Local financial development and constraints on domestic private-firm exports: Evidence from city commercial banks in China[☆]

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ABSTRACT

We show that the development of city commercial banks (CCBs) across China has alleviated the constraints from China's domestic financial-market inefficiency on the export activity of domestic private firms. Considering the export behavior of 260 cities between 1997 and 2012, we confirm the well-established under-performance of domestic private firms in financially more vulnerable sectors compared to foreign affiliates in China. We show that a greater number of CCB branches raises domestic private-firm exports disproportionately more in financially-dependent sectors, which is in line with improved financing conditions for these companies. This improvement in export performance appears to result from both an increase in the number of destination countries and a decline in prices. CCB development is moreover associated with a reduction in the systematic disadvantage of domestic private firms relative to foreign-owned firms in export markets resulting from their greater financial exclusion. We, however, also find that private-firm export performance has deteriorated relative to that of state-owned firms, casting doubt on the ability of CCBs to end the systematic bias of lending in favor of the state sector.

1. Introduction

China's banking sector has undergone substantial restructuring in recent decades in an attempt to move away from its notoriously inefficient state-centered system (Dollar and Wei, 2007). Various rounds of reforms have focused on the commercialization of the four national state-owned banks that continue to dominate the banking sector. A no-less ambitious parallel approach pursued by the Chinese authorities consists in allowing the entry of successive waves of new types of financial institutions. Many developing countries have also pursued policies to liberalize their banking systems and have encouraged the arrival of new players, particularly foreign ones (Claessens and Van Horen, 2014). The precise assessment of the impact of the development of these new banks is therefore of great importance.

A particularly remarkable source of transformation and competition has come from the growth of the current 133 city commercial

banks (CCBs), which first appeared in the mid 1990s: they presently account for 12.6% of Chinese banking assets.[1] As the name suggests, CCBs were originally allowed to operate only within the city from which they originated. However, since 2004, they have been authorized to expand outside their home area. Their fast growth, better management, and innovative behavior are the driving forces behind the mounting effective market competition among banks (Ferri, 2009; Lin et al., 2015). In contrast to the national state-owned banks, whose lending remains focused on notoriously inefficient state-owned enterprises, CCBs target the growing demand for investment loans from local small and medium-sized enterprises, which have been the main engine of China's rapid economic growth. This suggests a potential improvement in the famous misallocation of capital in China (Brandt et al., 2013; Hsieh and Klenow, 2009). However, to our knowledge there has been no empirical work on this issue. This paper begins to fill this gap.

The inefficiency of China's financial system mainly stems from non-market distortions resulting from government policies (Allen et al., 2005; Dollar and Wei, 2007). The state-dominated banking system allocates credit mainly to support the development of state-owned enterprises (SOEs), while the development of private enterprises has been impeded (Chen et al., 2016). One stylized fact in China's malfunctioning banking system is the discrimination against domestic private firms (Brandt and Li, 2003). These credit constraints faced by Chinese private firms have been manifested in the systematic under-performance of private firms in export markets, especially in financially-dependent sectors, compared to firms with foreign ownership that can access foreign capital markets or funding from their parent companies (Manova et al., 2015). This paper asks whether the growth of CCBs has helped reduce this performance gap.

Our analysis of the repercussions of local financial development in China exploits data on sectoral exports for 260 cities between 1997 and 2012. We ask whether the development of city commercial banks across China has alleviated the constraints from China's domestic financial market inefficiency on the export activity of domestic private firms. Our estimation strategy follows a large empirical literature pioneered by Rajan and Zingales (1998), identifying the effect of credit frictions via geographical variation in financial development and sectoral variation in financial vulnerability (Chaney, 2016; Manova, 2013). A number of heterogeneous-firm trade models with financial frictions support the use of export data to detect financial constraints and track their change over time (Besedeš et al., 2014; Manova et al., 2015; Muûls, 2015). These models are based on the observation that access to export markets is more demanding than access to local markets in terms of external finance due to fixed entry costs, delays in cross-border transit, and greater risk. They thus formalize the intuition that if financial development helps tilt growth towards financially-de-pendent industries,[2] then the impact of development should be accentuated for export growth.

Our focus on export performance instead of more traditional indicators of performance (such as economic growth, sales, productivity, financial returns, etc.) furthermore relates to various advantages of export data. The advantages of using export data to assess how the development of CCBs has reduced the credit constraints faced by private Chinese firms are three-fold. First, as our estimation strategy follows Rajan and Zingales (1998), we need data disaggregated by sector and city level. To our knowledge, GDP data broken down by sector are not available at the city level. They are also not detailed according to the type of firm ownership. Export data, contrary to production data, are disaggregated by product and city level and are available continuously over a longer and more recent period (1997–2012), which is key to our identification strategy. Various problems in the Chinese annual surveys of industrial firms, summarized by Brandt et al. (2014), would limit data on production or productivity to a subperiod of 1998–2007. This restriction is harmful since, as shown in Fig. 1, a large number of CCBs were created after 2007. Second, export data allow a much finer sectoral decomposition of activity than the production data where firms only report their main sector of activity. Moreover, while production data exclude private firms with revenues below five million yuan, export data cover the whole universe of exporting firms in China. Third, export data, compared to production data or financial data, are less likely to suffer from measurement or misreporting problems, which could severely bias the estimates.

We first build on Manova et al. (2015), who use 2005 data to show that foreign-firms, especially fully-foreign firms, suffer fewer financial constraints in China, possibly because they can access foreign capital markets or can obtain funding from their parent companies. We confirm this diagnostic over our data period (1997–2012): foreign affiliates and joint ventures exhibit better export performance than do domestic private firms in financially-vulnerable sectors. Our evaluation of the ongoing financial reforms in China tests the prediction that greater financial-system efficiency should affect the export structure of private firms. We expect the most financially-dependent sectors to be disadvantaged in environments where distortions are more significant, but benefit more from greater efficiency in the financial system.

Our key contribution is our focus on one specific component of the ongoing restructuring of China's banking sector: the emergence of city commercial banks. We use the number of CCB branches in a city to measure local CCB development. Our main variable of interest is the interaction of CCBs with sectoral financial vulnerability. We identify the loosening of credit constraints with Chinese financial reform by seeing how the comparative export disadvantage of private firms in financially-vulnerable sectors falls with local CCB presence.

Our baseline results show that domestic private firms' export performance rose faster in sectors with greater financial vulnerability when there were more CCBs, hence dampening the systematic disadvantage (via financial exclusion) of domestic private firms compared to foreign-owned firms in export markets. The development of CCBs then seems to have relaxed the financial constraints that weigh on local private firms. However, when using state-owned firm export performance to gauge the sensitivity of private-firm

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[1] The figure of 12.6% comes from the China Banking Regulatory Commission 2017 Annual Report. A great deal of attention was also given to the entry of foreign banks following China's entry into the WTO (Lai et al., 2016; Lin, 2011; Lin and Zhang, 2009). However their combined share of Chinese banking assets was only 1.3% in 2015, limiting their potential impact.

[2] In the following we refer interchangeably to financially-dependent and financially-vulnerable sectors.
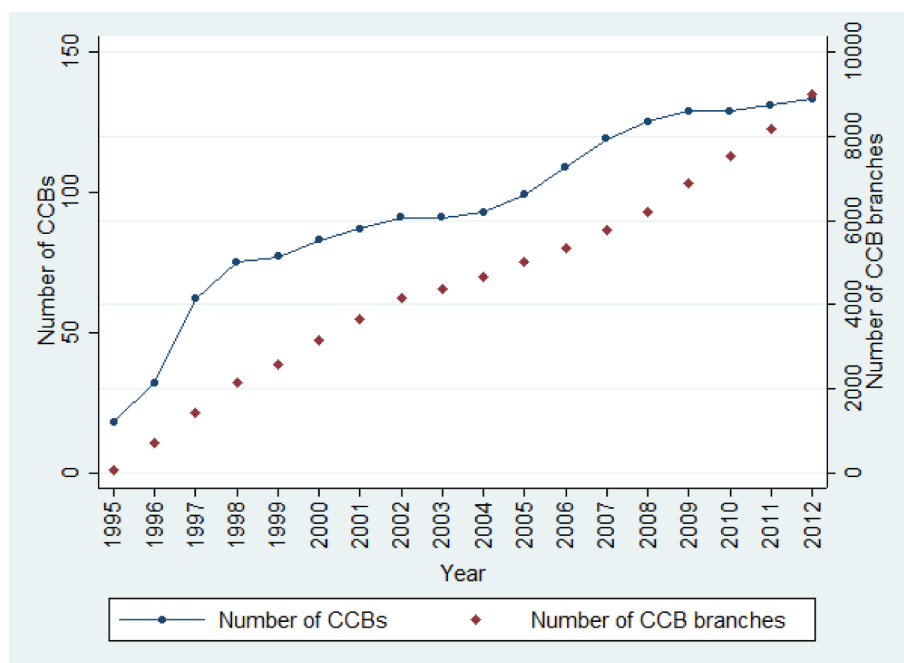
Fig. 1. The development of city commercial banks over time Source: Official website of China's Banking Regulatory Commission (http://www.cbrc.gov.cn/).

exports to financial frictions, we find that the relative performance of private firms has worsened. Hence, while CCBs appear to have extended lending to private firms, thus promoting a reallocation of their export activity to sectors with greater capital requirements, they have not reversed state firms' preferential access to financing. The local financial development introduced by city commercial banks has not put an end to the systematic lending bias in favor of the state sector. These results are robust to controlling for the inclusion of fixed effects accounting for time-varying shocks to the city or the sector in a way that is specific to firm type. They also hold when we control for confounding factors such as the credit-constraint relaxing effects of economic development, foreign presence or foreign-bank entry. The results are further confirmed when we use alternative proxies for financial vulnerability.

We make three contributions to the literature. First, we are the first to our knowledge to evaluate the effect of local bank availability on domestic private firms in China. Our analysis adds to the emerging literature showing the importance of within-country variation in financial development, notably in developing countries (Brandt et al., 2005; Fafchamps and Schündeln, 2013; Guiso et al., 2004; Kendall, 2012). It also contributes to the debate on the impact of the entry of new banks on access to credit for private companies in developing countries. The literature is indeed very divided on the relationship between firms' credit constraints and the intensifying competition between banking institutions in developing countries. In particular, results on the direct effect of competition on the availability of bank credit to firms are mixed and depend on the countries included in the sample (Beck et al., 2004; Léon, 2015a; Petersen and Rajan, 1995).[3] A study based on Chinese subnational data is therefore better able to measure the impact of financial reforms in China. Only a few papers have examined how the outcomes of Chinese financial-market reforms differ across China according to the local bank presence. Most have used measures of financial development at the level of the 31 Chinese provinces, a relatively aggregated level. Our count measure of city commercial bank branches provides much more spatial variation over a long period (1997–2012), and directly picks up the effect of new financial institutions on banking sector reform.[4]

Second, previous work has also struggled with the endogeneity of financial development. The incentives for local authorities to intervene to create a city commercial bank in their jurisdiction are particularly strong in the Chinese context, where promotions for local executives are directly tied to economic growth and therefore to the implementation of favorable financial conditions (Li and Zhou, 2005). Our identification strategy interacts the financial-development measure with sectoral financial vulnerability, and further with dummies for firm-ownership type. More precisely, we do not require that the development of CCBs be exogenous to financial constraints. Our conclusions would in fact be strengthened under the likely scenario that CCBs developed in response to

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[3] Refer to Léon (2015b) for a survey with a special focus in Africa. A part of this literature focuses on the consequences of the entry of foreign banks (whose share almost doubled between 1995 and 2009). The relation between private credit and foreign bank presence appears to importantly depend on host country and banks' characteristics (Claessens and Van Horen, 2014; Detragiache et al., 2008). Results suggest that foreign banks only seem to have a negative impact on credit in low-income countries.

[4] The standard measure of provincial banking efficiency is the market share of banks other than the four state-owned commercial banks (SOCBs). This is only available up to 2004 (Guariglia and Poncet, 2008; Jarreau and Poncet, 2014). In Lai et al. (2016), which looks at the productive gains from the opening up of regions to foreign-bank entry, the key variable is a dummy for the restrictions on foreign banks being lifted.

deficiencies in the state-banking sector (Girardin and Ping, 1997). Our panel of city-product-year export flows by firm type also allows us to control for city-year and product-year fixed effects, so that the estimated coefficients do not reflect particular shocks to cities or sectors in a given year.

Third, existing research on Chinese financial reform has mostly concentrated on the outcomes of GDP and productivity (Guariglia and Poncet, 2008; Lai et al., 2016; Wang, 2017). Despite the growing evidence of a link between financial development and export performance as well as the role of trade as an engine for development in China, little work has explicitly related banking reform to Chinese exports. Our focus on private firms is especially relevant here, as their exports grew at the impressive annual rate of 90% between 1997 and 2012, five times the average growth rate of Chinese exports. Our findings on the positive role played by CCBs with respect to the key Chinese export sector sheds light on an effective policy tool that can consolidate the benefits of Chinese economic opening. We also investigate the mechanisms at work behind the increase in private exports made possible by the development of CCBs. Export gains appear to pass through the destination margin: the easing of financial frictions seems to allow domestic private companies to export to more countries. We also find evidence, albeit less robust, suggesting that cheaper credit enables exporters to reduce their export prices, and therefore to export more.

In addition to the contributions cited above, our work relates to two other literatures. First, we provide an additional test of the well-known hypothesis that financially more-developed countries export relatively more from financially more-vulnerable industries (Beck, 2002; Manova, 2013). As we rely on regional variations within one single country (China), our identification strategy of comparing Chinese cities avoids the problem of omitted legal and institutional-system variables that arises in cross-country analysis. Second, we are in line with the empirical finding that FDI may relax domestic firms' credit constraints (Harrison et al., 2004), notably in the Chinese context of state intervention in finance (Guariglia and Poncet, 2008). China's financial repression has made it difficult for domestic private firms to enter into contracts with foreign buyers, creating fertile conditions for foreign firms to extend equity financing instead (Huang, 2003). Our results suggest that the relative advantage of FDI in mitigating the debilitating effect of malfunctioning national state-owned commercial banks on private exports falls as CCBs expand.

As we consider the emergence of city commercial banks, we effectively study a part of what Ferri (2009) refers to as the "New Tigers". We confirm that CCBs are beneficial for domestic private firms. Ferri finds that the new banks perform better than the state-owned commercial banks that are burdened with non-performing loans from unprofitable state-owned enterprises. Our conclusion that CCB presence does not prevent preferential lending to state firms also resonates with the conclusion in Ferri (2009) that the "New Tigers" cannot by themselves solve China's deep-rooted financial inefficiency, as state-owned commercial bank reform is necessary for better banking in China.

The remainder of this article is structured as follows. In the following section we describe the emergence of city commercial banks and provide preliminary evidence suggesting that the development of CCBs improves the financing of domestic private activities mainly by providing these firms with cheaper credit (deepening financial markets) rather than by increasing the number of those with access to a loan (broadening financial markets). Section 3 presents our data and financial-dependence indicators, and provides evidence that credit constraints restrict domestic private firms' export activity. Section 4 sets out our empirical strategy to analyze the effects of city commercial banks on domestic private exports. In Section 5 we dig deeper into the mechanisms behind the measured rise in domestic private exports, and discuss the ability of CCBs to end discrimination against private companies compared to state-owned enterprises in terms of access to finance. The last section concludes.

2. The development of city commercial banks

This section provides a short background to the evolution of China's financial system and the reform giving rise to city commercial banks (CCBs). This helps us to understand why the number of CCB branches in a city can be seen as a proxy for the liberalization of the local financial sector in China. We then conduct an exploratory statistical exercise on the link between CCBs and access to credit of domestic private firms.

2.1. The rise of city commercial banks

Reforms of China's notoriously inefficient, state-centered banking system has taken two complementary directions since their launch in the 1980s. The first focused on reforming the four state-owned commercial banks (the Bank of China, China Construction Bank, the Agricultural Bank of China, and the Industrial and Commercial Bank of China). The reforms did not proceed monotonically. The latest ingredients to the convulsive restructuring of the national state banks in the 2000s include the injection of new capital, the divestment of pervasive Non-Performing Loans, the introduction of strategic private and foreign investors, and the public listing on domestic and foreign stock exchanges (Lin et al., 2015). Despite those reforms and the new market-based regulatory framework, the distribution of credit by the four state-owned banks seems to have remained largely policy motivated or politically motivated, rather than commercially motivated (Fu and Heffernan, 2009; Li et al., 2008; Podpiera, 2006; Zhang et al., 2016).

The second facet of Chinese banking reforms relates to rising competition from domestic financial intermediaries other than the big state-owned commercial banks. A variety of new bank types started to appear in the Chinese financial system in the mid-1980s, including urban and rural credit cooperatives, trust and investment companies, financial companies, and other institutions. Their role remained nevertheless minor for the most part of the 1990s. At the launch of the 1994 reform, the four state-owned banks held 80% of the total deposits and loans in the banking system. Two major changes occurred. First, there is the development of urban credit co-operatives (UCCs), which later became city commercial banks (CCBs). Second, there is the creation of new banks, including the

creation of the current dozen national and regional joint-stock commercial banks, eight of which have foreign investors.[5]

The UCCs were the most dynamic of the new financial institutions to emerge in the mid-1980s. Their comparative advantage in using local information and monitoring and enforcing sanctions on borrowers allowed them to circumvent better the traditional information asymmetry than national state-owned banks (Girardin and Ping, 1997). They were also subject to less regulation and were thus able to respond effectively to the growing demand for investment loans by enterprises, both in the state and non-state sectors. Starting in 1995, the UCCs were restructured into urban cooperative banks which were renamed CCBs in 1998. The State Council's official announcement in 1995 states that the new banks should be established in steps, with first experiments in Beijing, Tianjin, Shanghai and then expansion to another 35 large and medium cities.[6] The capital structure of to-be CCBs was set up so as to have local governments play a significant role, but also to include shares from urban enterprises and residents.[7] Although the CCBs were typically used by local governments to handle local projects and programs, the stated goal in the State Council's official announcement in 1995 was also to serve the local economy, especially small and medium urban enterprises. The CCBs differ from the state-owned banks in one important dimension: they have many shareholders. Although some of these shareholders may themselves be in the public sector, or belong to either the public administration or the SOE system, the plurality of shareholders encourages better corporate governance and performance, as it significantly reduces political interference in bank business (Ferri, 2003; Ferri, 2009).

The growth of CCBs reflects the government's efforts to liberalize and reform the banking sector. At first city commercial bank business was confined to the urban districts of their home city. From 2006 onwards some CCBs that met certain size and experience conditions were allowed to open branches in other cities in their home province,[8] and even in other cities in other provinces.[9] In 2007, CCBs were allowed to expand their operations to non-urban areas, further entering into head-on competition with traditional financial actors. These successive reforms have reduced the geographical segmentation of the banking market, which was one of the main restrictions on the ability of the CCBs to compete effectively with public commercial banks. They also prompted a series of mergers and reorganization intended to address another CCB weakness: their smaller size. Starting in 2005, a number of CCBs merged so as to create larger entities. This restructuring continued as the government encouraged qualified domestic and foreign strategic investment in the CCBs, and even allowed some of them to make an initial public offering on the Hong Kong Stock Exchange.

Fig. 1 shows that the number of city commercial banks throughout the country rose sharply in the 2000s. There were 113 active city commercial banks in 2012, as opposed to 62 in 1997. The number of their branches reached 9000 in 2012. Data on the number of CCBs and of their local branches is taken from the official website of China's Banking Regulatory Commission.[10] In 1995, CCBs operated in only 21 cities, a figure that rose to 70 in 1997, 109 in 2002, 164 in 2007 and 291 in 2012. CCBs started in a small number of, mostly provincial capital, cities. By 2012, the last year in our sample, CCB operations had expanded to cover most Chinese cities.

Fig. 2 shows that the history and extent of bank presence vary across regions in mainland China. In absence of data on Hainan, we split the remaining 30 provincial-level administrative units of China into six subgroups that differ in terms of income, internationalization, and reform orientation. We first isolated the three coastal province-level cities of Beijing, Tianjin, and Shanghai, which are distinguished by their high GDP per capita, high political and economic power, and pioneering nature in the creation of CCBs. As indicated above in the section, it was in these three municipalities that the first experiments with CCBs were undertaken as early as 1995. The second group comprises the three provinces of Northeast China "Heilongjiang, Jilin, and Liaoning" also known collectively as Inner Manchuria. This is the old heavy-industry center of China and as such retains a strong presence of state-owned enterprises. This region, often referred to as the Rust Belt in China, has seen its economic importance erode over time with the rapid growth of the coastal provinces. Unlike the vigorous process of economic reform in the latter areas, the economic modernization of North-East China has been hampered by the weight of state-owned enterprises and their close links with state-owned banks. The remaining provinces are split into four groups of six provinces each. Two groups correspond to peripheral and poor locations in the western parts of China, targeted by the "Western Development" plan launched in 2000. They include six Western provinces (Gansu, Guizhou, Qinghai, Shaanxi, Sichuan, and Yunnan), five autonomous regions (Guangxi, Inner Mongolia, Ningxia, Tibet, and Xinjiang), and one municipality (Chongqing).

The two other groups correspond to the central and coastal provinces, respectively. The latter group includes the most internationally oriented provinces, those most committed to economic reform, and, relatedly, those with high and rapidly growing per

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[5] The joint-stock banks emerged through restructuring the former wholly state-owned entities. The government often maintained majority ownership of the stock but allowed the ownership structure to embrace private (including foreign) capital. Six banks operate on a regional basis (mostly in the coastal area).

[6] The official "Notice of the State Council on the Establishment of Urban Cooperative Banks" is accessible online at:http://www.jiangsu.gov.cn/xxgk/project/P0201605/P020160504/P020160504361298284074.pdf.

[7] The share arrangements are that the local-government share should be about 30%, while a single legal entity cannot hold a share of over 10% and single person cannot hold a share of over 2%. See the official 1997 notice from the People's Bank of China: "Provisions on the administration of Urban Cooperative Banks", accessible online at: http://www.law-lib.com/LAW/law_view.asp?id=13362.

[8] The conditions for opening branches in other cities in the same province include: being in existence for over three years with total assets of at least 15 billion Yuan; registered capital (paid in capital) of at least 500 million Yuan; a capital-adequacy ratio of at least 8%; and a core capital-adequacy ratio of at least 4%. See the "Notice of the China Banking Regulatory Commission on Issuing the Measures for the Administration of Non Home-City Branches of City Commercial Banks".

[9] Stricter conditions apply for opening branches outside of the home province. See the "Notice of the China Banking Regulatory Commission on Issuing the Measures for the Administration of Non Home-City Branches of City Commercial Banks".
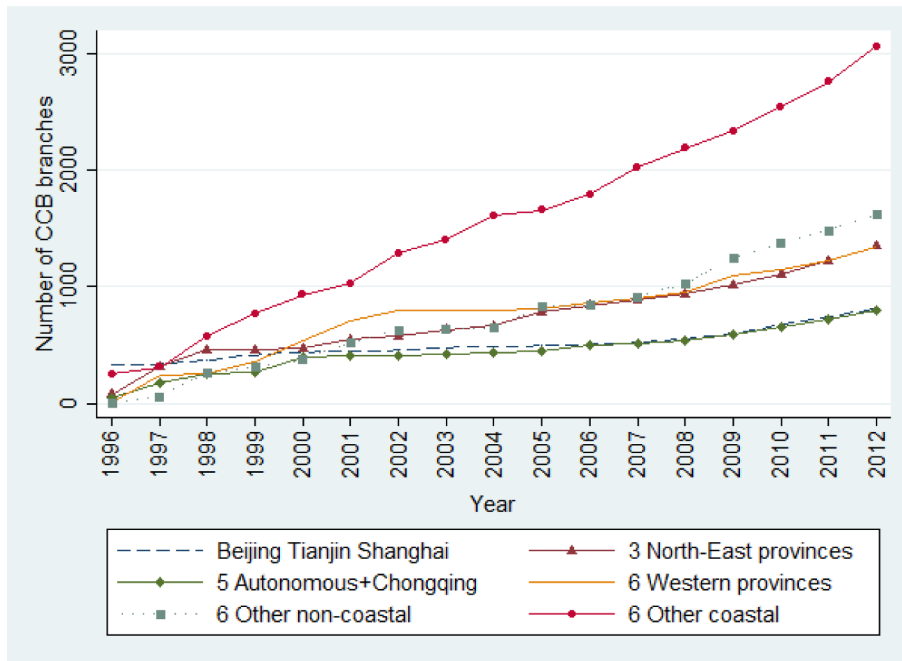
[10] The site address is http://www.cbrc.gov.cn/.

Fig. 2. Spatial heterogeneity of CCB development Source: Official website of China's Banking Regulatory Commission (http://www.cbrc.gov.cn/).

capita GDPs (Hebei, Shandong, Fujian, Jiangsu, Zhejiang, and Guangdong). In Fig. 2, the coastal provinces clearly show the most rapid expansion of CCBs, suggesting a strong positive correlation between per capita income (in level and growth) and local financial development. A third of the CCB branches in 2012 (3069 out of 8999) were in those six provinces.

Analyzing the possible determinants of the creation of a CCB is beyond the scope of this article. Nevertheless, it should be said that the positive correlation between income and CCB development is consistent with both the expected income gains from CCBs and the greater capacity of wealthy locations to engage in possibly disruptive banking reforms. The picture is further complicated by the fact that local authorities may be incentivized to support CCB development in their jurisdictions if they anticipate that it will prompt growth (Li and Zhou, 2005).

2.2. CCBs and private firms' access to credit

The literature unanimously concludes that CCBs are more cost- and profit-efficient than national state-owned banks (Ariff and Can, 2008; Fu and Heffernan, 2009; Berger et al., 2009). This better performance is attributed to their mixed ownership structure, which alleviates in part their policy-lending obligations (Ferri, 2009).

Local knowledge and privileged links with local authorities also improve the CCBs' assessments of the credit-worthiness of local companies (Martin, 2012). In light of these features, we expect CCBs to have better capital-allocation practices than the dominant national state-owned banks so that their development would improve the credit-market conditions of private firms. Private enterprises receive a significant share of CCB loans: Zhu et al. (2012) find that 14.5% of the top 10 borrowers from each CCB were private firms, a much higher figure than the corresponding figure for foreign firms (6.16%). Although the data are not directly comparable as they are calculated over all loans, Firth et al. (2009) find that the share of non-state enterprises in loans from state-owned banks is only 7%, confirming that CCBs are more likely to lend to private firms than traditional national state operators. Another channel of impact could be the number of private firms since ownership itself could be endogenous to banking behavior (Brandt et al., 2005). More favorable credit conditions could therefore facilitate the creation of private companies.

However, it is not clear that CCBs are completely immune from the systematic lending bias in favor of the state sector. The existing institutionally-grounded political pecking order of firms in China leads to the systematic over-allocation of loans to the state sector, even by profit-seeking banks. State firms enjoy preferential treatment from the government at a number of levels, including licensing approvals, government contracts, property rights protection, and taxation. This treatment combined with soft-budget constraints gives SOEs an unfair competitive edge that makes it rational for banks, and not just national state-owned banks, to lend them money.

The influence of the local government is especially prevalent, as CCB operations are largely confined to the local area. While some local governments are more efficient than the central government, others can be more bureaucratic and less developed. City commercial banks face pressure from local governments to grant policy loans for political purposes rather than profit maximization. Of

the top 10 borrowers from CCBs, 33% were state-owned firms or state-owned asset management companies (Zhu et al., 2012).[11] The extent to which CCBs reduce or reinforce discrimination against private firms in the allocation of credit remains an open question.

Before we look at the link between CCBs and domestic private exports in Section 4, we propose here an exploratory statistical exercise on the link between CCBs and access to credit of domestic private firms in China. We consider the two main theoretical channels through which CCBs can reduce financial discrimination against private firms: financial deepening and financial widening respectively (Chaney, 2016). The development of CCBs can give firms easier access to cheap external financing (a deepening of financial markets), or give a larger number of firms access to external finance (a widening of the financial markets).

We study these two margins using a comprehensive dataset of all medium and large enterprises in China from the Chinese National Bureau of Statistics between 1998 and 2012.[12] Brandt et al. (2014) describe this dataset in greater detail. There is no information on the origin of loans obtained by firms, but the data provide information on total interest and current liabilities. We follow Aghion et al. (2015) and calculate an effective interest rate on loan obligations. This indicator highlights the discrimination against domestic private firms in that they face an effective interest rate that is higher than that faced by state owned enterprises. On average over the period, it was 2.9% for state owned firms compared to 4.3% for domestic private enterprises. If the development of CCBs leads to a deepening of the financial markets, we should observe a reduction in the effective interest rate paid by the domestic private firms subject to credit constraints. Following the literature, we assume that the financial constraints faced by firms are intrinsically linked to the financial vulnerability of the sector in which they operate. We consider a sector's *External financial dependence* and *Asset tangibility* as sources of firms' exposure to and ability to overcome financial constraints (Manova, 2013). We hence follow Manova et al. (2015), and calculate the first principal component of external finance dependence and asset tangibility. As a robustness check we also use a measure of short-run working capital needs (*Inventories ratio*). This indicator, first proposed by Raddatz (2006), is the ratio of inventories to annual sales and focuses on variable costs and liquidity aspects. Section 3 provides a more detailed presentation of these indicators and data sources.

Table 1 examines whether the average cost of credit paid by Chinese private companies tends to decrease with the local development of CCBs, especially if they operate in a financially vulnerable sector. The explained variable is thus the average effective interest rate on loan obligations for domestic private companies at the level of a city-sector pair in a given year.[13]

The first two columns of Table 1 use our preferred indicator of financial vulnerability that combines financial dependence and asset tangibility. The last two columns use the inventories ratio, which focuses on the latter aspect of short-term liquidity needs.

The results presented in Table 1 show a negative association between the development of CCBs and our proxy for the cost of credit for private companies, which is sharper in sectors with greater financial vulnerability. This suggests that the development of CCBs provides constrained firms easier access to cheap external financing (a deepening of financial markets).

Table 2 follows a similar approach to explore the possible widening of financial markets as a result of the development of CCBs. The explained variable is the share of domestic private firms with a loan. It is calculated for each city-sector-year triad as the share of private companies that declare positive interest payments. A widening of the financial markets corresponds to a reduction in the fraction of financially constrained firms. We hence investigate whether the development of CCBs raises the share of firms with a loan especially in the financially dependent sectors.

None of the coefficients are significant in Table 2. The results suggest the absence of the financial widening effect. Overall the results from the two tables indicate that the development of CCBs improves the financing of private domestic activities mainly by providing these firms with cheaper credit (deepening financial markets) rather than by increasing the number of those with access to a loan (broadening financial markets).

3. Credit constraints and exports in China

In this section, we provide evidence of the systematic influence of credit constraints on China's export performance. We also show that these constraints produce an advantage for foreign-owned firms over domestic private firms and that the advantage grows with sectoral financial vulnerability. The credit constraints of the different firm types are identified from the way in which the finance content of exports varies by firm-ownership type (Jarreau and Poncet, 2014; Manova et al., 2015).

3.1. Trade data

Our key dependent variable is export flows, disaggregated by city, product, and type of firm. Annual export values are taken from Chinese Customs. The values are provided by city[14] at the HS 8-digit product level separated by firm ownership. We can thus distinguish between state-owned enterprises (SOEs),[15] private domestic firms, and foreign-owned firms. These latter include fully foreign-owned firms and joint ventures (with foreign ownership of under 100%). Our sample covers 260 Chinese cities.

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[11] The remaining loans went to development and land-trading companies, and local governments or government-affiliated companies.

[12] Unfortunately there are no data for the year 2010.

[13] Sectors are defined as 4-digit GB/T sectors and are matched to 36 ISIC three-digit sectors for which Manova et al. (2015) provide measures of financial vulnerability.

[14] Mainland China is divided into four municipalities (Beijing, Tianjin, Shanghai and Chongqing) and 27 provinces which are further divided into prefectures.

[15] We define SOEs as including collectively-owned firms.

Table 1
CCBs and domestic private firms' access to loans: financial deepening.

Dependent variable:	Average effective interest rate paid by the domestic private firms (city-sector, 1998–2012) in %			
Financial vulnerability measure	First Principal Component of financial dependence and asset tangibility		Inventories ratio	
	(1)	(2)	(3)	(4)
No. of CCB branches	−0.0032		0.0036	
	(0.0021)		(0.0055)	
No. of CCB branches × Fin. Vuln.	− 0. 0013^c	− 0. 0012^c	−0.0419	− 0. 0485^c
	(0.0006)	(0.0007)	(0.0292)	(0.0278)
Sector-year Fixed Effects	Yes	Yes	Yes	Yes
City-sector Fixed Effects	Yes	Yes	Yes	Yes
City-year Fixed Effects	No	Yes	No	Yes
Observations	305,193	305,193	305,193	305,193
R-squared	0.372	0.391	0.372	0.391

This table shows the effect of bank liberalization, proxied by the number of local city commercial bank branches, on the average effective interest rate paid by the domestic private firms in a city across sectors, depending on their financial vulnerability. Heteroskedasticity-robust standard errors appear in parentheses. Standard errors are clustered at the city level. ^{a}, ^{b} and ^{c} indicate significance at the 1%, 5% and 10% confidence levels. Financial-vulnerability indices at the sector level are taken from Manova et al. (2015).

Table 2
CCBs and domestic private firms' access to loans: financial widening.

Dependent variable:	Share of domestic private firms with a loan (city-sector, 1998–2012) in %			
Financial vulnerability measure	First Principal Component of financial dependence and asset tangibility		Inventories ratio	
	(1)	(2)	(3)	(4)
No. of CCB branches	−0.002		−0.006	
	(0.019)		(0.028)	
No. of CCB branches × Fin. Vuln.	−0.001	−0.005	0.026	−0.213
	(0.005)	(0.005)	(0.146)	(0.130)
Sector-year Fixed Effects	Yes	Yes	Yes	Yes
City-sector Fixed Effects	Yes	Yes	Yes	Yes
City-year Fixed Effects	No	Yes	No	Yes
Observations	311,733	311,733	311,733	311,733
R-squared	0.441	0.481	0.441	0.483

This table shows the effect of bank liberalization, proxied by the number of local city commercial bank branches, on the share of domestic private firms that have obtained a loan in a city across sectors, depending on their financial vulnerability. Heteroskedasticity-robust standard errors appear in parentheses. Standard errors are clustered at the city level. ^{a}, ^{b} and ^{c} indicate significance at the 1%, 5% and 10% confidence levels. Financial-vulnerability indices at the sector level are taken from Manova et al. (2015).

The Chinese 8-digit classification is not consistent over time. To account for the changes following the different revisions of the international harmonized system (HS) classification in 2002, 2007, and 2012, we aggregate the data to the 6-digit level of the 1996 HS classification. This aggregation[16] yields a panel of 4581 products over the 1997–2012 period.

In our empirical analysis, the HS 6-digit product-level trade flows are matched to 36 ISIC three-digit sectors for which Manova et al. (2015) provide measures of financial vulnerability (as used in Section 2.2). We use the correspondence table between the international trade nomenclature and the ISIC Rev. 2 categories from World Integrated Trade Solution (WITS).[17]

3.2. Empirical setting

Our empirical approach directly builds on Manova et al. (2015) and identifies the effect of credit constraints on exports from the variation across firm types. Our dataset is constructed to provide observations every year from 1997 to 2012 on any city c, product k, and firm type F triad which recorded a positive export flow at some point over this period.

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[16] The correspondence tables between HS 6-digit products over time come from UNCTAD and can be found at https://unstats.un.org/unsd/trade/classifications/correspondence-tables.asp.
[17] This table is taken from http://wits.worldbank.org/product_concordance.html.

Table 3

Firm-ownership types and export-structure distortions.

Dependent variable:	Ln export value (city/HS6/firm type/year)			
Financial vulnerability measure	First Principal Component of Fin dependence and Asset tang.	Inventories ratio	First Principal Component Fin dependence and Asset tang.	Inventories ratio
	(1)	(2)	(3)	(4)
Fin. Vuln. × Domestic Private Firms	-0.376^a	-7.980^a	-0.343^a	-6.505^a
	(0.0401)	(0.965)	(0.039)	(0.950)
Fin. Vuln. × Joint-Ventures	-0.145^a	-5.261^a	-0.145^a	-5.276^a
	(0.031)	(0.971)	(0.030)	(0.958)
Fin. Vuln. × State-owned Firms			-0.233^a	-1.909^b
			(0.036)	(0.937)
City-firm type-year Fixed Effects	Yes	Yes	Yes	Yes
City-HS6 product-year Fixed Effects	Yes	Yes	Yes	Yes
Observations	6,500,133	6,500,133	12,232,419	12,232,419
R-squared	0.700	0.700	0.665	0.665

The table shows how the effect of credit constraints on city-product exports across sectors differs across different firm types. Columns 1 and 2 compare domestic private firms and JVs to fully-foreign firms. Columns 3 and 4 compare domestic private firms, state firms and JVs, compared to fully-foreign firms. Heteroskedasticity-robust standard errors are reported in parentheses. Standard errors are clustered at the city level. [a], [b] and [c] indicate significance at the 1%, 5% and 10% confidence levels. Financial-vulnerability indices at the sector level are from Manova et al. (2015).

We regress our dependent variable in Eq. (1), the export value from city c in HS6-product k at year t, by firm type F, on the interaction of Financial Vulnerability$_s$ and firm-type dummies. We control for the local determinants of specialization and local supply shocks specific to given firm-ownership types through a variety of fixed effects. We use fully foreign-owned firms, i.e. those that are the least financially-constrained, as the omitted category.

$$\ln \text{Export}_{ckt}^F = \beta^F \text{ Financial Vulnerability}_s \times \text{Firm type}^F + \mu_{ckt} + \nu_{ct}^F + \epsilon_{ckt}^F \tag{1}$$

Here Financial Vulnerability$_s$ is one of our two indices at the sector level s described above in Section 2.2. Our sample consists of a panel of yearly observations for 260 Chinese cities.

Our baseline specification includes city-HS6 product-year fixed effects, μ_{ckt}, as well as city-firm type-year fixed effects, ν_{ct}^F. The former picks up the level effect of Financial Vulnerability$_s$, so that we measure how the other firm types differ from the benchmark of fully-foreign firms in their specialization in sectors with different financial vulnerability.

3.3. Private ownership of domestic firms and credit constraints

Table 3 show the estimation results from Eq. (1).[18]

The first two columns directly build on Manova et al. (2015) and consider three firm types, with domestic private firms and joint-ventures (JVs) being compared to fully-foreign owned firms. We expect a gap between the exports of domestic private and fully-foreign firms that rises with sectoral financial vulnerability. A similar pattern, although less-pronounced, is expected for joint ventures.

We include state-owned firms in columns 3 and 4 of Table 3. The conventional wisdom in China is that state-owned firms benefit from "soft budget constraints" via state-owned banks, as state bank lending is still partly political rather than commercial (Park and Sehrt, 2001). Although we would thus expect state-owned firms also to have a comparative advantage over domestic private firms in financially-vulnerable sectors, the pervasive inefficiency and regulations associated with the former may prevent them from realizing this advantage. Despite their preferential access to loans from state-owned banks, state-owned firms appear much less efficiently-managed than private firms (Dollar and Wei, 2007; Khandelwal et al., 2013; Song et al., 2011). The relative sorting of SOEs according to the sectoral need for external funds is less informative regarding their credit constraints as their export decisions in part reflect governmental priorities rather than profit-maximization (Manova et al., 2015). A variety of subsidies, regulations or softer influence allows the Chinese government to exert considerable control over state-owned firms, notably with respect to the extent of their presence in certain industries.

The results in Table 3 confirm that domestic private firms export significantly less than fully-foreign firms in financially more-dependent industries, relative to less financially-dependent industries. They also export significantly less than do joint ventures, but less markedly so. Private firms thus seem to have a greater comparative disadvantage over fully-foreign-owned companies in sectors where there is more external-finance dependence and less tangible assets (column 1). In column 2 we compare sectors with different inventories-to-sales ratios (signaling working-capital needs) and find that private firms have a systematic disadvantage in inventory-

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[18] Some export figures will thus be zero in some years. The dependent variable is $\ln(1 + \text{Export}_{ckt}^F)$, so as to include these zero export figures.

intensive sectors with greater finance requirements due to longer production cycles. The results hence confirm that credit constraints vary by firm type and that foreign ownership alleviates the impact of financial-market imperfections on trade (Manova et al., 2015; Jarreau and Poncet, 2014).

The last two columns of Table 3 show that state-owned firms have a comparative disadvantage relative to foreign firms in financially-sensitive sectors, as attested by the negative significant coefficients on the interaction between sectoral financial vulnerability and state-ownership. The sensitivity of state-owned firm exports to financial vulnerability is nevertheless smaller than that for private firms, in line with their preferential treatment and access to external finance from the domestic banking system (Dollar and Wei, 2007).

Overall Table 3 shows that domestic private firms under-perform relative to fully-foreign firms and that the gap widens with financial vulnerability. The results are virtually unchanged when we account for state-owned firms.[19]

4. City commercial banks and constraints on private-firm exports

We here use a difference-in-difference approach to ask whether the dampening effect of credit constraints on domestic private firms' exports was affected by the development of local banks in China. If the development of CCBs produced effective financial liberalization, we expect this to be especially beneficial for discriminated private firms, and in general that the impact will be ordered by sectoral financial vulnerability.

Eq. (2) asks whether private firms in cities with more CCBs exported more, and especially in sectors with greater financial vulnerability.

$$\ln \text{Private Export}_{ckt} = \beta \, \text{City Commercial Banks}_{ct} \times \text{Financial Vulnerability}_s$$
$$+ \mu_{ck} + \nu_{kt} + \lambda_{ct} + \epsilon_{ckt} \tag{2}$$

Here Private Export$_{ckt}$ is the export value of private domestic firms in city c in HS 6-digit product k in year t. City Commercial Banks$_{ct}$ is measured by the number of city commercial bank branches in year t in city c. Financial Vulnerability$_s$ is one of our two indices of financial vulnerability at sector level s.

Our specification includes city-product (μ_{ck}) and product-year (ν_{kt}) fixed effects. The former capture all the time-invariant characteristics of a particular city-product combination that might affect the export performance of private firms for a certain good in a certain city: examples might include local factor endowments or local regulations and know-how. These absorb the level effect of Financial Vulnerability$_s$. Our analysis hence exploits the within-city-product variation in export performance. Product-year fixed effects are also included to account for yearly differences in exports between products from both time-varying demand and supply shocks at the product level.

Our preferred specification also includes city-year fixed effects λ_{ct} that capture time-varying local factors and shocks, including local economic performance and financial development. These also absorb the level effect of City Commercial Banks$_{ct}$ so that our variable of interest, City Commercial Banks$_{ct}$ × Financial Vulnerability$_s$, is identified from the variation between sectors of the export effect of a change in the number of CCB branches in a city. This specification ensures that our results do not reflect differences between cities in terms of economic performance or export potential.

We cluster standard errors at the city-level to take into account the correlation of shocks on the different export flows within cities (Moulton, 1990).

4.1. City commercial banks and exports of private firms

Table 4 shows, for our two indicators of financial vulnerability, that local bank development causes private-firm exports to grow more in sectors where finance is most needed, suggesting that credit constraints have been loosened. Columns 1 and 5 show the estimation results from Eq. (2) without the dyadic city-year fixed effects but including only city-HS6 product and HS6 product-year dummies. We obtain an estimate of the impact of the presence of CCBs in the city on the exports of domestic private firms. This estimate is positive and significant in both columns, suggesting export gains from bank presence. As these estimates are potentially subject to endogeneity concerns, our main identification strategy exploits the extent to which these export gains vary with financial vulnerability, and focuses on the interaction between CCB presence and financial vulnerability at the sector level. This coefficient, β, reveals that export gains are larger in sectors with greater external finance dependence and fewer tangible assets (column 1) and a higher inventories-to-sales ratio, signaling greater working-capital needs (column 5). CCB development thus relaxes the financial constraints on private exporters.

One possible concern in these results is that the CCB coefficients may pick up the effects of omitted variables that are correlated with financial frictions and influence export performance. To allay this worry, the later columns show our benchmark specification in Eq. (2), which includes city-year fixed effects. The estimated coefficients hence do not reflect local features (such as comparative advantage or reforms) or time-varying supply or demand conditions that are particular to a product. The CCB presence variable logically drops out here, and we continue to find that the CCB effect of private-firm exports rises with sectoral financial vulnerability.

We may also consider that some time-varying local factors have differential effects on exports across sectors and are possibly

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[19] Adding data for state-owned firms affects the estimates of the City-HS6 product-year fixed effects, which explains the minor differences in the coefficients for private domestic firms and JVs in the two panels of Table 3.

Table 4

Number of CCB branches and exports of private firms.

Dependent variable:	Ln domestic private export value (city/HS6/year)							
Financial vulnerability measure	Principal Component of Fin dep and Asset tang.				Inventories ratio			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
No. of CCB branches	0.034^a				0.010^a			
	(0.003)				(0.003)			
No. of CCB branches × Fin. Vuln.	0.0019^a	0.0019^a	0.0011^c	0.0012^b	0.144^a	0.136^a	0.097^a	0.097^a
	(0.0005)	(0.0005)	(0.0005)	(0.0005)	(0.018)	(0.019)	(0.021)	(0.021)
Ln GDP/POP × Fin. Vuln.			0.0251	0.020			2.524	2.528
			(0.049)	(0.049)			(2.135)	(2.131)
FDI/GDP × Fin. Vuln.			-0.072^a	-0.073^a			-2.047^a	-2.047^a
			(0.015)	(0.014)			(0.575)	(0.576)
FDI Zones × Fin. Vuln.			0.086^c	0.083^c			1.793	1.795
			(0.046)	(0.046)			(1.564)	(1.568)
High-Tech Zones × Fin. Vuln.			−0.062	−0.060			−1.051	−1.053
			(0.096)	(0.096)			(3.636)	(3.637)
Processing Zones × Fin. Vuln.			0.158^a	0.152^a			9.817^a	9.821^a
			(0.036)	(0.035)			(1.505)	(1.492)
Trade Zones × Fin. Vuln.			0.253^a	0.255^a			5.395^b	5.394^b
			(0.079)	(0.080)			(2.109)	(2.109)
Foreign banks × Fin. Vuln.				0.077^b				−0.060
				(0.036)				(1.358)
HS6 product-year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
City-HS6 product Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
City-year Fixed Effects	No	Yes	Yes	Yes	No	Yes	Yes	Yes
Observations			5,350,724				5,350,724	
R-squared	0.581	0.635	0.635	0.635	0.581	0.635	0.635	0.635

This table shows the effect of local CCB development, proxied by the number of local city commercial bank branches, on city-product exports of Chinese private firms across sectors, depending on their financial vulnerability. Heteroskedasticity-robust standard errors appear in parentheses. Standard errors are clustered at the city level. ^{a}, ^{b} and ^{c} indicate significance at the 1%, 5% and 10% confidence levels. Financial-vulnerability indices at the sector level are taken from Manova et al. (2015).

correlated with CCB presence. Columns 3 and 4 as well as columns 7 and 8 account for the possibility that time-varying differences in economic conditions may also relax credit constraints. Each column considers sectoral financial vulnerability as well as its interactions with a number of macro conditions. In columns 3 and 7 we look at per capita GDP, as well as several variables reflecting the degree of foreign-capital inflows and the existence of location-specific factors.[20] This allows us to take into account the fact that richer cities and special economic zones are more likely to be financially developed, and that FDI may be used to alleviate the costs associated with the inefficient banking sector in China (Guariglia and Poncet, 2008). We use the ratio of inward FDI to GDP and several dummies indicating the presence of special zones in the city to attract overseas investment (Wang, 2013). Starting in 1979, the Chinese government established a multitude of spatially-targeted programs as jumping-off points for its internationalization strategy. After the first wave of special economic zones there were different rounds of FDI-promoting zones, high-technology development zones, export-processing zones etc. These zones offered a variety of tax and customs-duty incentives, and other types of preferential treatment to attract (notably foreign) investors.[21]

We take into account the different types of zones separately. We consider 4 types according to whether they focus respectively more on the attraction of foreign investment in manufacturing, technological development, processing trade promotion, and trade facilitation. The first category denoted FDI Zones corresponds to Special Economic Zones (SEZ) and Economic and Technological Development Zones (ETDZ) which both heavily focus on attracting FDI and tend to provide incentives for manufacturing. These zones often have a specific industry focus and are located away from city centers. The second category denoted High-Tech Zones includes the zones labeled Hi-Tech Development Zones, Hi-Tech Industrial Zones, High-Tech Industrial Development Zones etc. These zones are typically located inside city centers and aim at creating clusters of high-tech research institutions to foster research collaboration. They also provide incentives to attract foreign tech firms. A third category of zones called Export Processing Zones (EPZs) specifically target processing activities. Lastly, the category called Trade Zones includes the various zones such as Bonded Areas, Bonded Logistic Parks, and Bonded Ports which all focus on attracting FDI to increase imports and exports through cost reductions. The results suggest heterogeneous effects of financial vulnerability on exports depending on the place-based policy in question.

The estimated coefficients on the per-capita GDP interactions are insignificant, suggesting that the effect of economic

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[20] The city-level variables such as GDP, population and FDI come from China Data Online, provided by the University of Michigan.

[21] We know whether a city hosted such a zone in a given year from Chinese Customs trade data, which provide export flows aggregated by 5-digit location, where the fifth digit identifies the zone type (1 is a Special Economic Zone, 2 is an Economic and Technological Development Zone, 3 is a High-Tech Zone, 4 is a Bonded Zone, 5 is an Export-Processing Zone, and 6 is a Bonded Port).

development on the export performance of domestic private firms is the same for all industries. However, the interactions between sector-level financial vulnerability and FDI per capita yield negative coefficients, suggesting that the credit constraints on private firms are indeed tighter in localities with large FDI inflows. By contrast, we estimate positive and well-estimated coefficients on the interactions between sector-level financial vulnerability and the last two categories of zones focusing respectively on processing activities and trade facilitation. This suggests that the constraints on exports by private domestic firms are looser in localities that host such zones. Our coefficients of interest are nevertheless largely unchanged in these new specifications: our baseline estimates are not contaminated by the correlation of CCB development with foreign economic activity.

Accounting for the various place-based policies implemented in China partially allows us to take the emerging role of foreign banks into consideration. Starting in the 1990s, Special Economic Zones were the only place where foreign banks were allowed to open branches and conduct foreign-currency business with foreigners. In columns 4 and 8 of Table 4, we more directly account for the phasing out of the restrictions on foreign banks' local currency business after China's entry into the WTO in 2001. We follow Lai et al. (2016) and rely on a dummy that identifies when restrictions on foreign banks were lifted in each city.[22] The interaction between sectoral financial vulnerability and this proxy for foreign-bank entry is positive and significant only in one case out of 2. We suspect that this reflects insufficient variation: the restrictions were lifted in the same year (2006) for 240 of the 260 cities in our sample, and the 20 cities that liberalized earlier did so between 2001 and 2005. Reassuringly however, the inclusion of these variables does not change our key coefficients, suggesting that our estimates of the repercussions of CCB development do not reflect foreign-bank entry.

As we do not have an instrument for CCB development, we must of course be careful about causality. However, our conclusions do not require growing CCB presence to be exogenous to initial local financial inefficiency. Our measured trade gain for private companies from the presence of CCBs would actually be larger were CCBs to have developed as a response to demand from financially-constrained private firms. Financial reform in China is, however, seen as centrally-planned, rather than as a response to the political demand from private entrepreneurs. As explained in Section 2, the locations of the first would-be city commercial banks were announced by the State Council in 1995, and followed the typical Chinese-style strategy of incremental experimentation. While we do not argue that the procedure was random, we do believe that the development of CCBs was not dictated by prior financial conditions or the performance gaps across firm-ownership types. The literature nevertheless suggests that, once established, CCBs developed faster in more favorable (richer and more liberalized) locations (Ferri, 2009). The interaction terms between sectoral financial vulnerability and the proxies for income, FDI, place-based policies and foreign-bank presence are expected to account for this phenomenon.

Table B.1 in the Appendix B repeats the regression of column 4 of Table 4 to ensure our results are robust to a variety of tests related to the city of origin and the sector of exports. In column 1 we exclude cities from Guangdong province, which alone accounts for a quarter of China's exports. We want to ensure they do not fully drive our results. In column 2, we tackle China's interior-coast divide and exclude coastal provinces. Coastal locations are significantly different from the rest of the country: they have more outward-oriented economies and have had great success in attracting foreign investment. In column 3, we exclude autonomous regions (Inner Mongolia, Guangxi, Ningxia, Xinjiang, and Tibet), which stand out by their greater political autonomy, peripheral location and larger surface area. The exclusion of export flows from these different locations does not affect our results. In column 4, we drop export flows from cities for which restrictions on the entry of foreign banks were lifted early (before 2006, see footnote 22). In column 5, we exclude observations for the top and bottom 3 sectors in terms of financial vulnerability. In all cases, our key result holds.

Table B.2 in the Appendix B follows the same logic as Table B.1, with the ratio of inventories to annual sales as the measure of sectoral financial vulnerability. Again, we find evidence of trade gains for private companies from the presence of CCBs.

To summarize: our main findings show a relative rise in private-firm exports following the development of CCBs. This rise is sharper in sectors with greater financial vulnerability. We interpret this as evidence that CCBs improved the financial conditions faced by domestic private firms and dampened the repercussions of credit constraints on their export activity. This result is consistent with the observation made in Section 2.2 that the development of CCBs reduces the cost of external financing for domestic private firms. Two questions remain. First, how does the reduction of credit constraints increase exports by domestic private companies? We are interested here in the trade margins through which the effect passes. Second, have CCBs helped to smooth out the systematic disadvantage faced by domestic private firms vis-à-vis foreign-owned firms in export markets in financially-vulnerable sectors, as shown in Section 3.3? These are the two questions we address in the next Section.

5. Underlying channels and discussion

In this section we dig deeper into the mechanisms behind the rise in domestic private exports, and discuss the ability of CCBs to end discrimination against private companies compared to public companies in terms of access to finance.

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[22] As announced in the WTO accession protocol, restrictions were to be removed upon accession for Shanghai, Shenzhen, Tianjin and Dalian; within one year for Guangzhou, Zhuhai, Qingdao, Nanjing and Wuhan; within two years for Jinan, Fuzhou, Chengdu and Chongqing; within three years for Kunming, Beijing and Xiamen; and within four years for Shantou, Ningbo, Shenyang and Xi'an. By 2006, all restrictions were to be removed.

Table 5

Number of CCB branches and the destination country channel.

Dependent variable:	Ln number of countries served by domestic private exports (city/HS6/year)			
Financial vulnerability measure	Principal Component of Fin dep and Asset tang.		Inventories ratio	
	(1)	(2)	(3)	(4)
No.of CCB branches × Fin. Vuln.	0.00024^c	0.00022^c	0.018^a	0.016^a
	(0.0001)	(0.0001)	(0.004)	(0.005)
Ln GDP/POP × Fin. Vuln.	0.010	0.014	0.406	0.573
	(0.012)	(0.013)	(0.493)	(0.506)
FDI/GDP × Fin. Vuln.	-0.014^a	-0.013^a	-0.347^a	-0.316^b
	(0.004)	(0.005)	(0.132)	(0.134)
FDI zones × Fin. Vuln.	-0.006	-0.006	0.676^c	0.700^c
	(0.010)	(0.010)	(0.386)	(0.405)
High-Tech Zones × Fin. Vuln.	0.041^b	0.041^b	-0.899	-0.895
	(0.020)	(0.020)	(0.869)	(0.882)
Processing Zones × Fin. Vuln.	-0.003	-0.003	0.494^b	0.478^b
	(0.007)	(0.007)	(0.216)	(0.223)
Trade Zones × Fin. Vuln.	0.031^c	0.029^c	0.328	0.266
	(0.017)	(0.017)	(0.505)	(0.499)
Foreign banks × Fin. Vuln.		-0.015^b		-0.740^a
		(0.007)		(0.235)
HS6 product-year Fixed Effects	Yes	Yes	Yes	Yes
City-HS6 product Fixed Effects	Yes	Yes	Yes	Yes
City-year Fixed Effects	Yes	Yes	Yes	Yes
Observations	1,440,645	1,440,645	1,440,645	1,440,645
R-squared	0.852	0.852	0.852	0.852

This table shows the effect of local CCB development, proxied by the number of local city commercial bank branches, on the number of countries served by Chinese private firms at the city-product level across sectors, depending on their financial vulnerability. Heteroskedasticity-robust standard errors appear in parentheses. Standard errors are clustered at the city level. ^{a}, ^{b} and ^{c} indicate significance at the 1%, 5% and 10% confidence levels. Financial-vulnerability indices at the sector level are taken from Manova et al. (2015).

5.1. Trade margins

We use our trade data to investigate two different trade margins through which domestic private exports can expand as a result of CCB development. Exports of a given product by domestic private companies in a city may rise due to a change in the number of destination countries they serve (the destination margin) as well as a change in their average price (price margin). Credit market imperfections prevent producers from seizing all profitable export opportunities because producers have limited access to capital and incur trade costs in each market they enter (Manova, 2013). Aggregating across firms, this implies that local credit constraints restrict the number of destination countries served by local exports to suboptimal levels. Manova et al. (2015) find cross-country empirical results that confirm these expectations: they show that financially developed nations export to more markets, and that this effect is stronger in sectors that rely heavily on the financial system.

Table 5 follows the same empirical logic as Manova et al. (2015). It shows the results from the estimation of Eq. (2) with the number of countries served by the domestic private exports of a given city-HS6 pair in a year as the dependent variable. The interaction No. of CCB branches × Fin. Vuln. produces a positive and significant coefficient, so that the development of CCBs reinforces the relative rise in the number of countries served by domestic private exporters for financially dependent sectors. Our results are therefore consistent with those obtained by Manova et al. (2015) on a panel of countries. The relaxation of credit constraints following the development of CCBs in China seems to make it easier for domestic private companies to finance the fixed cost of exporting and thus to export to a larger number of countries.

Table 6 reproduces Table 5, but used the average unit value (value divided by volume) of city-product exports by domestic private firms as the dependent variable. We hence investigate the possibility that the reduction in the cost of credit resulting from the development of CCBs (identified in Section 2.2) may be partially passed on to export customers and may increase the total value exported. The results show that the interaction No. of CCBs × Fin. Vuln. attracts a negative coefficient, significant only when financial vulnerability is measured based on the short-run working capital needs. Although not very robust, the negative coefficient on No. of CCBs × Fin. Vuln. suggests that Chinese private exporters are able to pass on some of the savings made on their credit to their export prices, and thus export more.

Overall, the results of this section shed some light on the mechanisms at work behind the increase in private exports made possible by the development of CCBs. Some of the export gains come from destination margin adjustments: the easing of financial frictions allows domestic private companies to export to more countries. Some of the gains appear to come from exporters passing on a lower cost of credit to their customers, resulting in more exports, tough evidence in favor of this finding is somewhat weak.

Table 6

Number of CCB branches and the price margin.

Dependent variable:	Ln unit value of domestic private exports (city/HS6/year)			
Financial vulnerability measure	Principal Component of Fin dep and Asset tang.		Inventories ratio	
	(1)	(2)	(3)	(4)
No. of CCB branches × Fin. Vuln.	−0.00014	−0.00016	−0.010[a]	−0.011[a]
	(0.00014)	(0.00013)	(0.004)	(0.004)
Ln GDP/POP × Fin. Vuln.	0.042[b]	0.045[b]	1.644[a]	1.749[a]
	(0.018)	(0.019)	(0.460)	(0.468)
FDI/GDP × Fin. Vuln.	−0.016[b]	−0.015[b]	−0.049	−0.029
	(0.007)	(0.007)	(0.160)	(0.159)
FDI zones × Fin. Vuln.	−0.036	−0.035	−0.408	−0.392
	(0.044)	(0.044)	(1.424)	(1.410)
High-Tech Zones × Fin. Vuln.	0.027	0.027	0.284	0.286
	(0.028)	(0.029)	(0.973)	(0.983)
Processing Zones × Fin. Vuln.	−0.009	−0.009	−0.192	−0.202
	(0.007)	(0.007)	(0.263)	(0.257)
Trade Zones × Fin. Vuln.	−0.028	−0.029	0.060	0.021
	(0.025)	(0.025)	(0.699)	(0.706)
Foreign banks × Fin. Vuln.		−0.014[c]		−0.466[c]
		(0.007)		(0.263)
HS6 product-year Fixed Effects	Yes	Yes	Yes	Yes
City-HS6 product Fixed Effects	Yes	Yes	Yes	Yes
City-year Fixed Effects	Yes	Yes	Yes	Yes
Observations	1,440,423	1,440,423	1,440,423	1,440,423
R-squared	0.903	0.903	0.903	0.903

This table shows the effect of local CCB development, proxied by the number of local city commercial bank branches, on the average unit export value by Chinese private firms at the city-product level across sectors, depending on their financial vulnerability. Heteroskedasticity-robust standard errors appear in parentheses. Standard errors are clustered at the city level. [a], [b] and [c] indicate significance at the 1%, 5% and 10% confidence levels. Financial-vulnerability indices at the sector level are taken from Manova et al. (2015).

5.2. City Commercial Banks and the export-performance gap across firm-ownership types

We now ask whether the loosening of credit constraints on export activity of domestic private firms identified above is particular to the domestic private firms. We then calculate the analogous effect for foreign firms, which suffer less from financial constraints in China. Effective financial development would be expected to reduce the systematic advantage of fully-foreign over private firms in financially-vulnerable sectors found in Section 3.3.

To explore this possibility we refine our analysis of the effects of CCBs development by considering different firm-ownership types. Our approach corresponds to a triple difference. Accounting for firm types transforms Eq. (2) into Eq. (3):

$$
\ln \text{Export}^F_{ckt} = \beta \text{ City Commercial Banks}_{ct} \times \text{Financial Vulnerability}_s \times \text{Private}
$$
$$
+ \mu^F_{kt} + \nu^F_{ck} + \lambda^F_{ct} + \epsilon^F_{ckt} \tag{3}
$$

Here Export^F_{ckt} is the export value from city c in HS 6-digit product k at year t for firm type F. Fully-foreign firms are the omitted category to which other firm-types are compared. In our baseline specification we compare private domestic firms to fully-foreign firms; in a second stage we add state-owned firms so as to consider state firms' preferential access to financing.

We allow all the pairwise fixed effects in Eq. (2) to vary by firm-ownership type. The fixed effects ν^F_{kt} account for all time-varying demand and supply drivers of the export performance of a given HS 6-digit product, separately for domestic private and foreign firms. The inclusion of fixed effects μ^F_{ck} absorbs all the factors that are specific to a city-product pair and firm ownership type, and rules out the possibility that our estimates just reflect the pattern of firm types by factor intensity, which is correlated with financial characteristics. The city-year and firm-type λ^F_{ct} dummies capture the overall repercussions of local economic conditions (including financial development) on the exports of the various firm types. These fixed effects also take into account heterogeneous effects of financial reforms on exports for different types of firms. They also absorb any variable correlated with banking reforms that might affect the structure of exports across firm types (but in a way that does not depend on financial vulnerability). Our identification strategy, which filters the effect of CCBs by sector-level financial intensity, therefore focuses on factors that work through financial channels, as reflected by the heterogeneous effect by sectoral financial vulnerability.

Table 7 shows the estimated coefficients in Eq. (3). In columns 1 and 2, the key interaction is between CCB presence and our preferred measure of sectoral financial vulnerability that combines financial dependence and asset tangibility. Controls include interactions between sectoral financial vulnerability and GDP per capita, the FDI over GDP ratio and the various special zones respectively. Column 2 introduces the interaction between financial vulnerability and the proxy for the lifting of foreign-bank restrictions. Columns 3 and 4 follow the same logic, with the ratio of inventories to annual sales as the measure of sectoral financial

Table 7

Number of CCB branches and export performance gap between domestic private and foreign firms.

Dependent variable: Firm types	Ln export value (city/HS6/firm type/year) domestic private and foreign firms			
Financial vulnerability measure	Principal Component of Fin dep and Asset tang.		Inventories ratio	
	(1)	(2)	(3)	(4)
No. of CCB branches × Fin. Vuln. × Private	0.0014^a	0.0014^a	0.043^b	0.042^b
	(0.0005)	(0.0005)	(0.021)	(0.020)
Ln GDP/POP × Fin. Vuln. × Private	0.081	0.067	2.772	2.974
	(0.075)	(0.076)	(3.020)	(3.035)
FDI/GDP × Fin. Vuln. × Private	−0.035	−0.036	−0.156	−0.138
	(0.025)	(0.024)	(0.532)	(0.534)
FDI zones × Fin. Vuln. × Private	0.082	0.081	1.806	1.823
	(0.094)	(0.094)	(2.256)	(2.253)
High-Tech Zones × Fin. Vuln. × Private	−0.066	−0.065	−0.900	−0.915
	(0.118)	(0.119)	(5.214)	(5.175)
Processing Zones × Fin. Vuln. × Private	−0.037	−0.037	−0.648	−0.655
	(0.041)	(0.041)	(1.059)	(1.047)
Trade Zones × Fin. Vuln. × Private	−0.129	−0.127	−0.991	−1.019
	(0.084)	(0.084)	(1.674)	(1.683)
Foreign banks × Fin. Vuln. × Private		0.036		−0.644
		(0.041)		(0.998)
City-firm type-HS6 Fixed Effects	Yes	Yes	Yes	Yes
HS6 product-firm type-year Fixed Effects	Yes	Yes	Yes	Yes
City-firm type-year Fixed Effects	Yes	Yes	Yes	Yes
City-HS6 product-year Fixed Effects	Yes	Yes	Yes	Yes
Observations		6,480,356		6,480,356
R-squared	0.912	0.912	0.912	0.912

This table examines how the effect of local CCB development on city-product exports across sectors differs for domestic private and fully-foreign firms. Heteroskedasticity-robust standard errors appear in parentheses. Standard errors are clustered at the city level. ^{a}, ^{b} and ^{c} indicate significance at the 1%, 5% and 10% confidence levels. Financial-vulnerability indices at the sector level are taken from Manova et al. (2015).

vulnerability.

We consistently observe across columns that the export gains from CCBs are larger for domestic private firms than for fully-foreign firms, and grow with financial vulnerability. The coefficient β on "No. of CCB branches × Financial Vulnerability × Private" is positive and significant, indicating that the export gains from CCBs are greater for private firms and grow with sectoral credit constraints. This suggests that the gap between private and foreign firm export performance (due to the former's financial constraints) shrinks significantly as the number of CCB branches rises.

Our findings are robust to controls that allow the effect of economic development, foreign-capital availability and the presence of foreign banks on export performance to differ between private and foreign firms in a way that varies by industry. Even after including a large battery of fixed effects and controls, our estimates continue to convey a clear message: more CCB branches in a city is associated with the greater rebalancing of exports toward finance-intensive sectors for private firms compared to fully-foreign firms. As fully-foreign firms suffer from fewer financial constraints in China, the local presence of CCBs may effectively relax the credit constraints weighing on domestic private firms.

These estimates do not however allow us to determine whether CCBs have modified the well-documented institutionally-based political pecking order in Chinese firms, with a systematic lending bias in favor of the state sector. We thus add data on exports by state-owned firms to our panel of cities. We estimate Eq. (3) adding an interaction term between CCB presence and financial vulnerability for state-owned firms, and test whether the estimated coefficient is the same as that for private firms.

Table 8 shows the estimates using the same format as Table 7. For our two measures of sectoral financial vulnerability we add controls for the possibility that macro-economic conditions may vary by firm ownership in a way that is proportional to the sectoral financial sensitivity to credit constraints. We consider GDP per capita, FDI, policy zones (in columns 1 and 3), and also foreign bank operations (in columns 2 and 4). Adding information on state-owned firms does not modify the previous estimates of the interactions for private firms in Table 7.[23]

The coefficient on the interaction term between the number of CCB branches and sectoral financial vulnerability for state-owned firms is positive and significant in all specifications; as local CCB presence rises, state-owned firms, compared to fully-foreign firms, are more likely to reallocate their export activity to sectors with greater capital requirements, suggesting a relatively improved financial access for state firms.

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[23] Adding data for state-owned firms affects the estimates of the City-HS6 product-year fixed effects that are now identified using export flows from the three ownership types.

Table 8

Number of CCB branches and export performance gap between domestic private, foreign firms and state firms.

Dependent variable: Firm types	Ln export value (city/HS6/firm type/year) domestic private, foreign and state firms			
Financial vulnerability measure	Principal Component of Fin dep and Asset tang.		Inventories ratio	
	(1)	(2)	(3)	(4)
No. of CCB branches × Fin. Vuln. × Private	0.001^b	0.001^a	0.031^c	0.030^c
	(0.0004)	(0.0004)	(0.016)	(0.016)
Ln GDP/POP × Fin. Vuln. × Private	0.045	0.039	2.79	3.023
	(0.066)	(0.064)	(2.986)	(2.945)
FDI/GDP × Fin. Vuln. × Private	-0.031^c	-0.032^c	−0.338	−0.305
	(0.017)	(0.017)	(0.466)	(0.465)
FDI zones × Fin. Vuln. × Private	0.0454	0.0451	1.584	1.623
	(0.069)	(0.069)	(1.540)	(1.535)
High-Tech Zones × Fin. Vuln. × Private	0.024	0.027	-8.092^a	-8.119^a
	(0.221)	(0.222)	(1.961)	(1.930)
Processing Zones × Fin. Vuln. × Private	−0.027	−0.029	−0.288	−0.281
	(0.035)	(0.035)	(1.057)	(1.047)
Trade Zones × Fin. Vuln. × Private	−0.103	−0.103	−1.252	−1.296
	(0.073)	(0.073)	(1.709)	(1.718)
Foreign banks × Fin. Vuln. × Private		0.023		−0.914
		(0.037)		(1.018)
No. of CCB branches × Fin. Vuln. × State	0.0016^a	0.0016^a	0.054^a	0.054^a
	(0.0006)	(0.0006)	(0.020)	(0.020)
Ln GDP/POP × Fin. Vuln. × State	−0.035	−0.040	1.033	1.084
	(0.062)	(0.062)	(2.612)	(2.608)
FDI/GDP × Fin. Vuln. × State	−0.0034	−0.004	0.331	0.336
	(0.011)	(0.011)	(0.473)	(0.475)
FDI zones × Fin. Vuln. × State	0.054	0.054	−0.724	−0.733
	(0.060)	(0.060)	(1.718)	(1.715)
High-Tech Zones × Fin. Vuln. × State	0.089	0.093	1.476	1.442
	(0.075)	(0.075)	(1.494)	(1.456)
Processing Zones × Fin. Vuln. × State	0.0004	−0.002	0.858	0.862
	(0.036)	(0.037)	(1.094)	(1.080)
Trade Zones × Fin. Vuln. × State	-0.128^a	-0.129^a	−1.467	−1.455
	(0.041)	(0.042)	(1.509)	(1.501)
Foreign banks × Fin. Vuln. × State		0.025		−0.216
		(0.039)		(1.025)
City-firm type-HS6 Fixed Effects	Yes	Yes	Yes	Yes
HS6 product-firm type-year Fixed Effects	Yes	Yes	Yes	Yes
City-firm type-year Fixed Effects	Yes	Yes	Yes	Yes
City-HS6 product-year Fixed Effects	Yes	Yes	Yes	Yes
Observations	9,780,012		9,780,012	
R-squared	0.912	0.912	0.912	0.912
F-Test β Private = β State	4.35	2.48	4.35	4.57
Proba F	0.11	0.12	0.04	0.03

This table examines how the effect of CCB development on city-product exports across sectors differs for domestic private and fully-foreign firms. Heteroskedasticity-robust standard errors appear in parentheses. Standard errors are clustered at the city level. ^{a}, ^{b} and ^{c} indicate significance at the 1%, 5% and 10% confidence levels. Financial-vulnerability indices at the sector level are taken from Manova et al. (2015). The F-test at the foot of each column tests the equality of the estimated coefficients on the No. of CCB branches × Fin. Vuln. for domestic private and state-owned firms. The probabilities (below 0.1) indicate that this equality is rejected at the 10% confidence level.

The F-tests at the foot of the columns indicate that we reject (at the 10% confidence level)[24] the null hypothesis that the coefficients are equal for private firms and state-owned firms. This suggests that the systematic discrimination of private firms relative to state-owned firms has risen with CCB development. Hence, state-owned firms appear to enjoy a greater advantage over private firms in financially vulnerable sectors as CCBs expand.

Our conclusions are thus mixed. On the one hand, the development of CCBs has alleviated the restraining effect of China's domestic financial-market inefficiency on domestic private firm exports. This evolution has reduced the systematic advantage of foreign-owned firms over domestic private firms in export markets, as the former can access foreign capital markets or tap into funding from their parent company. However, when gauged against state-owned firms, the relative situation of private firms has not improved and has even deteriorated. The growing presence of CCBs has been shown to produce an export-growth bias in favor of financially-vulnerable sectors, which is greater for state-owned firms compared to domestic private firms. This casts doubt on the

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[24] In column 3, rejection is at the 12% confidence level.

capacity of CCBs alone to resolve the problem of capital misallocation in China.

6. Conclusion

This paper investigates the extent to which the development of city commercial banks (CCBs) has contributed to the reduction of financial distortions in China. We first look at the export patterns of 260 Chinese cities between 1997 and 2012 and identify lending discrimination against domestic private firms. We find that domestic private firms systematically under-perform compared to foreign affiliates in financially more vulnerable sectors. Our results suggest that the development of CCBs helps domestic private firms to obtain cheaper credit and raises domestic private firm exports disproportionately more in financially-dependent sectors. These export gains seem to pass through the destination margin, suggesting that domestic private companies are better able to finance fixed export costs and thus export to more countries. Furthermore, the local development of CCBs is associated with a more pronounced re-balancing of exports toward finance-intensive sectors for private firms compared to fully-foreign firms (considered here as the "unconstrained" reference group). This suggests that CCBs have helped to reduce the disadvantage of domestic private firms over foreign-owned firms in export markets related to the former's greater financial exclusion. Nevertheless, we observe an even stronger rebalancing for state-owned firms, casting doubt on the capacity CCBs to put an end to the systematic lending bias in favor of the state sector in China.

Appendix A. Financial vulnerability indicators

Financial constraints faced by firms are intrinsically linked to the financial vulnerability of the sector in which they operate (Rajan and Zingales, 1998; Manova et al., 2015). The two most commonly measured dimensions are the external financial dependence and the tangibility of a sector's assets, as they directly affect companies' exposure to financial constraints and their ability to overcome them.

The first reflects the requirement for outside funds arising from upfront long-term investments. It is calculated as the share of capital expenditures not financed out of cash flows from operations, and hence focuses on financial needs related to long-term investments. It is argued to correspond mostly to fixed costs (Manova et al., 2015). The second measure picks up the ability to overcome financial constraints, namely the capacity to raise external finance by pledging available tangible assets as collateral (*Asset tangibility*). Sectors differ in the tangibility of their assets that they used in production. This has an impact on their borrowing capacity, as more external finance can be raised by pledging assets such as plant, property, and equipment. The share of these tangible assets in total asset book value, *Asset tangibility*, is hence key in reducing financial vulnerability. Larger values of external financial dependence are assumed to increase firms' sensitivity to the availability of outside capital, while greater asset tangibility should have the opposite effect. These two sectoral measures capture conceptually distinct dimensions of financial vulnerability, and are not particularly highly correlated with each other (see Table A.1). For the sake of conciseness, we use the first principal component of financial dependence and asset tangibility as our preferred indicator. As can be seen in Table A.1, this measure (which we prefer in our empirical analysis) logically rises with *External finance dependence* and falls with *Asset tangibility*: sectoral financial vulnerability is larger when external finance needs are high but collateralizable assets are limited.

As a robustness check we also use a measure of short-run working capital needs (*Inventories ratio*). This indicator, first proposed by Raddatz (2006), is the ratio of inventories to annual sales. This focuses on variable costs and liquidity aspects. It reflects another dimension of firms' dependence on access to external financing: the time lag between investments and the receipt of the corresponding revenues.

All measures were calculated by Kroszner et al. (2007) for the 1980–1999 period following the method in Rajan and Zingales (1998) and Claessens and Laeven (2003), and are provided in the appendix to Manova et al. (2015). The measures are constructed from Compustat's annual industrial files for all publicly-traded U.S.-based companies. The indicator in each sector is the median firm value in each 3-digit ISIC sector. We cover 36 ISIC three-digit sectors. The use of US-based indices of sectoral financial

Table A.1
Correlations between industry-level financial vulnerability.

	Financial dependence	Asset tangibility	First Principal Component of Fin. dep and Asset tang.
Financial dependence	1		
Asset tangibility	−0.12	1	
	(0.50)		
First Principal component	0.81	−0.68	1
	(0.01)	(0.01)	
Inventories ratio	−0.23	−0.64	0.21
	(0.17)	(0.01)	(0.22)

This table shows the correlation between the various measures of sectoral financial vulnerability. Financial-vulnerability indices are measured for 36 sectors and are taken from Manova et al. (2015). The significance levels appear in parentheses.

vulnerability has become standard in the literature on the repercussions of financial liberalization following the pioneering work of Rajan and Zingales (1998). The hypothesis is that there is a technological component to financial vulnerability which is common to firms around the world. This component determines why industries differ in their need for credit, beyond the situation of the local economy in terms of liquidity constraints. As the United States is one of the better-developed financial systems, the variation in the use of financial services across US firms should pick up the technology-specific component of external finance needs.

In addition, the use of financial measures in US firm data ensures that financial vulnerability is exogenous to Chinese financial development. The indices would likely differ if calculated on Chinese firm data, showing that firms organize production differently in credit-constrained environments. Our identification does not rely on the level of sectoral financial vulnerability per se, but rather its ranking. This latter has been shown to be fairly persistent across countries and over time, which is consistent with it reflecting the innate technological component of sector financial vulnerability that is exogenous to individual firms (Claessens and Laeven, 2003; Kroszner et al., 2007).

Appendix B.

Table B.1
Number of CCB branches and exports of private firms: sample checks (1).

Dependent variable:	Ln export value of domestic private exports (city/HS6/year)				
Financial vulnerability measure	Principal Component Fin dep and Asset tangibility				
Exclusion from sample	Guangdong province	Coastal provinces	Autonomous regions	Cities with early foreign bank entry	Bottom/Top 3 sector Fin. Vuln.
	(1)	(2)	(3)	(4)	(5)
No. of CCB branches $\times$ Fin. Vuln.	0.0018^a	0.0025^a	0.0010^c	0.0016^c	0.0028^b
	(0.0005)	(0.0006)	(0.0006)	(0.0008)	(0.0014)
Ln GDP/POP $\times$ Fin. Vuln.	-0.026	-0.012	0.035	0.060	0.029
	(0.068)	(0.071)	(0.053)	(0.055)	(0.111)
FDI/GDP $\times$ Fin. Vuln.	-0.014	0.063^c	-0.070^a	-0.060^a	-0.144^a
	(0.040)	(0.037)	(0.015)	(0.015)	(0.033)
FDI zones $\times$ Fin. Vuln.	0.010^b	0.094^b	0.075	0.072	0.082
	(0.044)	(0.047)	(0.048)	(0.052)	(0.126)
High-Tech Zones $\times$ Fin. Vuln.	-0.114	-0.028	-0.050	-0.039	-0.075
	(0.084)	(0.061)	(0.108)	(0.096)	(0.226)
Processing Zones $\times$ Fin. Vuln.	0.140^a	0.113^a	0.157^a	0.080^c	0.372^a
	(0.033)	(0.039)	(0.036)	(0.043)	(0.079)
Trade Zones $\times$ Fin. Vuln.	0.249^a	0.090	0.276^a	-0.005	0.357^a
	(0.091)	(0.074)	(0.079)	(0.111)	(0.122)
Foreign banks $\times$ Fin. Vuln.	0.064^c	0.020	0.079^b		0.101
	(0.038)	(0.042)	(0.036)		(0.078)
HS6 product-year Fixed Effects	Yes	Yes	Yes	Yes	Yes
City-HS6 product Fixed Effects	Yes	Yes	Yes	Yes	Yes
City-year Fixed Effects	Yes	Yes	Yes	Yes	Yes
Observations	4,868,751	1,949,360	5,020,119	4,247,623	4,733,397
R-squared	0.623	0.516	0.641	0.598	0.636

This table reports sample checks on the effect of CCB presence, proxied by the number of local city commercial bank branches, on city-product exports of Chinese private firms across sectors, depending on their financial vulnerability. Financial vulnerability is measured by the first principal component of financial dependence and asset tangibility. Financial-vulnerability indices at the sector level are taken from Manova et al. (2015). Heteroskedasticity-robust standard errors appear in parentheses. Standard errors are clustered at the city level. ^{a}, ^{b} and ^{c} indicate significance at the 1%, 5% and 10% confidence levels.

Table B.2

Number of CCB branches and exports of private firms: sample checks (2).

Dependent variable:	Ln export value of domestic private exports (city/HS6/year)				
Financial vulnerability measure	Inventories ratio				
Exclusion from sample	Guangdong province	Coastal provinces	Autonomous regions	Cities with early foreign bank entry	Bottom/Top 3 sector Fin. Vuln.
	(1)	(2)	(3)	(4)	(5)
No. of CCB branches × Fin. Vuln.	0.121[a]	0.137[a]	0.085[a]	0.132[a]	0.074[a]
	(0.020)	(0.043)	(0.022)	(0.031)	(0.026)
Ln GDP/POP × Fin. Vuln.	1.762	−2.235	4.294[c]	3.393	3.953[c]
	(2.945)	(3.190)	(2.185)	(2.224)	(2.387)
FDI/GDP × Fin. Vuln.	−0.0014	3.904[b]	−1.789[a]	−1.682[a]	−2.038[a]
	(1.599)	(1.884)	(0.597)	(0.514)	(0.665)
FDI zones × Fin. Vuln.	2.350	4.836[b]	1.737	1.780	1.018
	(1.500)	(1.918)	(1.482)	(1.849)	(2.159)
High-Tech Zones × Fin. Vuln.	−4.160[c]	0.272	−0.999	−0.240	−4.665
	(2.374)	(2.137)	(4.163)	(3.710)	(4.830)
Processing Zones × Fin. Vuln.	9.474[a]	7.958[a]	9.941[a]	8.272[a]	8.680[a]
	(1.371)	(2.076)	(1.513)	(1.873)	(1.675)
Trade Zones × Fin. Vuln.	5.289[b]	4.232[c]	6.218[a]	−1.110	4.391[c]
	(2.213)	(2.272)	(1.879)	(2.638)	(2.450)
Foreign banks × Fin. Vuln.	−0.623	−2.129	0.0955		1.770
	(1.604)	(2.398)	(1.336)		(1.839)
HS6 product-year Fixed Effects	Yes	Yes	Yes	Yes	Yes
City-HS6 product Fixed Effects	Yes	Yes	Yes	Yes	Yes
City-year Fixed Effects	Yes	Yes	Yes	Yes	Yes
Observations	4,868,751	1,949,360	5,020,119	4,247,623	4,974,055
R-squared	0.624	0.516	0.642	0.598	0.640

This table reports sample checks on the effect of CCB presence, proxied by the number of local city commercial bank branches, on city-product exports of Chinese private firms across sectors, depending on their financial vulnerability. Financial vulnerability is measured by the inventories ratio at the sector level taken from Chan and Manova (2015). Heteroskedasticity-robust standard errors appear in parentheses. Standard errors are clustered at the city level. [a], [b] and [c] indicate significance at the 1%, 5% and 10% confidence levels.

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