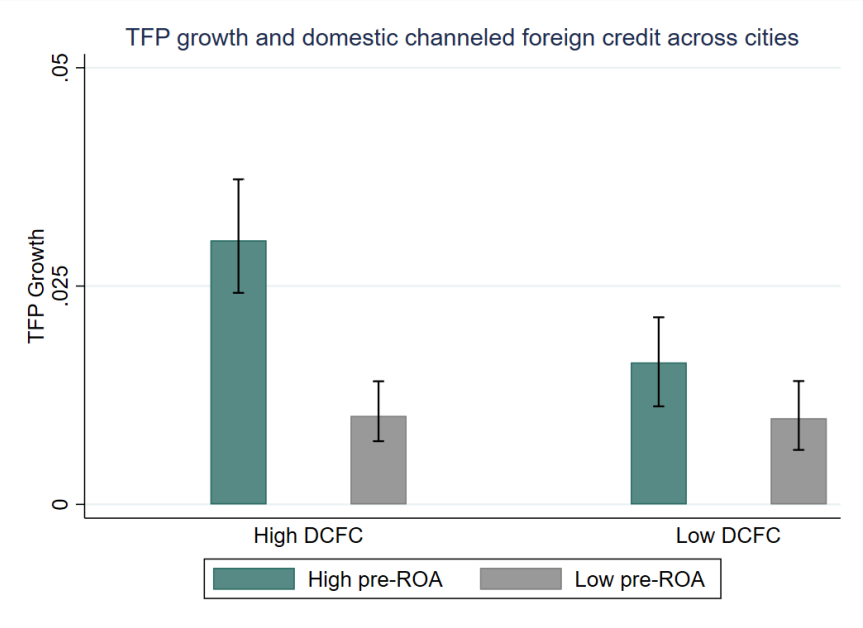
(b)

Notes: The figure compares firm-level TFP growth during 2003-2007 in cities with high and low domestic channeled foreign credit during the 2003-2007 period. Panel (a) demonstrates the young and old firms' pre-cycle TFP growth across industry groups sorted by the industries' pre-cycle tangibility. Panel (b) compares the young and old firms' TFP growth during the cycle for those located in high DCFC cities and those in low DCFC cities.

Figure 5.14: Distribution of Bank of China Lending Balance Market Share



(a)



(b)

Notes: The figure compares firm-level TFP growth during 2003-2007 in cities with high and low domestic channeled foreign credit during the 2003-2007 period. Panel (a) demonstrates the high-ROA and low-ROA firms' pre-cycle TFP growth across industry groups sorted by the industries' pre-cycle tangibility. Panel (b) compares the high-ROA and low-ROA firms' TFP growth during the cycle for those located in high DCFC cities and those in low DCFC cities.

Table 5.14: Domestic channeled foreign credit and new firm debt growth across cities

	Debt growth		
	OLS	IV-1	IV-2
Domestic channeled foreign credit	0.268**	0.365***	0.339**
	(0.0896)	(0.0878)	(0.0927)
Foreign credit/Total credit	0.217**	0.143*	0.146*
	(0.0709)	(0.0588)	(0.0618)
Observations	37418	37418	37418
R^2	0.094	0.123	0.122
Province FE	✓	✓	✓
City-level Controls	✓	✓	✓

Standard errors in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Notes: The table shows the average within-firm debt growth for firms that were newly established across different cities. IV-1 is the instrumental variable using BOC's pre-cycle loan market share in the city; and IV-2 is the instrumental using the BOC-'s pre-cycle branching intensity in the city. City -level control variables include the total foreign credit to the city scaled by the city's total credit, agricultural labor share, industrial sector labor share, financial sector labor share, real estate sector labor share, average labor wage, unemployment rate, total fixed asset investment scaled by GDP, total population, total land resource and total foreign-owned firms' value-added scaled by total value-added by all firms.

Table 5.15: Summary Statistics of domestic relationship lending and collateral

Panel A: Firm-bank pair			
Total #. of firms	3287		
Total #. of banks	672		
Ave. # of firms/year (2003-2012)	1617		
% of firms located in high CL price volatility cities	31.9%		
% of lending (/year) secured by fixed assets	72.8%		
	Mean	Sd.	Median
#. of years relationship within each bank-firm pair	4.58	2.83	4
#. of banks within each firm-year	5.27	4.23	6
#. of banks each firm has relationship	5.89	6.13	4
Ln(Total borrowing amount)(CNY)	15.89	2.37	17.42
Panel B: Collateral Type			
	Mean	Sd.	Median
Property, Land, Pland and Factory	0.82	0.48	1.00
Security holdings	0.06	0.24	0.00
Account receivables, Earning and Cash flow	0.10	0.30	0.00
Machine and Equipment	0.08	0.27	0.00
More than two of the above categories	0.22	0.42	0.00

Table 5.16: Summary City Level Land Prices and Transactions

	# of cities	Mean	Std. Dev	25th	Median	75th
Industrial land price	214	548.52	189.34	252.34	454.23	798.28
Commercial land price	214	655.13	156.29	335.28	389.38	933.26
Financing volume collateralized by land	301	186531.12	389151.22	82634.77	288232.27	492342.76
# of industrial land transactions	289	113.54	89.23	22.15	42.45	89.32
# of pieces of industrial land purchases	289	84.78	79.27	9.28	31.49	56.78
Commercial mortgage issuance	251	34.39	45.33	3.39	14.52	59.89

Notes: The above table presents the summary statistics of city-level industrial land prices and transaction dynamics from 2002-2009. Financing volume collateralized by land is the total amount (in 10000 RMB) of loans that's collateralized by land in a city in a given year. # of industrial land transactions is the total number of sums of land transactions and # of pieces of land purchases are the total number of industrial land transacted during a year. Commercial mortgage issuance is the total number of sums of commercial mortgage transactions issued by local industrial firms.

Table 5.17: Real impact of domestic bank channeled foreign credit: easing period

	Ln[1+amount]			
	(1)	(2)	(3)	(4)
1[Easing]	0.185***	0.0521***	0.0631***	0.0212***
	(0.0129)	(0.0104)	(0.00923)	(0.0134)
1[Easing]×1[Land]		0.111***		0.0747***
		(0.0230)		(0.0219)
1[Easing]×1[Land]×				0.167***
1[High commercial land price volatility city]				(0.034)
1[Land]		0.0979**		0.0984**
		(0.0341)		(0.0341)
1[Easing]×1[High commercial land price volatility city]			0.113***	
			(0.0240)	
1[High commercial land price volatility city]			0.340	
			(0.0480)	
Observations	23233	23233	23233	23233
Adjusted R^2	0.796	0.801	0.798	0.803
Firm FE	Yes	Yes	Yes	Yes
Industry-year FE	Yes	Yes	Yes	Yes
Bank FE	Yes	Yes	Yes	Yes
Firm-Bank FE	Yes	Yes	Yes	Yes

Standard errors in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Notes: The above table presents the regression results in equation 5.7. The dependent variable is the natural log of total loan amount of loans lent by a domestic local bank to its local relationship lender. 1[Easing] is an indicator variable that equals to 1 for years 2003-2007, 1[Land] is an indicator variable that equals to 1 if the loan is secured by land, properties and buildings. 1[High commercial land price volatility city] is an indicator variable that equals to 1 if the city's industrial land price decreased by more than 20% during the 2008-2009 compared with 2007.

Table 5.18: Real impact of domestic bank channeled foreign credit: easing period

	Ln[1+amount]			
	(1)	(2)	(3)	(4)
1[Tightening]	-0.371***	-0.499***	-0.155***	-0.0923***
	(0.0308)	(0.0321)	(0.0219)	(0.0182)
1[Tightening]×1[Land]		-0.108**		-0.103**
		(0.0368)		(0.0382)
1[Tightening]×1[Land]×				-0.364***
1[High commercial land price volatility city]				(0.0317)
1[Land]		0.0590**		0.0589*
		(0.0224)		(0.0322)
1[Tightening]×1[High commercial land price volatility city]			-0.237***	
			(0.0332)	
1[High commercial land price volatility city]			-0.105	
			(0.164)	
Observations	23233	23233	23233	23233
Adjusted R^2	0.797	0.802	0.798	0.811
Firm FE	Yes	Yes	Yes	Yes
Industry-year FE	Yes	Yes	Yes	Yes
Bank FE	Yes	Yes	Yes	Yes
Firm-Bank FE	Yes	Yes	Yes	Yes

Standard errors in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Notes: The above table presents the regression results in equation 5.7. The dependent variable is the natural log of total loan amount of loans lent by a domestic local bank to its local relationship lender. 1[Tightening] is an indicator variable that equals to 1 for years 2008-2009, 1[Land] is an indicator variable that equals to 1 if the loan is secured by land, properties and buildings. 1[High commercial land price volatility city] is an indicator variable that equals to 1 if the city's industrial land price decreased by more than 20% during the 2008-2009 compared with 2007.

Table 5.19: Real impact of domestic bank channeled foreign credit

	Ln[1+amount]			
	(1)	(2)	(3)	(4)
1[Easing]	0.134***	0.0235***	0.0442***	0.0109***
	(0.0189)	(0.00501)	(0.00826)	(0.00202)
1[Easing]×1[Land]		0.128***		0.0323***
		(0.0208)		(0.00421)
1[Easing]×1[Land]×				0.114***
1[High commercial land price volatility city]				(0.0222)
1[Land]		0.145		0.138
		(0.0933)		(0.143)
1[Easing]×1[High commercial land price volatility city]			0.0928***	
			(0.0172)	
1[High commercial land price volatility city]			0.109	
			(0.126)	
Observations	9946	9946	9946	9946
Adjusted R^2	0.818	0.821	0.826	0.833
Firm FE	Yes	Yes	Yes	Yes
Industry-year FE	Yes	Yes	Yes	Yes
Bank FE	Yes	Yes	Yes	Yes
Firm-Bank FE	Yes	Yes	Yes	Yes

Standard errors in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Notes: The above table presents the regression results in equation 5.7. The dependent variable is the natural log of total loan amount of loans lent by a domestic local bank to its local relationship lender. 1[Easing] is an indicator variable that equals to 1 for years 2003-2007, 1[Land] is an indicator variable that equals to 1 if the loan is secured by land, properties and buildings. 1[High commercial land price volatility city] is an indicator variable that equals to 1 if the city's industrial land price decreased by more than 20% during the 2008-2009 compared with 2007.

Table 5.20: Real impact of domestic bank channeled foreign credit

	Ln[1+amount]			
	(1)	(2)	(3)	(4)
1[Tightening]	-0.405***	-0.377***	-0.163***	-0.0982***
	(0.0823)	(0.0802)	(0.0823)	(0.0226)
1[Tightening]×1[Land]		-0.0202		-0.105***
		(0.0323)		(0.0235)
1[Tightening]×1[Land]×				-0.353***
1[High commercial land price volatility city]				(0.0552)
1[Land]		0.186		0.169
		(0.469)		(0.568)
1[Tightening]×1[High commercial land price volatility city]			-0.413***	
			(0.0416)	
1[High commercial land price volatility city]			-0.203	
			(0.272)	
Observations	9946	9946	9946	9946
Adjusted R^2	0.809	0.811	0.818	0.822
Firm FE	Yes	Yes	Yes	Yes
Industry-year FE	Yes	Yes	Yes	Yes
Bank FE	Yes	Yes	Yes	Yes
Firm-Bank FE	Yes	Yes	Yes	Yes

Standard errors in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Notes: The above table presents the regression results in equation 5.7. The dependent variable is the natural log of total loan amount of loans lent by a domestic local bank to its local relationship lender. 1[Tightening] is an indicator variable that equals to 1 for years 2008-2009, 1[Land] is an indicator variable that equals to 1 if the loan is secured by land, properties and buildings. 1[High commercial land price volatility city] is an indicator variable that equals to 1 if the city's industrial land price decreased by more than 20% during the 2008-2009 compared with 2007.

Table 5.21: Real impact of domestic bank channeled foreign credit

	Ln[1+amount]			
	(1)	(2)	(3)	(4)
1[Easing]	0.149***	0.0298***	0.0388***	0.0229***
	(0.0283)	(0.00612)	(0.00752)	(0.00308)
1[Easing]×1[High-tangibility]		0.143***		0.0212***
		(0.0198)		(0.00403)
1[Easing]×1[High-tangibility]×				0.132***
1[High commercial land price volatility city]				(0.0234)
1[High-tangibility]		0.122		0.144
		(0.106)		(0.152)
1[Easing]×1[High commercial land price volatility city]			0.0733***	
			(0.0135)	
1[High commercial land price volatility city]			0.118	
			(0.137)	
Observations	9946	9946	9946	9946
Adjusted R^2	0.722	0.725	0.794	0.799
Firm FE	Yes	Yes	Yes	Yes
Industry-year FE	Yes	Yes	Yes	Yes
Bank FE	Yes	Yes	Yes	Yes
Firm-Bank FE	Yes	Yes	Yes	Yes

Standard errors in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Notes: The above table presents the regression results in equation 5.7. The dependent variable is the natural log of total loan amount of loans lent by a domestic local bank to its local relationship lender. 1[Easing] is an indicator variable that equals to 1 for years 2003-2007, 1[Land] is an indicator variable that equals to 1 if the loan is secured by land, properties and buildings. 1[High commercial land price volatility city] is an indicator variable that equals to 1 if the city's industrial land price decreased by more than 20% during the 2008-2009 compared with 2007.

Table 5.22: Real impact of domestic bank channeled foreign credit

	Ln[1+amount]			
	(1)	(2)	(3)	(4)
1[Tightening]	-0.412***	-0.381***	-0.201***	-0.121***
	(0.0593)	(0.0588)	(0.0502)	(0.0211)
1[Tightening]×1[High-tangibility]		-0.0332		-0.129***
		(0.0405)		(0.0321)
1[Tightening]×1[High-tangibility]×				-0.369***
1[High commercial land price volatility city]				(0.0576)
1[High-tangibility]		0.202		0.177
		(0.433)		(0.332)
1[Tightening]×1[High commercial land price volatility city]			-0.422***	
			(0.0602)	
1[High commercial land price volatility city]			-0.344	
			(0.498)	
Observations	9946	9946	9946	9946
Adjusted R^2	0.689	0.692	0.732	0.745
Firm FE	Yes	Yes	Yes	Yes
Industry-year FE	Yes	Yes	Yes	Yes
Bank FE	Yes	Yes	Yes	Yes
Firm-Bank FE	Yes	Yes	Yes	Yes

Standard errors in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Notes: The above table presents the regression results in equation 5.7. The dependent variable is the natural log of total loan amount of loans lent by a domestic local bank to its local relationship lender. 1[Tightening] is an indicator variable that equals to 1 for years 2008-2009, 1[Land] is an indicator variable that equals to 1 if the loan is secured by land, properties and buildings. 1[High commercial land price volatility city] is an indicator variable that equals to 1 if the city's industrial land price decreased by more than 20% during the 2008-2009 compared with 2007.

Table 5.23: Firms' Response I

	ΔTangibility$_{04-07}$				
	(1)	(2)	(3)	(4)	(5)
% Domestic channeled foreign credit	0.0233***	0.0229***	0.0187***	0.0192***	0.0203***
	(0.00617)	(0.00632)	(0.00522)	(0.00531)	(0.00503)
%Foreign credit/GDP	0.252***	0.214***	0.211***	0.199***	0.192***
	(0.0502)	(0.0423)	(0.0402)	(0.0398)	(0.0359)
Observations	173118	173118	173118	173118	173118
R^2	0.0182	0.122	0.159	0.233	0.256
Province FE	✓	✓	✓	✓	✓
Baseline Controls		✓	✓	✓	✓
Industry FE			✓	✓	✓
Region FE				✓	✓
Export exposure					✓

Standard errors in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Notes: The table presents regression analysis of firm asset tangibility adjustment behavior shown in equation 5.8. The left-hand side variable is the change in asset tangibility between 2004 and 2007 at firm level, and is calculated as $\frac{\text{PPE}_{2007}}{\text{Assets}_{2006}} - \frac{\text{PPE}_{2004}}{\text{Assets}_{2003}}$. The main explanatory variable on the right-hand side is the fraction of total foreign-currency denominated loans to local firms made by local domestic banks at the city level. Provincial fixed effects is controlled in column (1), column (2) add baseline controls which include GDP per capita, foreign-owned industrial firms output/GDP, industrial sector labor share, financial sector labor share and total construction land areas. Industry fixed effects are added in column (3), and region fixed effects are added in column (4). Finally, in the column (5), we explicitly control further for firms' and cities' export exposure by including the local industrial firms' total exporting goods value/total goods value and fraction of industrial firms that are exporters in the city. Standard errors are clustered at the city level.

Table 5.24: Firms' Response II

	ΔTotal Debt$_{04-07}$				
	(1)	(2)	(3)	(4)	(5)
% Domestic channeled foreign credit	0.0288**	0.0288***	0.0402***	0.0353**	0.0376***
	(0.00962)	(0.00822)	(0.0876)	(0.0855)	(0.0823)
% Foreign credit/GDP	0.129**	0.133**	0.132**	0.163***	0.154***
	(0.0469)	(0.0483)	(0.0455)	(0.0421)	(0.0478)
Observations	173118	173118	173118	173118	173118
R^2	0.0499	0.103	0.154	0.188	0.233
Province FE	✓	✓	✓	✓	✓
Baseline Controls		✓	✓	✓	✓
Industry FE			✓	✓	✓
Region FE				✓	✓
Export exposure					✓

Standard errors in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Notes: The table presents regression analysis of firm asset tangibility adjustment behavior shown in equation 5.8. The left-hand side variable is the change in total current debt between 2004 and 2007 at firm level, and is calculated as $\frac{\text{Total Current Debt}_{2007}}{\text{Assets}_{2006}}$ - $\frac{\text{Total Current Debt}_{2004}}{\text{Assets}_{2003}}$. The main explanatory variable on the right-hand side is the fraction of total foreign-currency denominated loans to local firms made by local domestic banks at the city level. Provincial fixed effects is controlled in column (1), column (2) add baseline controls which include GDP per capita, foreign-owned industrial firms output/GDP, industrial sector labor share, financial sector labor share and total construction land areas. Industry fixed effects are added in column (3), and region fixed effects are added in column (4). Finally, in the column (5), we explicitly control further for firms' and cities' export exposure by including the local industrial firms' total exporting goods value/total goods value and fraction of industrial firms that are exporters in the city. Standard errors are clustered at the city level.

Table 5.25: Firms' Response III

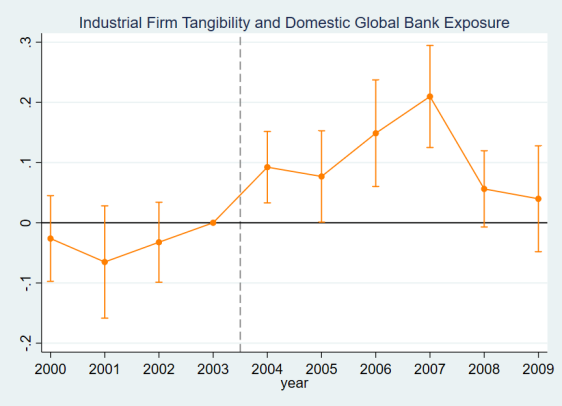
	ΔFixed Asset Investment$_{04-07}$				
	(1)	(2)	(3)	(4)	(5)
% Domestic channeled foreign credit	0.0275***	0.0289***	0.0332***	0.0343***	0.0298***
	(0.00622)	(0.00643)	(0.00651)	(0.00633)	(0.00653)
% Foregin credit/GDP	0.0508***	0.0455***	0.0429***	0.0403***	0.0412***
	(0.0123)	(0.0114)	(0.0112)	(0.0102)	(0.0114)
Observations	173118	173118	173118	173118	173118
R^2	0.0823	0.113	0.175	0.211	0.232
Province FE	✓	✓	✓	✓	✓
Baseline Controls		✓	✓	✓	✓
Industry FE			✓	✓	✓
Region FE				✓	✓
Export exposure					✓

Standard errors in parentheses

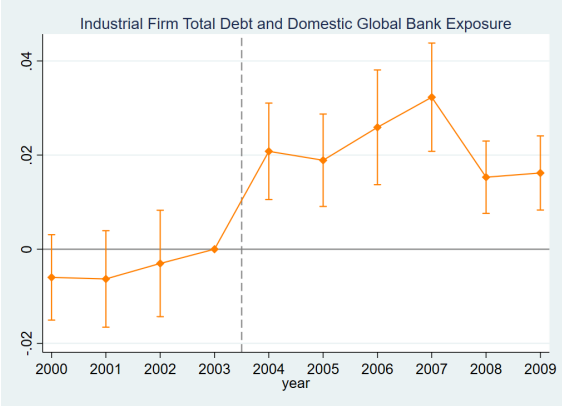
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Notes: The table presents regression analysis of firm asset tangibility adjustment behavior shown in equation 5.8. The left-hand side variable is the increase in total fixed-asset investment between 2004 and 2007 at firm level, and is calculated as $\frac{\text{Total fixed investment between 2004-2007}}{\text{Assets}_{2003}}$. The main explanatory variable on the right-hand side is the fraction of total foreign-currency denominated loans to local firms made by local domestic banks at the city level. Provincial fixed effects is controlled in column (1), column (2) add baseline controls which include GDP per capita, foreign-owned industrial firms output/GDP, industrial sector labor share, financial sector labor share and total construction land areas. Industry fixed effects are added in column (3), and region fixed effects are added in column (4). Finally, in the column (5), we explicitly control further for firms' and cities' export exposure by including the local industrial firms' total exporting goods value/total goods value and fraction of industrial firms that are exporters in the city. Standard errors are clustered at the city level.

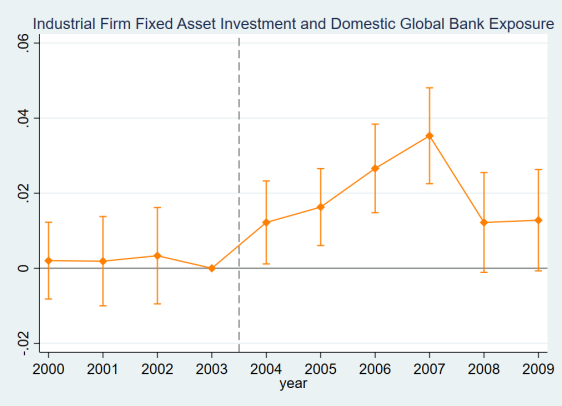
Figure 5.15: Firm Behavior and Pre-Cycle Exposure to BOC



(a) Local firm Tangibility and BOC exposure



(b) Firm Total Debt Growth and BOC Exposure



(c) Firm Fixed Assets Investment and BOC Exposure

The figures above show the coefficient estimates of the following regression equation at the firm level with different corresponding left-hand side variables:

$$y_{i,c,t} = \alpha_c + \mu_s + \sum_{t=1999, s\neq 2003}^{2009} \beta_s \text{BOC}^{pre} \mathbf{1}[s=t] + \theta(\frac{\text{Total FX credit}}{\text{GDP}}_{c,t}) + \gamma \mathbf{X}_{c,t} + \epsilon_{c,t}$$

In Panel (a), the left-hand side variable is the firm-level PPE/Assets(t-1); in panel (b), the left-hand side variable is firm-level Total current debt/Assets(t-1); in panel (c), the left-hand side variable is firm-level total fixed-asset investment/Assets(t-1). baseline controls which include GDP per capita, foreign-owned industrial firms output/GDP, industrial sector labor share, financial sector labor share and total construction land areas. Standard errors are clustered at the city level.

Table 5.26: Local Commercial and Industrial Land Prices:tightening phase

	ΔLocal Commercial property price		ΔLocal Industrial land price	
	OLS	IV	OLS	IV
(Domestic share of local foreign credit)	-0.0303**	-0.0503***	-0.0233**	-0.0362**
	(0.00802)	(0.00877)	(0.00642)	(0.0125)
Foreign credit/Total credit	-0.00923*	-0.00762	-0.0132	-0.0105
	(0.00442)	(0.00653)	(0.0175)	(0.0154)
Observations	214	214	214	214
Adjusted R^2	0.115	0.113	0.0923	0.106
Province FE	Yes	Yes	Yes	Yes
Region FE	Yes	Yes	Yes	Yes
City controls	Yes	Yes	Yes	Yes

Standard errors in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Notes: The above table presents the regression results of equation 5.10 in the tightening episode 2008-2009. The left-hand side variables are the changes in local commercial and industrial land prices during the tightening period and are defined as $\Delta(P^{\text{land}}_{2008-2009})_c$ are defined as $\frac{Ave.P^{land}_{2008-2009}-P^{land}_{2007}}{P^{land}_{2007}}$. The main explanatory variable is the share of foreign-currency denominated loans lent by local domestic banks during the 2003-2007 period. Column (1) and (3) are baseline regressions including province and city fixed effects and baseline controls including DP per capita, foreign-owned industrial firms output/GDP, industrial sector labor share, financial sector labor share and total construction land areas. Column (2) and (4) are 2SLS regressions using the city's pre-cycle BOC lending market share as instrumental variable.

Table 5.27: Local Commercial and Industrial Land Prices Easing phase

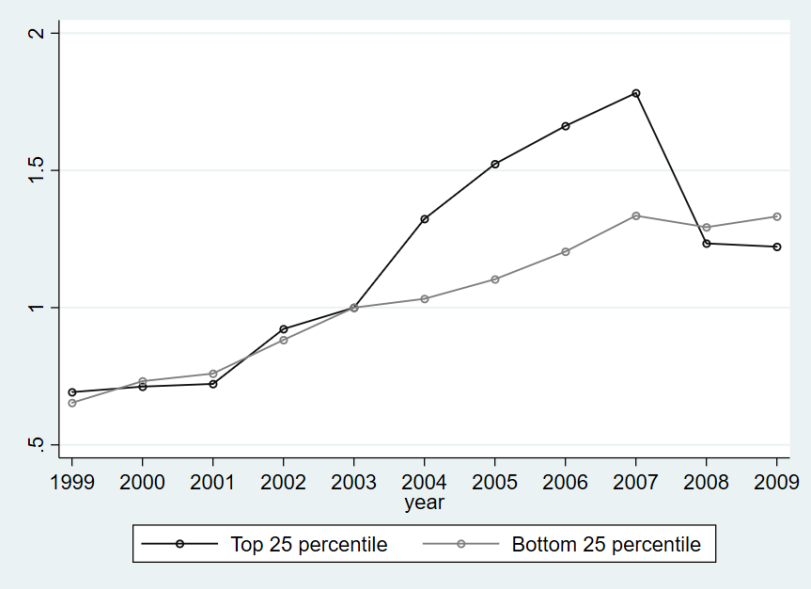
	ΔLocal Commercial land price		ΔLocal Industrial land price	
	OLS	IV	OLS	IV
(Domestic share of local foreign credit)	0.0676**	0.0529**	0.0458**	0.0449**
	(0.0288)	(0.0166)	(0.0166)	(0.0161)
Foreign credit/Total credit	0.00729*	0.00664**	0.0221**	0.0187**
	(0.00323)	(0.00262)	(0.00742)	(0.00659)
Observations	214	214	214	214
Adjusted R^2	0.0832	0.0917	0.0744	0.826
Province FE	Yes	Yes	Yes	Yes
Region FE	Yes	Yes	Yes	Yes
Baseline controls	Yes	Yes	Yes	Yes

Standard errors in parentheses

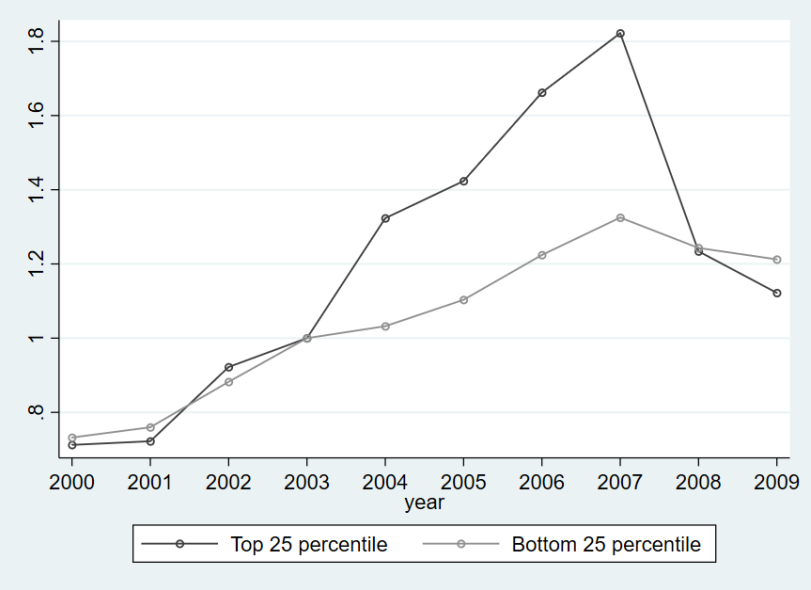
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Notes: The above table presents the regression results of equation 5.10 in the easing episode 2003-2007. The left-hand side variables are the changes in local commercial and industrial land prices during the tightening period and are defined as $\Delta(P^{\text{land}}_{2003-2007})_c$ are defined as $\frac{P^{land}_{2007}-P^{land}_{2003}}{P^{land}_{2003}}$. The main explanatory variable is the share of foreign-currency denominated loans lent by local domestic banks during the 2003-2007 period. Column (1) and (3) are baseline regressions including province and city fixed effects and baseline controls including DP per capita, foreign-owned industrial firms output/GDP, industrial sector labor share, financial sector labor share and total construction land areas. Column (2) and (4) are 2SLS regressions using the city's pre-cycle BOC lending market share as instrumental variable.

Figure 5.16: City-level Industrial Land Transaction Dynamics and Exposure to Domestic Global Bank

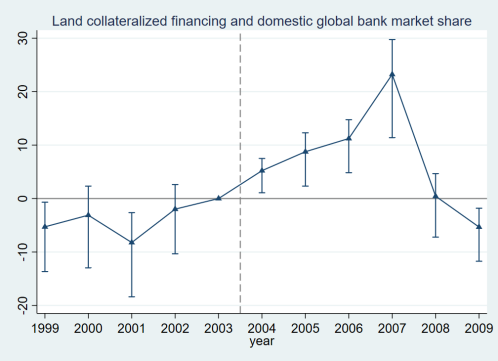


(a) Financing Collateralized by Land and Domestic Global Bank Exposure

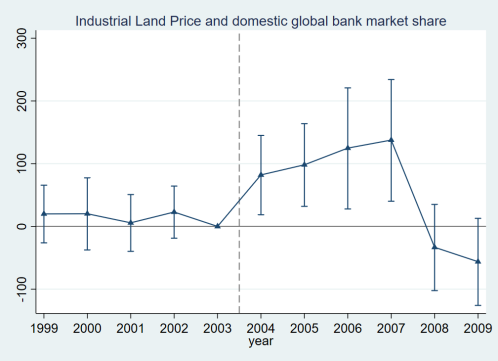


(b) Industrial Land Price and Domestic Global Bank Exposure

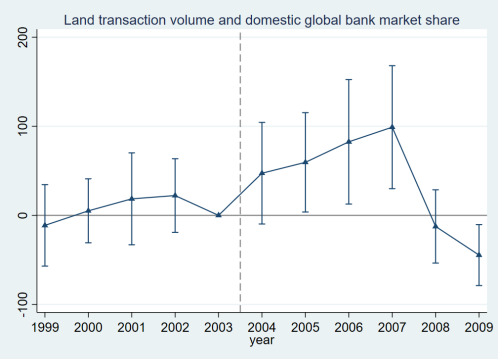
Figure 5.17: City-level Industrial Land Transaction Dynamics and Exposure to Domestic Global Bank: Loan Market Share



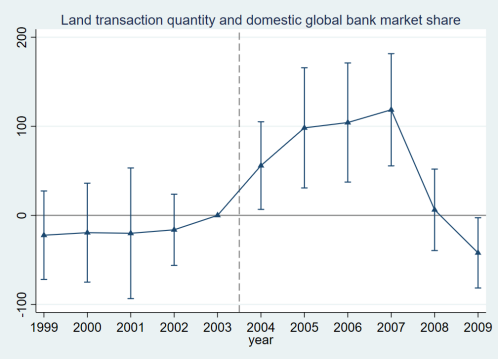
(a) Financing Collateralized by Land and Domestic Global Bank Exposure



(b) Industrial Land Price and Domestic Global Bank Exposure

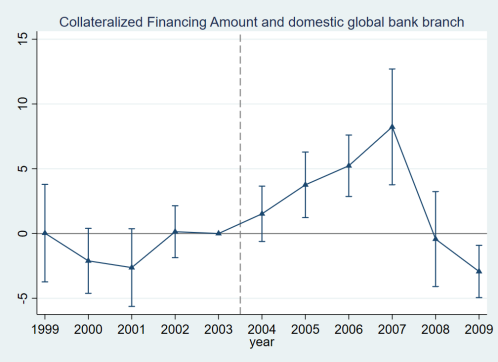


(c) NO. Sums of Industrial Land Transaction and Domestic Global Bank Exposure

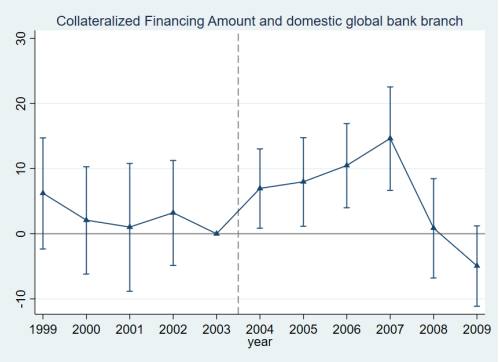


(d) NO. Pieces of Industrial Land Purchases and Domestic Global Bank Exposure

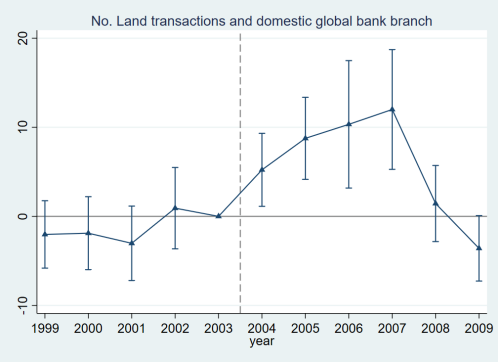
Figure 5.18: City-level Industrial Land Transaction Dynamics and Exposure to Domestic Global Bank: BOC branching intensity



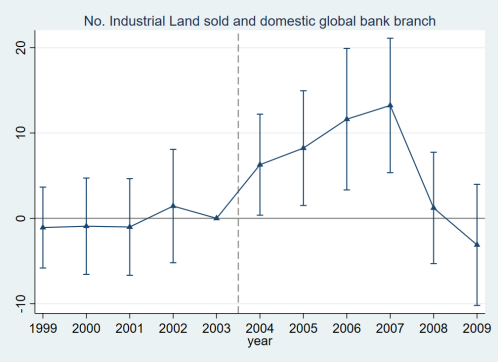
(a) Financing Collateralized by Land and Domestic Global Bank Exposure



(b) Industrial Land Price and Domestic Global Bank Exposure



(c) NO. Sums of Industrial Land Transaction and Domestic Global Bank Exposure



(d) NO. Pieces of Industrial Land Purchases and Domestic Global Bank Exposure

Table 5.28: Comparing pre-cycle city-level characteristics

	Mean(High)	Mean(Low)	Diff.	Std. Error	Obs.
Population	419.33	409.33	-10.00	36.41	316
Unemployment rate	0.06	0.06	0.00	0.01	316
Agriculture labor share	0.04	0.06	0.02	0.01	316
Manufacturing labor share	0.28	0.24	-0.03	0.02	316
Construction labor share	0.07	0.06	-0.01*	0.01	316
Real estate labor share	0.01	0.01	0.00	0.00	316
Financial labor share	0.03	0.03	-0.00	0.00	316
Commercial labor share	0.08	0.08	0.00	0.00	316
Land resource	13257.41	14951.04	1693.63	1574.28	316
Arable land p/c	1.14	1.28	0.14	0.13	316
Agriculture value to GDP	17.92	22.07	4.15*	2.04	316
Industrial value to GDP	44.96	42.25	-0.70	1.38	316
Service value to GDP	37.12	35.68	-1.45	0.93	316
no. Industrial firms	632.44	670.57	38.13	47.93	316
Value added domestic firm	0.64	0.56	-0.07*	0.04	316
Value added foreign firm	0.08	0.04	-0.04	0.03	316
Fixed investment/GDP	0.27	0.26	-0.01	0.03	316
FDI/GDP	0.02	0.02	-0.01	0.01	316
no. FDI contracts	137.43	56.26	-81.17***	31.25	316
Transport capacity	5965.99	5160.05	-805.93	801.24	316

The above table shows the summary statistics at of city-level characteristic variables during 2003-2007. The data are collected from City Statistical Yearbook of China from 2003-2007, CEIC and city-level statistical yearbook. Real GDP is reported in 10,000 RMB, Arable Land per capita is reported in acre/person, city land area is reported in km^2, construction sector labor force, financial sector labor force, industrial sector labor force and unemployed are reported in 10,000 persons; industrial output, industrial output (foreign-funded) and fixed asset investment are reported in 10,000 RMB. FDI contract value and actual FDI are reported in 10,000 USD. GDP per capita is reported in RMB per person and Real GDP growth is the average annual growth rate between 2003-2007, reported in percentage. Passenger transportation capacity is reported in 10,000 persons.

Table 5.29: Comparing pre-cycle firm characteristics

	Mean(High)	Mean(Low)	Diff.	Std. Error	Obs.
Total assets	9.7257	9.5822	-0.1435	0.9753	166270
Age	10.9163	11.2753	0.3590	0.4621	167279
Employees	309.7672	292.1175	-17.6498*	8.7385	167279
Current debt	0.5246	0.4998	-0.0248	0.0318	166270
Long-term debt	0.0669	0.0925	0.0256	0.0319	166270
ROA	0.0612	0.0666	0.0053	0.0060	166270
Value-added	8.6086	8.4585	-0.1502	0.2102	163134
Tangibility	0.3397	0.3679	0.0282	0.0214	166270
Cash flow	9.0176	8.8041	-0.2135*	0.1178	166030
Labor productivity	-2.7713	-2.6937	0.0777	0.0532	162917
Investment rate	0.0120	0.0131	0.0011	0.0008	166270
Wage bill	7.0547	6.8445	-0.2102**	0.0671	165987

The above table shows the summary statistics at of city-level characteristic variables during 2003-2007. The data are collected from City Statistical Yearbook of China from 2003-2007, CEIC and city-level statistical yearbook. Real GDP is reported in 10,000 RMB, Arable Land per capita is reported in acre/person, city land area is reported in km^2, construction sector labor force, financial sector labor force, industrial sector labor force and unemployed are reported in 10,000 persons; industrial output, industrial output (foreign-funded) and fixed asset investment are reported in 10,000 RMB. FDI contract value and actual FDI are reported in 10,000 USD. GDP per capita is reported in RMB per person and Real GDP growth is the average annual growth rate between 2003-2007, reported in percentage. Passenger transportation capacity is reported in 10,000 persons.

Table 5.30: BOC Branch Intensity and Local characteristics

Panel A: Local Basic Economic Conditions					
	GDP growth	GDP/pc	Transportation capacity	Construction land	Arable land
	(1)	(2)	(3)	(4)	(5)
Branching	-0.392	3.979*	-0.00635	11.643	-0.688
	(0.664)	(1.929)	(0.101)	(14.802)	(0.396)
Observations	306	306	306	306	306
Province FE	✓	✓	✓	✓	✓
Panel B: Local Labor Conditions					
	Industrial	Financial	Real estate	Service	Unemployment
	(1)	(2)	(3)	(4)	(5)
Branching	0.0421	0.00112	0.00434	0.00161	0.00633
	(0.0226)	(0.00231)	(0.00127)	(0.00157)	(0.0118)
Observations	306	306	306	306	306
Province FE	✓	✓	✓	✓	✓
Panel C: FDI and Export Exposure					
	FDI/GDP	% of exporter	%Foreign owned	Foreign-owned output/GDP	Export/GDP
	(1)	(2)	(3)	(4)	(5)
Branching	0.00239	0.123	0.0233	0.00160*	0.00439
	(0.00131)	(0.0725)	(0.0183)	(0.000709)	(0.00345)
Observations	306	306	306	306	306
Province FE	✓	✓	✓	✓	✓

Standard errors in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

This table presents the regression results of equation 5.4, where the right-hand side variable is BOC's branch intensity and the left-hand side variables are divided into three categories. In Panel (A), GDP growth is the real GDP growth rate, GDP/pc is the GDP per capita, Transportation capacity is the total volume of passengers the city's transportation system carried over a year, the the unit of observation is 0.1 million; Construction land is the total area (in square of kilometers) of construction stock in the city; the total arable land is the total area (in acres) of arable land in the outskirt of the city. Panel (B) shows the correlation between local labor market condition and pre-cycle BOC branching intensity. "Industrial", "Financial", "Real Estate" and "Service" refer to the share of labor force employed in the four sectors respectively, and unemployment is the unemployment rate. Panel (C) shows the correlation between the city's export and FDI exposure with the pre-cycle BOC exposure. FDI/GDP is the total dollar amount of FDI scaled by local GDP, % of exporter is the share of local industrial firms that are exporters; % foreign owned is the share of local industrial firms that have foreign ownership; Foreign-owned output/GDP and Export/GDP are the total value of output produced by foreign-owned industrial firms and exporting industrial firms scaled by GDP. All regressions are included with province-level fixed effects.

Table 5.31: BOC Market share and Local characteristics

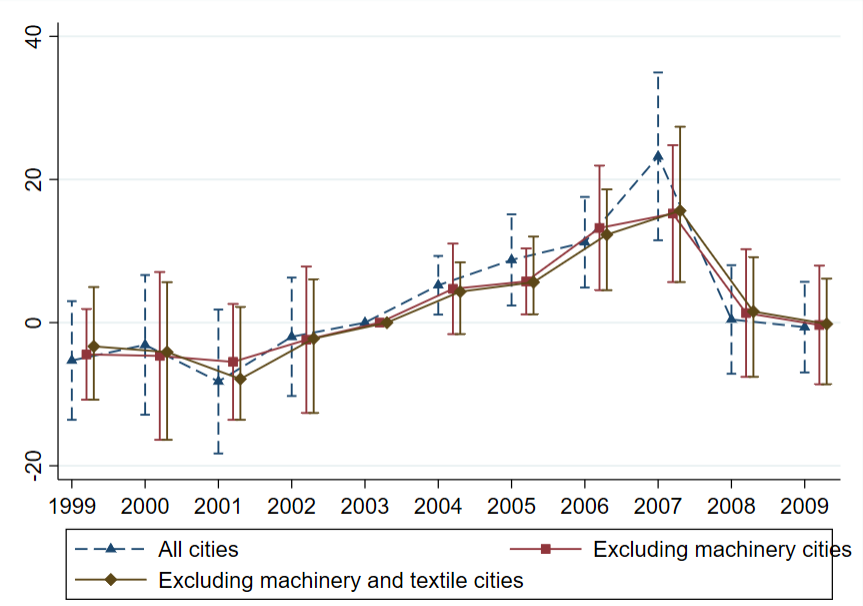
Panel A: Local Basic Economic Conditions					
	GDP growth	GDP/pc	transportation_capacity	Construction land	Arable land
	(1)	(2)	(3)	(4)	(5)
Market share	0.817	30.28*	0.592	12.672	-3.473
	(3.382)	(15.709)	(0.511)	(7.495)	(1.907)
Observations	306	306	306	306	306
Province FE	✓	✓	✓	✓	✓
Panel B: Local Labor Conditions					
	Industrial	Financial	Real estate	Service	Unemployment
	(1)	(2)	(3)	(4)	(5)
Market share	0.0259	0.0100	0.00233	0.00287	-0.0553
	(0.175)	(0.0117)	(0.00649)	(0.00365)	(0.0599)
Observations	306	306	306	306	306
Province FE	✓	✓	✓	✓	✓
Panel C: Local FDI and Export Exposure					
	FDI/GDP	% of exporter	%Foreign owned	Foreign-owned output/GDP	Export/GDP
	(1)	(2)	(3)	(4)	(5)
Market share	0.00527	0.0785	0.0145	0.00585	0.0455
	(0.00670)	(0.0397)	(0.0144)	(0.00363)	(0.0403)
Observations	306	306	306	306	306
Province FE	✓	✓	✓	✓	✓

Standard errors in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

This table presents the regression results of equation 5.4, where the right-hand side variable is BOC's lending market share at the city level and the left-hand side variables are divided into three categories. In Panel (A), GDP growth is the real GDP growth rate, GDP/pc is the GDP per capita, Transportation capacity is the total volume of passengers the city's transportation system carried over a year, the the unit of observation is 0.1 million; Construction land is the total area (in square of kilometers) of construction stock in the city; the total arable land is the total area (in acres) of arable land in the outskirt of the city. Panel (B) shows the correlation between local labor market condition and pre-cycle BOC lending market share. "Industrial", "Financial", "Real Estate" and "Service" refer to the share of labor force employed in the four sectors respectively, and unemployment is the unemployment rate. Panel (C) shows the correlation between the city's export and FDI exposure with the pre-cycle BOC exposure. FDI/GDP is the total dollar amount of FDI scaled by local GDP, % of exporter is the share of local industrial firms that are exporters; % foreign owned is the share of local industrial firms that have foreign ownership; Foreign-owned output/GDP and Export/GDP are the total value of output produced by foreign-owned industrial firms and exporting industrial firms scaled by GDP. All regressions are included with province-level fixed effects.

Figure 5.19: Land Collateralized Credit and BOC exposure: Robustness



Notes: The above figure shows demonstrate the correlation between a city's pre-cycle exposure to BOC and the city's land-collateralized credit expansion over the financial cycle. The figure aims to provide robustness checks of whether land-collateralized credit expansion was driven by the city's exporting firms. According to Berger and Martin (2011), China's export during the 2000s was concentrated primarily at two categories of industries, one is machinery (HS categories 84 and 85), and the other is textile/apparel (HS categories 42, 51, 52, 58, 60, 61, 62, 63, 64). The dashed blue line is the same line as in the panel (a) of Figure 5.17. The red line plots the same coefficient estimates for cities with machinery output value-added being more than 12.2% of total industrial output value added (top 15-th percentile of cities with the highest machinery output value-added, a total of 36 cities). The olive solid line shows the coefficient estimates of cities excluding the machinery export intensive cities and the textile export intensive cities (top 15-th percentile of cities with the highest textile and apparel output value-added, a total of 18 more cities).

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