

**THE CHINA SYNDROME AFFECTS
BANKS: THE CREDIT SUPPLY
CHANNEL OF FOREIGN IMPORT
COMPETITION**

2019

Sergio Mayordomo and Omar Rachedi

**Documentos de Trabajo
N.º 1908**

BANCO DE ESPAÑA
Eurosistema



**THE CHINA SYNDROME AFFECTS BANKS: THE CREDIT SUPPLY CHANNEL
OF FOREIGN IMPORT COMPETITION**

THE CHINA SYNDROME AFFECTS BANKS: THE CREDIT SUPPLY CHANNEL OF FOREIGN IMPORT COMPETITION (*)

Sergio Mayordomo and Omar Rachedi

BANCO DE ESPAÑA

(*) Addresses: sergio.mayordomo@bde.es, omar.rachedi@bde.es. We thank Henrique S. Basso, Jan Bietenbeck, Kizkitza Biguri, Roberto Blanco, Juan Francisco Jimeno, Enrique Moral-Benito, Steven Ongena, Javier Suárez, Emanuele Tarantino, Carlos Thomas, Ernesto Villanueva, and participants to several seminar and conference presentations for useful comments. The views expressed in this paper are those of the authors and do not necessarily represent the views of the Banco de España or the Eurosystem.

Documentos de Trabajo. N.º 1908

2019

The Working Paper Series seeks to disseminate original research in economics and finance. All papers have been anonymously refereed. By publishing these papers, the Banco de España aims to contribute to economic analysis and, in particular, to knowledge of the Spanish economy and its international environment.

The opinions and analyses in the Working Paper Series are the responsibility of the authors and, therefore, do not necessarily coincide with those of the Banco de España or the Eurosystem.

The Banco de España disseminates its main reports and most of its publications via the Internet at the following website: <http://www.bde.es>.

Reproduction for educational and non-commercial purposes is permitted provided that the source is acknowledged.

© BANCO DE ESPAÑA, Madrid, 2019

ISSN: 1579-8666 (on line)

Abstract

We study the effect of rising Chinese import competition in the early 2000s on banks' credit supply policies. Using bank-firm-level data on the universe of Spanish corporate loans, we exploit heterogeneity across banks in the exposure of their loan portfolios towards firms competing with Chinese imports. Exposed banks rebalanced their loan portfolios by cutting the supply of credit to firms affected by Chinese competition, while raising their lending towards non-exposed sectors. This portfolio reallocation depressed further the economic activity of firms competing with Chinese imports.

Keywords: trade shock, credit register, banks' portfolio reallocation, bank loans, real effects.

JEL classification: G21, G32, F65.

Resumen

Este artículo estudia el efecto del aumento en la competencia de las importaciones chinas a principios de la década de los 2000 en las políticas de oferta de crédito de los bancos españoles. El uso de información a nivel banco-empresa del universo de préstamos concedidos a empresas no financieras españolas nos permite explotar la heterogeneidad existente entre los bancos, en términos de la exposición de sus carteras de préstamos a empresas que compiten con las importaciones chinas. Los bancos más expuestos a este último grupo de empresas equilibraron sus carteras reduciendo la oferta de crédito a las empresas afectadas por la competencia china y, a su vez, aumentando el crédito a los sectores no afectados. Esta reasignación del crédito deprimió, aún más, la actividad económica de las empresas que competían con las importaciones chinas.

Palabras clave: *shock* comercial, registro de crédito, préstamos bancarios, reasignación de la cartera crediticia, efectos reales.

Códigos JEL: G21, G32, F65.

1 Introduction

Over the recent decades China has progressively integrated into the world economy through a process which has changed dramatically global trade flows. The share of world manufacturing export accounted for by China rose from 2% in 1990 to 4% in 2000, and then increased even more rapidly, reaching a value of 11% in 2010. The rising Chinese competition has had widespread consequences on advanced economies: firms operating in sectors more exposed to competitive pressures from Chinese imports experienced a sharp drop in profitability, sales, employment, capital expenditures, and innovation (e.g., Xu, 2012; Acemoglu et al., 2016; Bloom et al., 2016; Autor et al., 2017a; Pierce and Schott, 2016; Hombert and Matray, 2018), a phenomenon which has been referred to as the “China Syndrome”.¹

This paper studies the effect of the increase of Chinese imports competition in the early 2000s on banks’ credit supply policies. To do so, we merge bank-firm-level information from the Spanish Credit Registry, which covers the universe of Spanish corporate loans, with balance-sheet information on banks and firms. The Spanish economy represents an ideal case as firms are highly bank dependent (e.g., Delgado et al., 2007). In this way, we can exclude the possibility that any variation in bank loans is substituted with alternative sources of financing.

To understand the impact of import penetration on bank lending, we exploit heterogeneity across banks in the exposure of their loan portfolios towards firms competing with China. The import penetration has been heterogeneously distributed across industries within the manufacturing sector: roughly half of Spanish imports from China were concentrated in five three-digit NACE industries (i.e., rubber, footwear, industrial machineries, toys, and textiles). Thus, banks that in 2000 were lending relatively more to firms operating in these industries had a larger exposure to the drop in firms’ ability to meet debt obligations trig-

¹The China Syndrome is consistent with the results of Bernard et al. (2006) on the negative effects of the exposure to low-wage countries import competition on plant survival and growth. The rise of China exports has also affected local labor markets, causing a decline in employment and wages (e.g., Autor et al., 2013, 2014), and an increase in political polarization (e.g., Autor et al., 2017b).

gered by the dramatic rise of Chinese import competition. Importantly, banks' exposure to Chinese imports does not correlate with observable characteristics of banks' balance sheets or loan portfolios.²

Since the rise of Chinese imports could be driven by Spanish demand factors, we sharpen the identification of the effects of the exposure to import penetration with a strategy similar to Autor et al. (2013, 2014, 2017a,b) and Acemoglu et al (2016): we instrument the exposure of Spanish industries to China import competition with the sectoral exposures of a pool of non-E.U. advanced economies. Under the identifying restriction that demand shocks across these advanced countries are weakly correlated, our instrumenting strategy isolates the supply-side component which caused the massive worldwide rise of Chinese exports. Indeed, during the 1990s China undertook a transition to a market-oriented economy which boosted aggregate productivity (e.g., Hsieh and Klenow, 2009; Brandt et al., 2012; Zhu, 2012; Hsieh and Ossa, 2016). We also consider an alternative strategy which instruments import penetration with shipping costs (e.g., Bernard et al., 2006; Valta, 2012; Barrot et al., 2018, 2019).

Our baseline regression shows that banks exposed to import penetration cut the supply of credit between 2000 and 2006 to firms operating in sectors competing with Chinese goods. Yet, banks did not shrink their balance sheets, as they rebalanced their loan portfolios by raising the lending to firms in non-exposed sectors. Hence, banks shielded their balance sheets from the drop in profitability of firms competing with Chinese imports by shifting their loan portfolios away from these industries. The change in *credit supply* associated with bank exposure to import penetration is identified through multi-bank firms and within-firm variation in credit, as in Khwaja and Mian (2008). We also consider an alternative setting in which we control for the credit demand of all firms with the combination of sector-province fixed effects and firm controls.

²For instance, the least and most exposed banks are located just 50 km apart, they are both local saving banks, both very concentrated in just few industries, with the only difference that one bank was lending to firms operating in the agriculture sector, whereas the other was providing credit to footwear firms.

To dig deeper on the process of credit reallocation to non-exposed sectors, we split non-exposed firms into manufacturing firms, services firms, and construction firms, and explore the credit supply channel of import competition within each of these three samples. Although we find that banks reallocate their loan portfolios towards firms in all these non-exposed sectors, the evidence on the surge in credit supply to construction firms is stronger and more robust across all specifications. Moreover, while the rise in lending towards non-exposed manufacturing and services firms worked only through the intensive margin (i.e., firms with existing credit relationship in 2000), the extra supply of credit to construction firms was channeled both by establishing new credit relationships and by raising the amount of lending to firms with established bank connections.

The reallocation of credit supply from exposed manufacturing to non-exposed industries – and especially to construction – could be driven by confounding factors that in the early 2000s were shaping changes in the sectoral allocation of credit. For instance, Chakraborty et al. (2018), Cuñat et al. (2018), Martin et al. (2018) show that banks reacted to the housing boom by shifting their loans to construction firms and mortgage lending. We provide evidence that the reallocation to construction holds above and beyond bank exposure to local changes in either house prices or overall mortgage credit. In addition, bank exposure to China competition could also capture a variation in lending policies associated to the process of structural transformation out of manufacturing (e.g., Bustos et al., 2016, 2017). Yet, this possibility is inconsistent with the fact that exposed bank adjusted their loan portfolios even within the manufacturing sector, from exposed to non-exposed industries. To further rule out these alternative hypotheses, we consider a placebo exercise in which we consider the effects of bank exposure to *non-exposed* manufacturing in 2000. Consistently with the premise that bank exposure to import competition does not capture potential confounding factors, this measure implies no credit reallocation whatsoever to services and construction.

Then, why did exposed banks tend to shift their loan portfolios mainly to construction firms? The increase in the supply of credit to construction firms is stronger if banks are located in areas with fewer investment opportunities, that is, areas in which there are relatively fewer firms that operate in non-exposed industries outside of the construction sector. Hence, the marked spatial agglomeration of manufacturing industries (e.g., Krugman, 1991; Ellison and Glaeser, 1997; Ellison et al., 2010) implies that banks with highly geographically concentrated lending could mainly shield their balance sheet from the decline in profitability of the industries competing with Chinese imports by shifting their loans to construction firms.

The credit supply channel of foreign import penetration had large real effects. In addition to confirming the findings of previous studies indicating that rising imports depressed the economic activity of firms operating in sector subject to the competition of Chinese goods, we highlight a new channel through which these firms experienced a further drop in their real outcomes triggered by the cut in the supply of credit from exposed banks. This novel mechanism accounts for between one third and two thirds of the negative effects due to firms' direct exposure to foreign imports. On the one hand, a one-standard deviation increase in the direct sectoral exposure to Chinese imports reduced sales, value added, and employment in exposed manufacturing firms between 2000 and 2006 by 24.1%, 17.2%, and 10%, respectively. On the other hand, a one-standard deviation increase in bank exposure to Chinese imports reduced sales, value added, and employment in exposed manufacturing firms by 8.3%, 6%, and 7.5%.

Finally, we show that banks' portfolio reallocation triggered a surge in the real outcomes on firms in non-exposed sectors. This effect is particularly relevant – and statistically significant – for construction firms, as a one-standard deviation increase in bank exposure to China raised sales, value added, and employment of the construction sector between 2000 and 2006 by roughly 6%.

1.1 Related Literature

Although there is a vast literature that studies how foreign import penetration affects firms and households, the effects on the credit market have attracted much less attention. Among the few exceptions, Barrot et al. (2018) find that areas more exposed to Chinese imports had a faster rise in households' demand for mortgages. We complement this study by focusing on the supply of loans to firms, rather than households' credit demand. In addition, Xu (2012), Valta (2012), and Autor et al. (2017a) document that firms exposed to foreign import competition experienced a drop in debt, and an increase in financing costs. Our contribution to these papers is threefold. First, we identify the role of credit supply in the change of overall corporate loans by isolating credit demand through multi-bank firms, as in Khwaja and Mian (2008). Second, we show that the drop in credit of firms competing with Chinese imports came with an increase in lending to firms in non-exposed sectors, through banks' decisions to rebalance their loan portfolios. Third, we trace the real effects of all these changes in credit supply.

Our paper contributes to the literature on the role of banks' internal capital markets (e.g., Gan, 2007; Houston et al., 2007; Desai et al., 2008; Gilje et al., 2016; Cortes and Strahan, 2017; Chakraborty et al., 2018; Cuñat et al., 2018; Martin et al., 2018), which tends to focus on how banks propagate either positive or negative shocks across different geographical regions or lending types. Instead, this paper studies banks' reallocation of loan portfolios across different industries, as in Martin et al. (2018) and De Jonghe et al. (2019). In particular, we show that the rise of Chinese imports can be viewed as a negative shock to the ability to repay debt obligations to firms operating in industries facing this extra amount of competition, and banks used their internal capital markets to reallocate their portfolios away from these industries. This mechanism resembles the theory emphasized by Stein (1997) and Scharfstein and Stein (2000), in which a constrained business reallocates its limited resources from the least deserving project to the most profitable ones. In this sense, the closest paper to ours is Chakraborty et al. (2018), which documents how banks' exposure to the housing

price boom generate a crowding-out of credit from commercial lending towards mortgage lending.

Finally, we add to the literature on the bank lending channel (e.g., Kashyap and Stein, 1995; Khwaja and Mian, 2008; Jimenez et al., 2012; Chodorow-Reich, 2014; Amiti and Weinstein, 2018; Huber, 2018), by documenting that banks changed their credit supply policies amidst the dramatic rise of Chinese imports.

2 Data and Methodology

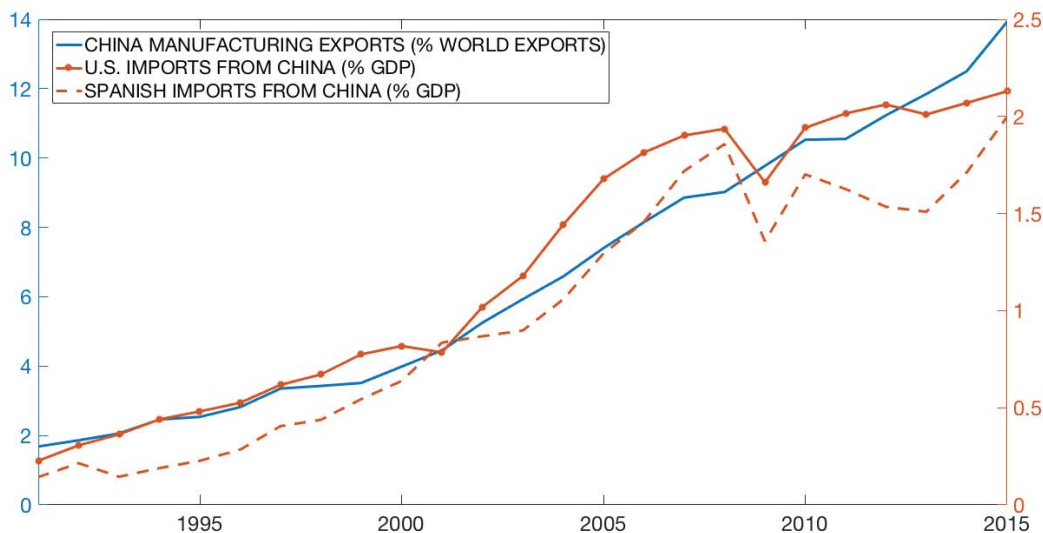
2.1 The Rise of China

The last two decades have witnessed dramatic variations in the structure of global trade flows, and the lion's share of these changes consists in the massive increase in the amount of Chinese manufacturing goods which are exported worldwide. This pattern can be noted by looking at Figure 1, which reports the share of Chinese manufacturing exports, as a fraction of world manufacturing exports, from 1991 to 2015. This share has been constantly trending up: it was 2% in 1991, increased up to 4% in 2000, and then has accelerated substantially in the early 2000s, by reaching a value of 11% in 2010. Figure 1 shows also that even the share of Spanish imports of Chinese manufacturing goods, as a fraction of Spanish GDP, displays a very similar trend. Indeed, the share of Chinese imports in total GDP has doubled in just six years, from a value of 2.8% in 2000 up to 5.5% in 2006. Interestingly, Chinese imports have kept increasing even amidst the sharp contraction of the Spanish economy from 2008 on, and reached 8% of GDP in 2010. These dynamics track very closely the changes in the amount of Chinese imports experienced by the U.S. economy, both in terms of levels and relative changes over time.

What did cause this dramatic increase in the relevance of China as a global exporting hub? The Chinese economy underwent two decades of reforms and sharp changes in its production structure, such as the liberalization of private economic activity and the transformation towards a market-oriented economy,

the fostering of a better reallocation of resources, the rural-to-urban migration of millions of households, the access to foreign technologies and intermediate inputs, and the access to the WTO. These reforms have boosted Chinese aggregate productivity (e.g., Hsieh and Klenow, 2009; Brandt et al., 2012; Zhu, 2012; Hsieh and Ossa, 2016). According to the measure of TFP provided by the Penn World Table, aggregate productivity in China grew at an annual rate of 4.7% between 2000 and 2007, whereas in the United States the growth rate of productivity during the same period was just 1%, and Spain experienced a stagnation in the level of productivity. As a result, the relative competitive advantage of Chinese goods has substantially increased over the recent years.

Figure 1: The Rise of Chinese Imports.



Note: This graph reports the ratio of Chinese imports over total world exports (continuous line - measured on the left y-axis), the ratio of Spanish imports from China over Spanish GDP (dashed line - measured on the right y-axis), and the ratio of U.S. imports from China over U.S. GDP (squared line - measured on the right y-axis). All series are reported from 1991 and 2015. Source: UN Comtrade and WorldBank.

2.2 Chinese Import Penetration

To measure the impact of the rising penetration of Chinese goods in the Spanish economy at the sectoral level, we follow the approach of Acemoglu et al. (2016) and exploit the industry-level changes in import and export between Spain and

China. Namely, we define the change in the Chinese import penetration for a specific sector s between 2000 and 2006 as

$$\Delta IP_{s,2006-2000} = \frac{\Delta M_{s,2000-2006}}{Y_{s,2000} + M_{s,2000} - X_{s,2000}} \quad (1)$$

which corresponds to the ratio of the changes in the imported goods of each sector between 2000 and 2006 over the total absorption capacity of each industry, where M_s and X_s denote Chinese imports and exports of goods of sector s , respectively, and Y_s is total sales of Spanish firms operating in sector s . Throughout the paper, all variables are defined in annualized terms.

Although Chinese imports have increased dramatically – and asymmetrically across industries – from the year 2000 on, these dynamics could also be driven by demand motives internal to the Spanish economy. To rule out this possibility, in the empirical analysis we follow Autor et al. (2013, 2014, 2017a,b) and instrument the changes in the Chinese import penetration with an analogous index which exploits the variation in the imports of Chinese goods in a pool of non-E.U. advanced countries, consisting of Australia, Canada, Japan, New Zealand, and the United States. Thus, the instrument is defined as

$$\Delta IP_{s,2006-2000}^* = \frac{\Delta M_{s,2000-2006}^*}{Y_{s,2000} + M_{s,2000} - X_{s,2000}} \quad (2)$$

where $\Delta M_{s,2000-2006}^*$ denotes the overall change in the imports of goods of sector s in these foreign economies. To deal with the different magnitude of the numerator and denominator, we standardize the former such that the maximum value of $\Delta IP_{s,2006-2000}^*$ equals the maximum value of $\Delta IP_{s,2006-2000}$.

This instrumenting strategy isolates the supply component of the rise in the competitiveness of Chinese goods. Under the identifying restriction that demand shocks are weakly correlated across countries, this approach captures the part of rising imports of Chinese goods which is due to the improvements in the aggregate productivity of the Chinese economy. Moreover, this instrument is highly relevant as the first-stage regression of $\Delta IP_{s,2006-2000}$ on $\Delta IP_{s,2006-2000}^*$ gives a coefficient of 0.68, with a standard error of 0.02 and a R^2 that equals 0.85.

We also consider an alternative instrumental strategy that borrows from Bernard et al. (2006), Valta (2012), and Barrot et al. (2018, 2019). Namely, we instrument the sectoral import penetration index $\Delta IP_{s,2006-2000}$ with shipping costs $SC_{s,2000}$ measured by Bernard et al. (2006). These authors compute freight rates – defined as the markup of the ratio of freight costs over the total value of imports – at the industry level by using the product-level U.S. import data of Feentra (1996). Although these costs are defined as a reference to the U.S. economy, this instrument is highly relevant as the first-stage regression of $\Delta IP_{s,2006-2000}$ on $SC_{s,2000}$ gives a coefficient of 0.47, with a standard error of 0.15 and an R^2 that equals 0.71. This result highlights that the freight costs capture technological costs of imports at the industry-level which do not vary substantially depending on the final-importing country.

Then, we compute a measure of bank exposure to foreign import competition, which captures the exposure of bank corporate loan portfolios towards firms competing with Chinese imports. Accordingly, the change in the import penetration between 2000 and 2006 for a given bank b weights the sectoral import penetration index with the share of credit that bank b grants to each firm f in sector s , that is

$$\Delta IP_{b,2000-2006} = \frac{\sum_{f \in s} [C_{b,f,s,2000} \times \Delta IP_{s,2000-2006}]}{\sum_f C_{b,f,s,2000}}, \quad (3)$$

where $C_{b,f,s,2000}$ denotes the overall amount of lending between bank b and firm f operating in sector s as of 2000. Analogously to the case of the index of sectoral import penetration, we rule out any possible demand component in bank exposure to Chinese competition by instrumenting the bank import penetration with an index which is built using the import flows of a panel of non-E.U. advanced countries, that is

$$\Delta IP_{b,2000-2006}^* = \frac{\sum_{f \in s} [C_{b,f,s,2000} \times \Delta IP_{s,2000-2006}^*]}{\sum_f C_{b,f,s,2000}}. \quad (4)$$

Although $\Delta IP_{b,2000-2006}^*$ is the baseline instrument, we also consider a instrument which is based on shipping costs, which is

$$SC_{b,2000} = \frac{\sum_{f \in s} [C_{b,f,s,2000} \times SC_{s,2000}]}{\sum_f C_{b,f,s,2000}}. \quad (5)$$

Finally, we use an alternative measure of bank exposure to foreign imports, which defines bank specialization in the set of manufacturing firms which are competing with Chinese goods, in the spirit of De Jonghe et al. (2019). Bank specialization $SPEC_{b,2000}$ is defined as the share of credit of a given bank to the manufacturing industries exposed to Chinese competition over the overall size of corporate loans of that given bank as of 2000, that is

$$SPEC_{b,2000} = \frac{\sum_{f \in \text{exposed manuf.}} C_{b,f,2000}}{\sum_f C_{b,f,2000}}. \quad (6)$$

Bank specialization captures the extent to which the corporate loan portfolio of a bank is tilted towards exposed manufacturing firms. This alternative measure of bank exposure to exposed manufacturing firms is a special case of the bank exposure index of Equation (3) which abstracts from the variation of the index of import penetration across sectors $\Delta IP_{s,2000-2006}$.

2.3 Data

To carry out the analysis of this paper, we merge industry-level information on import and export flows between Spain and China, with data on credit flows among banks and firms, and balance sheet information on both bank and firms. We merge all these sources of data and build a sample that ranges over the period 2000-2006. On the one hand, we follow Barrot et al. (2018) and start in the year 2000 to capture the implications of the access of China to the WTO. Although the WTO membership started officially in the late 2001, the normalization of the trade relationship of advanced economies with China started in the early 2000 under the push of the Clinton administration. On the other hand, we stop in the year 2006 to avoid that our analysis could be influenced by any confounding

factor connected to the deep financial and banking crisis which characterized the Spanish economy throughout the Great Recession period.

We derive measures of bank and sectoral exposure to China import competition by using data on international trade at the industry level, following the same steps of Autor et al. (2013), adapted to the case of the Spanish economy. The information on international trade at the sectoral level comes from the UN Comtrade Database. This database contains bilateral imports for six-digit Harmonized Commodity Description and Coding System products. Besides the data on the imports and exports of each sector from Spain to China, we use similar information on imports and exports of the same sectors in other non-E.U. advanced countries: Australia, Canada, Japan, New Zealand, and the United States.

Since the industry classification at the UN Comtrade Database differs from the standard classification method used in the European Union, we need to convert the six-digit HS product codes to the European standards. This conversion consists of two stages. First, we convert six-digit HS product codes to 1987 SIC codes using a crosswalk from Autor et al. (2013). Second, we convert 1987 SIC codes to the Statistical Classification of Economic Activities in the European Community, commonly referred to as NACE (for the French term “Nomenclature statistique des activités économiques dans la Communauté européenne”). More specifically, we convert the 1987 SIC codes to 3-digit NACE industries and then to CNAE-93 (the Spanish analogue to NACE Rev 1.1). We end up with information on Chinese imports for 252 industries at the 3-digit level of CNAE codes.

Table 1 reports the top-5 industries in terms of the import penetration index. Similarly to the case for the U.S. economy documented by Autor et al. (2013, 2014), the rise of Chinese imports has been very concentrated in few industries, that is, those producing rubber, footwear, industrial machineries, toys, and textiles. These five industries account for almost a half of the total increase of Spanish imports from China, highlighting the fact that the competitive threats of Chinese imports have affected asymmetrically Spanish production sectors.

Table 1: Top-5 Industries by Chinese Import Penetration.

Industry	Import Penetration
Rubber	12.91
Footwear	11.86
Industrial Machineries	9.81
Toys	8.70
Textile	8.66

Note: This table reports the five sectors characterized by the highest values for the average annual change in the import penetration of Chinese goods between 2000 and 2006, $\Delta IP_{s,2000-2006}$.

To understand the effects of Chinese import competition on the corporate loan market, we exploit the data of the Spanish Credit Register. This dataset, which is collected by the Bank of Spain in its role of banking supervisor, reports detailed monthly information on the credit position of each Spanish firm with each Spanish bank at the monthly frequency, for all loans above 6,000 euros. These characteristics guarantee that de-facto we are observing the entire corporate loan market of the Spanish economy. This source of data has already been used by Jimenez et al. (2012, 2014, 2019) and Bentolilla et al. (2018).

Since the Credit Register reports the identifier of each bank and firm, we merge the loan-level data with the balance sheets on the entire universe of banks and firms. The data on banks is collected by the Bank of Spain in its role of banking supervisor, and includes information on total assets, the holdings of cash and fixed income, the amount of net worth, and EBITDA. The data on firms come from the Spanish Commercial Register, which covers almost the entire universe of Spanish companies, and includes also information on firms' identifier and name, industry of operation, total assets, equity, cash holdings,

EBITDA, total sales, value added, and the number of employees. Moreover, we can identify each bank-firm relationship by aggregating loans within each bank-firm pair. This feature allows us to trace all the changes in credit flows between a given bank and a given firm over time. Unfortunately, the Credit Register collects information only on the quantities of each loan and not on the interest rates. Nevertheless, the dataset reports information on each bank-firm pair in which either firms have missed to pay back their debt obligations or the bank considers the loan as doubtful, i.e., the bank considers that it is likely that the firm will miss a payment in the near future. In this way, we are able to compute the ratio of doubtful and non-performing loans over total loans.

With all these sources of information, we build a panel of both real variables and credit data on 123,508 firms, 162 banks, and 300,579 firm-bank observations. Table 2 reports some descriptive statistics on the the change in total credit of all firms, and firms across different sectors (i.e., exposed and non-exposed manufacturing firms, services firms, and constructions and real estate firms), as well as key firm characteristics.

Figure 2 reports the values of the exposure to Chinese imports for each of the 162 banks in our samples. The figure shows that there is substantial heterogeneity in the way the rise of China has affected the loan portfolios of Spanish financial institutions. Indeed, bank exposure to import penetration (bank import penetration hereafter) ranges between 0 and 5%, with a mean value close to 2%.

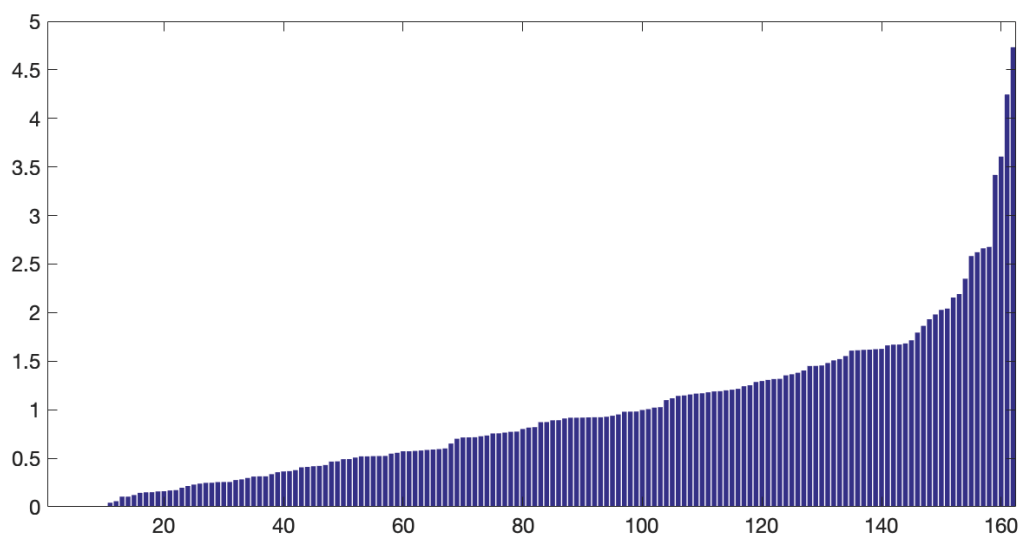
Heterogeneity in bank exposure to Chinese imports is not correlated with bank observable characteristics. Indeed, Table 3 reports some key bank characteristics, such as the size of the balance sheet, the fraction of liquid assets, leverage, the profitability, the fraction of non-performing loans, and a measure of the diversification of the loan portfolio across provinces and sectors, for the banks in the top tercile of the bank import penetration vis-à-vis all other banks. The table shows that banks with lowest and highest exposure to China have no statistically significant difference in any of these characteristics. Importantly, banks with higher levels of exposure to China are not less diversified than less exposed

Table 2: Descriptive Statistics.

	Mean	Median	P5	P95	SD	N
Panel A. $\Delta\text{Log}(\text{Credit}_{2000-2006})$						
All Firms	0.13	0.11	-0.79	0.97	0.56	300,579
Exposed Manufacturing Firms	0.11	0.08	-0.80	0.96	0.56	84,896
Non-Exposed Manufacturing Firms	0.12	0.10	-0.77	0.93	0.555	111,113
Services Firms	0.14	0.14	-0.76	0.96	0.56	45,144
Construction Firms	0.17	0.16	-0.84	1.07	0.61	59,425
Panel B. Firm Characteristics						
Total Assets (TA) (,000)	1752.10	301.71	30.18	2885.00	17708.59	123,508
Equity/TA	0.27	0.24	-0.17	0.81	0.30	123,508
Liquid Assets/TA	0.11	0.06	-0.01	0.45	0.16	123,508
ROA	0.11	0.10	-0.09	0.35	0.14	123,508

Note: Panel A of this table reports the descriptive statistics on the change in log credit between 2000 and 2006 at the firm level, with information also at the sectoral level. Panel B reports the descriptive statistics on other selected firm variables, that is, firm total assets, the ratio of equity over firm total assets, the ratio of liquid assets over firm total assets, and the return on assets (ROA). *P5* denotes the fifth percentile, *P95* denotes the ninety-fifth percentile, *SD* is the standard deviation, and *N* is the number of observations.

Figure 2: Bank Exposure to Import Competition.



Note: This graph reports the values in percentage points of the change in banks' exposure to foreign import competition from 2000 to 2006, $\Delta IP_{b,2000-2006}$.

financial institutions. Banks tend to have a portfolio rather concentrated across industries and provinces independently on their exposure to foreign imports. For instance, the banks with the lowest and highest exposure to China are both local banks, both operate in the same geographical area as the two headquarters are 50 kilometres apart, and both banks are highly concentrated in very few industries. The only difference is that the least exposed bank is specialized in lending to agriculture firms whereas the most exposed bank supplies credit to footwear companies. Hence, larger values of the bank import penetration are due to the fact that some banks had a corporate loan portfolio relatively more tilted to those sectors which have suffered the most the increased competition of Chinese goods.

Table 3: Bank Import Penetration and Bank Characteristics

	Banks with Low Exposure to China	Banks with High Exposure to China	Difference
Log Total Assets	13.09	13.91	-0.92 (0.56)
Liquid Assets/Total Liabilities (%)	14.27	14.24	0.03 (1.48)
Equity/Total Liabilities (%)	9.77	8.87	0.90 (1.01)
NPLs (%)	1.72	1.40	0.32 (0.22)
ROA (%)	0.81	0.92	-0.11 (0.07)
Average Credit Share at Province-Sector Level (%)	20.57	16.80	3.78 (2.33)

Note: This table reports bank characteristics for banks with high exposure to China, defined as the banks in the top tercile in terms of bank exposure to Chinese imported goods $\Delta IP_{b,2000-2006}$, and banks with low exposure to China, defined as the banks in the lowest two terciles in terms of bank exposure to Chinese imported goods $\Delta IP_{b,2000-2006}$. The bank characteristics are the log of total assets, the ratio of liquid assets over total liabilities in percentage values, the ratio of equity over total liabilities in percentage values, the fraction of non-performing loans (NPLs) in percentage values, the return on assets (ROA) in percentage values, and the average share of banks' overall total corporate credit loans which is concentrated at the province-sector level in percentage values. The last column reports the difference between the values in bank characteristics across the two groups of banks, with the values in brackets reporting the standard errors associated with a test of difference in the means.

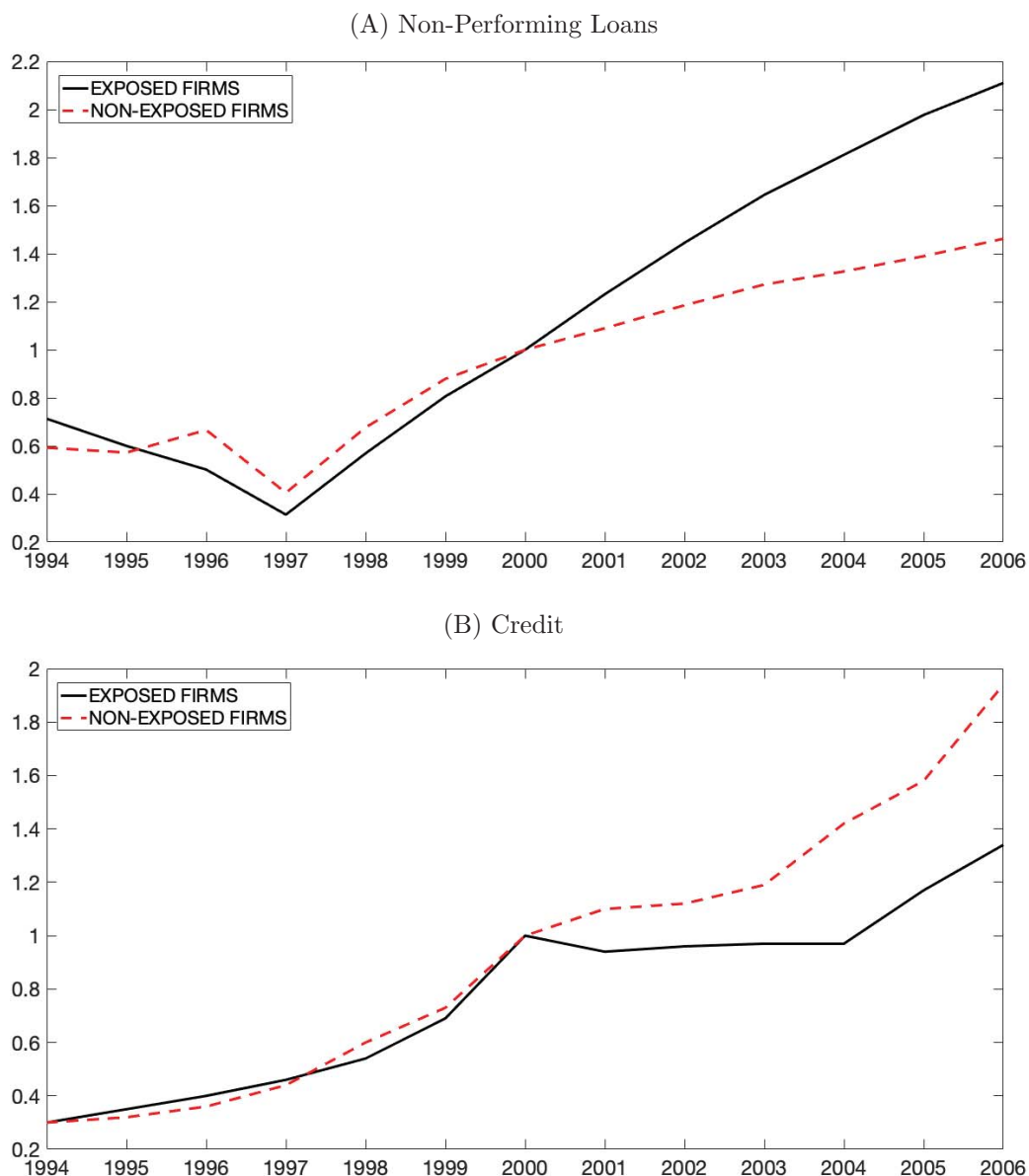
3 Import Competition and Credit Supply

How did the rising Chinese import penetration affect the Spanish corporate loan market? We start by providing some prima-facie evidence on the changes in both the ability to meet debt obligations and the total amount of credit among firms with different degrees of exposure to the competitive pressures of Chinese imported goods.

Panel A of Figure 3 plots the dynamics of the cumulative fraction of non-performing loans (NPLs) of firms exposed to Chinese competition vis-à-vis the non-performing loans of non-exposed firms between 1994 and 2006. Both lines are normalized to 1 in 2000. The figure shows that the cumulative NPLs of non-exposed firms have grown at a constant rate over these year, from a value of 1% in 1994 to 1.6% in 2000, and 2.5% in 2006. Instead, although the growth rate of the NPLs of exposed firms has been very similar to the one of non-exposed firms in the early years, from 2000 on the fraction of loans to exposed firms with repayment issues has more than doubled, from 2.3% to 4.9%. These dynamics are consistent with the notion that the dramatic rise in the import penetration of Chinese goods from 2000 has negatively affected the profitability of firms in exposed sectors (e.g., Xu, 2012; Autor et al., 2017a; Hombert and Matray, 2018), which has resulted in a rapid increase of the likelihood that exposed firms could not meet their debt obligations, with their loans turning into non-performing.

Panel B of Figure 3 reports a similar plot on total bank credit of exposed and non-exposed firms. Although the entire period of time is characterized by a progressive loosening of financial conditions which triggered a rise in the overall amount of corporate credit (e.g., Martin et al., 2018; Jimenez et al., 2019), again there is a substantial asymmetry in the dynamics of total loans from the year 2000 on, such as total credit grows much faster among non-exposed firms. Roughly, bank credit of non-exposed firms has doubled from 2000 to 2006, whereas it has increased by just 40% among exposed firms. This finding is consistent with the results of Xu (2012), on the negative effects of import penetration on firms' overall

Figure 3: Non-Performing Loans and Credit Across Exposed and Non-Exposed Firms.



Note: Panel A reports the cumulative ratio of non-performing and doubtful loans over total loans for both firms exposed to Chinese import competition (continuous line) and firms not exposed to Chinese import competition (dashed line), from 1994 to 2006. Both lines are normalized to 1 in 2000. Panel B reports the total amount of bank loans for firms exposed to Chinese import competition (continuous line) and the total amount of bank loans for firms not exposed to Chinese import competition (dashed line), from 1994 to 2006. Both lines are normalized to 1 in 2000.

debt positions. Again, the figure shows the absence of pre-existing trends, as the dynamics of credit of exposed and non-exposed firms are remarkably similar from 1994 to 2000.

Why did bank credit of exposed firms decline relatively to the amount of loans of non-exposed firms? Although this trend looks to be driven by the sudden surge of the foreign import competition, the change in corporate credit could be explained by demand motives, with firms reducing their outstanding credit

to boost their ability to meet their debt obligations, or by supply factors, with banks reducing the lending to firms exposed to Chinese competition to prevent a large surge of NPLs. To disentangle these possibilities and isolate uniquely the role of credit supply, in what follows we exploit the bank-firm-level dimension of our data.

3.1 The Causal Effect on Bank Credit Supply

We identify the causal effect of banks' exposure to China on their credit supply policies by explicitly taking into account the fact that banks' exposure to China could influence asymmetrically the supply of credit towards firms, depending on firms' direct exposure to Chinese import competition. To unveil these patterns, we run the regression

$$\begin{aligned} \Delta C_{b,f,s,2000-2006} = & \beta_1 \Delta IP_{b,2000-2006} + \beta_2 \Delta IP_{b,2000-2006} \times \Delta IP_{s,2000-2006} + \dots \\ & \dots + \mathbf{X}'_{\mathbf{b},2000} \beta_3 + \delta_f + \epsilon_{b,f,s,2000-2006} \end{aligned} \quad (7)$$

where $\Delta C_{b,f,s,2000-2006}$ is the change between 2000 and 2006 in the amount of credit from bank b to firm f operating in sector s . The coefficient β_1 captures the effect of bank exposure to China to its credit supply towards firms in non-exposed sectors, whereas the coefficient β_2 informs on how the changes in bank credit supply depend on firms' direct exposure to Chinese import competition. As long as the estimated signs of the coefficients β_1 and β_2 differ between each other, then bank exposure to China causes asymmetric changes in credit supply across industries with different direct exposure to foreign imports.

This regression includes a set of bank controls $\mathbf{X}_{\mathbf{b},2000}$, such as the size of the balance sheet (i.e., log of total assets), the liquidity ratio (i.e., the ratio of cash plus fixed income over total assets), leverage (i.e., the ratio of net worth over total assets), the fraction of NPLs (i.e., the ratio of doubtful assets over total assets), ROA (i.e., the ratio of EBITDA over assets), sector specialization (i.e., the fraction of credit granted to firms in a given sector over total credit), province specialization (i.e., the fraction of credit granted to firms in a given province over

total credit), and relationship lending (e.g., a dummy variable that equals 1 if bank b is the bank with the highest share of credit for firm f).

Crucially, we identify the change in credit supply associated with bank exposure to import penetration through multi-bank firms, as in Khwaja and Mian (2008). By focusing on these companies, we can saturate the cross-section regression with firm fixed effects δ_f and leverage the variation of bank-firm credit within any given firm. Since the firm fixed effect absorbs the unobserved firm credit demand, then any remaining variation in lending comes from supply motives. Although the focus of multi-bank firms reduces the size of our sample, in our data the vast majority of firms receive credit by more than one bank throughout the period 2000-2006.

The identification of the credit supply channel hinges on two key assumptions: (i) firms' credit demand is held constant across banks and (ii) changes in credit supply do not vary systematically across firms. This second assumption is challenged by the evidence of Paravisini et al. (2017), which highlight the presence of firm- and sector-specific patterns in credit supply due to bank specialization. To address this issue, we also explicitly control in the regression for both a measure of lending relationship at the firm-bank level, and bank specialization across industries and provinces as in De Jonghe et al. (2019). This approach allows us to elicit an identification strategy which isolates the role of bank exposure to China on credit supply that holds above and beyond any pattern of bank specialization at the firm-, sectoral-, and province-level.³ Moreover, the fact that our finding on the bank portfolio reallocation out of exposed manufacturing firms towards non-exposed sectors – and especially construction firms – could not be explained by bank specialization mitigates even further the concerns of Paravisini et al. (2017) on our identification approach.

Importantly, the Spanish economy represents an ideal case to study the effects of Chinese import competition on credit supply, as firms are highly bank depen-

³Moreover, Amiti and Weistein (2018) show that bank specialization does not bias our estimates of interest as long as bank exposure $\Delta IP_{b,2000-2006}$ is truly exogenous with respect to the omitted factors subsumed in the error term.

dent (e.g., Delgado et al., 2007). For instance, only 94 Spanish non-financial groups had issued a bond at any time between 2006 and 2015 (e.g., Arce et al. 2018). In this way, we can exclude the possibility that any variation in bank loans is substituted with alternative sources of financing

Column (1) of Table 4 reports the results of the regression (7) estimated with OLS methods. We find that bank exposure to Chinese competition has had an asymmetric effect on firms depending on firm direct exposure to Chinese imports. Indeed, we estimate a highly statistically significant coefficient β_1 , which implies that exposed banks have increased their lending towards firms in non-exposed industries. Instead, the fact that the estimated sign of the coefficient β_2 is negative – and also highly statistically significant – implies that exposed banks reduced the supply of credit to firms that were facing competing pressures from China.

Column (2) shows the results of the estimation in which the sectoral and the bank index of import penetration $\Delta IP_{s,2000-2006}$ and $\Delta IP_{b,2000-2006}$ are instrumented with the indexes that use the imports of Chinese goods in a pool of non-E.U. advanced economies, that is, $\Delta IP_{s,2000-2006}^*$ and $\Delta IP_{b,2000-2006}^*$. This approach raises slightly the magnitude of the coefficients, while maintaining the high statistical significance of both the cut in the supply of credit to exposed sectors and the increase in the lending to non-exposed firms. The results do not change if we use the alternative instrumental strategy of Column (3), in which $\Delta IP_{s,2000-2006}$ and $\Delta IP_{b,2000-2006}$ are instrumented with shipping costs $SC_{s,2000}$ and $SC_{b,2000}$, as in Bernard et al. (2006), Valta (2012), and Barrot et al. (2018, 2019). Overall, all these results highlight that bank exposure to China has triggered changes in the supply of credit that have affected asymmetrically firms, with banks reducing the share of loans to exposed firms in their portfolios.

Table 5 digs deeper in banks' loan portfolio reallocation, by running regression (7) on four different samples: we run one regression using data on exposed manufacturing firms, a regression using data on non-exposed manufacturing firms, then we focus on a sample of services firms, and finally we look at construction

Table 4: Bank Exposure to China and Credit Supply.

	Dependent Variable: $\Delta C_{b,f,s,2000-2006}$		
	(1) OLS	(2) IV	(3) IV Shipping Costs
$\Delta IP_{b,2000-2006}$	1.585*** (0.306)	1.945*** (0.335)	1.390*** (0.391)
$\Delta IP_{b,2000-2006} \times \Delta IP_{s,2000-2006}$	-13.313** (5.785)	-16.992** (7.710)	-13.996* (7.878)
Firm Fixed Effects	YES	YES	YES
Bank Controls	YES	YES	YES
R^2	0.460	-	-
Observations	249,782	249,782	249,782

Note: This table reports the results of a regression in which the dependent variable is $\Delta C_{b,f,s,2000-2006}$, the change in the credit between bank b and firm f between 2000 and 2006, and the independent variables are the change in bank import penetration $\Delta IP_{b,2000-2006}$ and the change in sectoral import penetration $\Delta IP_{s,2000-2006}$, and bank controls, such as the size of the balance sheet (i.e., log of total assets), the liquidity ratio (i.e., the ratio of cash plus fixed income over total assets), leverage (i.e., the ratio of net worth over total assets), the fraction of NPLs (i.e., the ratio of doubtful assets over total assets), ROA (i.e., the ratio of EBITDA over assets), sector specialization (i.e., the fraction of credit granted to firms in a given sector over total credit), province specialization (i.e., the fraction of credit granted to firms in a given province over total credit), and relationship lending (e.g., a dummy variable that equals 1 if bank b is the bank with the highest share of credit for firm f). The regression includes firm fixed effects. Column (1) reports the results for the case in which the regression is estimated using OLS. Column (2) reports the results for the case in which the regression is estimated using IV, in which the change in bank exposure to Chinese imports $\Delta IP_{b,2000-2006}$ and the change in the sectoral exposure to Chinese imports $\Delta IP_{s,2000-2006}$ are instrumented using $\Delta IP_{b,2000-2006}^*$ and $\Delta IP_{s,2000-2006}^*$, respectively. These instruments are derived by exploiting the change in the sectoral import penetration of a pool of non-E.U. advanced economies. Column (3) reports the results for the case in which the regression is estimated using IV, in which the change in bank exposure to Chinese imports $\Delta IP_{b,2000-2006}$ and the change in the sectoral exposure to Chinese imports $\Delta IP_{s,2000-2006}$ are instrumented using $SC_{b,2000}$ and $SC_{s,2000}$, respectively. These instruments are derived by exploiting the shipping costs computed by Bernard et al. (2006). In all cases, standard errors clustered at the industry-location-size level are reported in brackets. *, **, and *** indicate statistical significance at the 10%, 5% and 1%, respectively.

and real estate companies. The results highlight once again that exposed banks have reduced their supply of credit to exposed manufacturing firms, while raising lending to firms in all non-exposed sectors. Again, these results hold true independently on whether we estimate the regression with OLS or IV methods.

Table 5: The Effect of Bank Exposure to China on Credit Supply - Evidence Across Sectors.

	Dependent Variable: $\Delta C_{b,f,s,2000-2006}$							
	Exposed Manufacturing		Non-Exposed Manufacturing		Services		Construction	
	(1) OLS	(2) IV	(3) OLS	(4) IV	(5) OLS	(6) IV	(7) OLS	(8) IV
$\Delta IP_{b,2000-2006}$	0.825 (0.629)	1.668** (0.741)	1.877*** (0.478)	2.039*** (0.496)	1.668** (0.721)	2.218*** (0.776)	2.029*** (0.681)	2.128*** (0.753)
$\Delta IP_{b,2000-2006} \times$ $\Delta IP_{s,2000-2006}$	-10.310* (6.134)	-17.231* (9.591)						
Firm Fixed Effects	YES	YES	YES	YES	YES	YES	YES	YES
Bank Controls	YES	YES	YES	YES	YES	YES	YES	YES
R^2	0.409	-	0.450	-	0.535	-	0.503	-
Observations	75,395	75,395	94,521	94,521	33,092	33,092	46,774	46,774

Note: This table reports the results of a regression in which the dependent variable is $\Delta C_{b,f,s,2000-2006}$, the change in the credit between bank b and firm f between 2000 and 2006, and the independent variables are the change in bank import penetration $\Delta IP_{b,2000-2006}$ and the change in sectoral import penetration $\Delta IP_{s,2000-2006}$, and bank controls as in Table 4. The regression includes firm fixed effects. Column (1) reports the results for the case in which the regression is estimated using OLS on a sample of exposed manufacturing firms. Column (3) reports the results for the case in which the regression is estimated using OLS on a sample of non-exposed manufacturing firms. Column (5) reports the results for the case in which the regression is estimated using OLS on a sample of services firms. Column (7) reports the results for the case in which the regression is estimated using OLS on a sample of construction firms. Columns (2), (4), (6), and (8) report the results for the case in which the regression is estimated using IV, in which the change in bank exposure to Chinese imports $\Delta IP_{b,2000-2006}$ and the change in the sectoral exposure to Chinese imports $\Delta IP_{s,2000-2006}$ are instrumented using $\Delta IP_{b,2000-2006}^*$ and $\Delta IP_{s,2000-2006}^*$, respectively. These instruments are derived by exploiting the change in the sectoral import penetration of a pool of non-E.U. advanced economies. In all cases, standard errors clustered at the industry-location-size level are reported in brackets. *, **, and *** indicate statistical significance at the 10%, 5% and 1%, respectively.

If we use the OLS results to gauge the economic implications of these regressions, we find that a one standard deviation increase in bank exposure to Chinese imports reduced the amount of credit at the bank-firm pair in the exposed manufacturing sector by 3.5%. Instead, the portfolio rebalancing of exposed banks generated an increase in the credit at the bank-firm pair by 5.4% for non-exposed manufacturing firms, 4.8% for services firms, and 5.9% for construction firms. Hence, the economic magnitude of the bank portfolio reshuffling towards non-exposed industries is largest within construction firms.

3.2 Further Evidence

The findings of the paper do not depend on the way we identify changes in the supply of credit by isolating the role of firms' credit demand. Indeed, the results do not change if we consider an alternative setting to control for demand. Table 6 keeps looking at the effects of bank exposure to China on the change in credit across the four macro-sectors, but this time rather than isolating demand by focusing on multi-bank firms so to saturate the regression with firm fixed effects, we consider two alternative approaches. First, we consider multi-bank firms but control for credit demand with the combination of province-sector fixed effects and firm controls. Second, we keep controlling for credit demand with the combination of province-sector fixed effects and firm controls, but we extend the sample to all firms in our dataset.

Table 7 looks at the effects of Chinese competition on the changes in credit supply to firms within the four different macro-sectors, but this time considers bank specialization in exposed manufacturing firms in 2000, defined in Equation (6), as the measure of bank exposure to foreign import penetration. This alternative measure of bank exposure to exposed manufacturing firms is a special case of the bank exposure index of Equation (3) which abstracts from the variation of the index of import penetration across sectors $\Delta IP_{s,2000-2006}$. Hence, bank specialization in exposed manufacturing firms embeds less variation across financial institutions in their exposure to China than the baseline bank index of import penetration. Consistently with this notion, the results indicate that the

Table 6: Bank Exposure to China and Credit Supply - Alternative Credit Demand Controls.

	Dependent Variable: $\Delta C_{b,f,s,2000-2006}$							
	Exposed Manufacturing		Non-Exposed Manufacturing		Services		Construction	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Multi Bank Firms	All Firms	Multi Bank Firms	All Firms	Multi Bank Firms	All Firms	Multi Bank Firms	All Firms
	OLS	OLS	OLS	OLS	OLS	OLS	OLS	OLS
$\Delta IP_{b,2000-2006}$	0.933 (0.596)	0.938* (0.540)	1.758*** (0.460)	1.842*** (0.404)	1.644** (0.671)	1.366*** (0.523)	2.289*** (0.612)	2.066*** (0.522)
$\Delta IP_{b,2000-2006} \times \Delta IP_{s,2000-2006}$	-11.469* (6.374)	-9.615* (5.635)						
Firm Fixed Effects	NO	NO	NO	NO	NO	NO	NO	NO
Sector-Province Fixed Effects	YES	YES	YES	YES	YES	YES	YES	YES
Firm Controls	YES	YES	YES	YES	YES	YES	YES	YES
Bank Controls	YES	YES	YES	YES	YES	YES	YES	YES
R^2	0.179	0.198	0.177	0.210	0.296	0.352	0.219	0.283
Observations	75,395	84,521	94,521	111,060	33,092	44,871	46,774	59,403

Note: This table reports the results obtained by the same regressions of Table 5, with the only difference being the alternative settings to control for credit demand. Columns (1), (3), (5), and (7) uses multi-bank firms and controls for demand with the combination of province-sector fixed effects and firms covariates, which consist of leverage, the liquidity ratio, the return on assets, and size measured as the logarithm of assets. Columns (2), (4), (5), and (6) consider instead all firms and controls for demand with the combination of province-sector fixed effects and firms covariates.

Table 7: Bank Specialization in Exposed Manufacturing Firms and Credit Supply.

Dependent Variable: $\Delta C_{b,f,s,2000-2006}$				
	Exposed Manufacturing	Non-Exposed Manufacturing	Services	Construction
	(1) OLS	(2) OLS	(3) OLS	(4) OLS
$SPEC_{b,2000}$	-0.052 (0.042)	-0.020 (0.033)	0.058 (0.047)	0.118*** (0.044)
$SPEC_{b,2000} \times \Delta IP_{s,2000-2006}$	-0.788* (0.463)			
Firm Fixed Effects	YES	YES	YES	YES
Bank Controls	YES	YES	YES	YES
R^2	0.409	0.450	0.534	0.503
Observations	75,395	94,521	33,092	46,774

Note: This table reports the results of regressions at the bank-firm level as in Table 4 in which the main independent variable is bank specialization in exposed manufacturing firms, defined as the share of credit to these firms in the overall bank corporate loan portfolio, as of 2000.

surge in credit from banks specialized in exposed manufacturing firms towards both non-exposed manufacturing firms and services firms is not statistically significant anymore. Nonetheless, even with this measure we do find that exposed banks cut the supply of credit to exposed manufacturing firms, while raising lending to construction companies. This finding confirms once more that the bank portfolio reallocation due to the exposure to Chinese imports has been especially tilted towards the construction sector.

Then, we study whether the changes in bank-firm credit due to bank and sectoral exposure to China competition worked mainly through either an extensive margin, such that exposed banks changed their decisions on the definition of new lending relationships, or an intensive margin, such that exposed banks altered the amount of credit which is granted to firms with established relationships. To isolate the role of the extensive margin, we run a regression in which

the dependent variable is an indicator function which equals 1 in case we observe the establishment of a new credit relationship with a given bank and given firm between 2000 and 2006. Instead, we isolate the role of the intensive margin by looking into the change in lending over the period 2000-2006 between a given bank and a given firm, conditional on this bank-firm pair being already established in 2000. The results of Table 8 point out that the reduction in the supply of credit of exposed banks towards firms in the exposed manufacturing industries worked through both the intensive and extensive margins. On the other hand, while the rise in lending towards firms in non-exposed manufacturing industries and services worked only through the intensive margin, the extra supply of credit to construction firms was channeled both by establishing new credit relationships and by raising the amount of lending to firms with established bank connections.

So far, we have been looking at the effects of bank exposure to Chinese import penetration on the change in the supply of credit between a given bank-firm pair. This level of analysis allowed us to exploit within-firm variation such that we could isolate firms' credit demand and identify the variation in banks' credit supply. Nevertheless, the drop in the supply of credit between a given exposed bank and a given exposed firm could be offset if the exposed firm manages to receive additional lending from other financial institutions. To verify whether the changes in bank exposure to China do alter the overall credit of firms, we run the following regression at the firm-level using only the sample of multi-bank firms

$$\Delta C_{f,s,2000-2006} = \beta_1 \Delta \hat{IP}_{b,2000-2006} + \beta_2 \Delta IP_{s,2000-2006} + \dots \\ \dots + \mathbf{X}'_{f,s,2000} \beta_3 + \mathbf{X}'_{s,2000} \beta_4 + \hat{\delta}_f + \epsilon_{f,s,2000-2006} \quad (8)$$

where we define the bank exposure to Chinese competition at the firm-level $\Delta \hat{IP}_{b,2000-2006}$ as

$$\Delta \hat{IP}_{b,2000-2006} = \frac{\sum_b C_{b,f,s,2000} \times \Delta IP_{b,2000-2006}}{\sum_b C_{b,f,s,2000}}. \quad (9)$$

Basically, this new variable weights the bank exposure indexes with the share of credit between firm f and each bank with which the firm has a relationship. In

Table 8: Bank Exposure to China and Credit Supply - Extensive and Intensive Margins.

	Dependent Variable: $\Delta C_{b,f,s,2000-2006}$							
	Exposed Manufacturing		Non-Exposed Manufacturing		Services		Construction	
	(1) New Credit (0/1) OLS	(2) Firms with relationship in 2000 OLS	(3) New Credit (0/1) OLS	(4) Firms with relationship in 2000 OLS	(5) New Credit (0/1) OLS	(6) Firms with relationship in 2000 OLS	(7) New Credit (0/1) OLS	(8) Firms with relationship in 2000 OLS
$\Delta IP_{b,2000-2006}$	-1.344** (0.526)	0.871 (0.646)	0.341 (0.451)	1.910*** (0.494)	0.389 (0.580)	1.900** (0.766)	1.015* (0.535)	2.167*** (0.715)
$\Delta IP_{b,2000-2006} \times$ $\Delta IP_{s,2000-2006}$	-12.487** (6.374)	-11.391* (5.635)						
Firm Fixed Effects	YES	YES	YES	YES	YES	YES	YES	YES
Bank Controls	YES	YES	YES	YES	YES	YES	YES	YES
R^2	0.452	0.389	0.0492	0.429	0.592	0.499	0.555	0.470
Observations	75,395	73,259	94,521	91,299	33,092	30,701	46,774	43,937

Note: This table reports the results of regressions analogous to those in Table 5, with the only difference that the dependent variable in Columns (1), (3), (5), and (7) is an indicator function that equals 1 if between 2000 and 2006 we observe a new bank-firm pair which was not established as of 2000, whereas in Columns (2), (4), (6), and (8) the dependent variable is the change in credit of a given bank-firm pair between 2000 and 2006, conditional on observing the bank-firm pair as already established as of 2000.

the limiting case in which firm f has only a lending relationship, then the new variable $\Delta\hat{IP}_{b,2000-2006}$ coincides with the bank exposure index $\Delta IP_{b,2000-2006}$.

The regression also includes a set of firm characteristics $\mathbf{X}'_{f,s,2000}$, which consist of leverage, the liquidity ratio, the return on assets, and size measured in terms of assets, a set of sector characteristics $\mathbf{X}'_{s,2000}$, which consist of the sectoral averages of each firm control, and both sectoral and province fixed effects. Since we now study changes in credit at the firm-level, we cannot employ anymore firm fixed-effects to isolate firms' credit demand and identify changes in the supply of credit. Hence, the estimates on the effects of bank exposure to China on changes in credit supply at the firm-level could be biased if bank exposure does correlate with firms' credit demand. To address this concern, we follow the insights of Bonaccorsi di Piatti and Sette (2016), Cingano et al. (2016), and Jimenez et al. (2019), by adding to the regression the firm fixed effect $\hat{\delta}_f$ as estimated in the bank-firm-level regression (7).

The results of Columns (1) - (4) in Table 9 show that even if we look at the changes in the entire amount of firms' credit, we still observe that exposed manufacturing firms experienced in drop in the supply of lending from exposed banks, whereas firms in non-exposed industries experienced a surge in the supply of credit.

Finally, we look at the changes in the total amount of lending at the bank level. Indeed, the results of the regressions at the bank-firm-level do not reveal whether either bank exposure to Chinese competition has caused a decline in the total amount of bank corporate loans, or banks did not change the size of their balance sheets, and just perfectly offset the reduction in the supply of credit to exposed manufacturing firms with an increase in lending to non-exposed industries. To evaluate the effects of bank exposure to import competition on the size of bank corporate loan portfolios, we run the following regression at the bank-level

$$\Delta C_{b,2000-2006} = \beta_1 \Delta IP_{b,2000-2006} + \mathbf{X}'_{b,2000} \beta_2 + \hat{\delta}_b + \epsilon_{b,2000-2006}. \quad (10)$$

The regression includes the same set of bank controls of regression (7), and includes also the estimated firm fixed effects, such as we can control for the possible role of changes in firm credit demand. Given the estimates of firm fixed effects of regression (7), we define the new set of fixed effects $\hat{\delta}_b$ as

$$\hat{\delta}_b = \frac{\sum_f C_{b,f,s,2000} \times \hat{\delta}_f}{\sum_f C_{b,f,s,2000}} \quad (11)$$

which weights the estimated firm fixed effects $\hat{\delta}_f$ by the share of credit of the bank-firm pair on the overall size of bank corporate loans.

Column (5) of Table 9 shows that the coefficient that relates the changes in the overall size of bank corporate loans to bank exposure to Chinese imports is not statistically significant. This finding implies that exposed banks did not shrink their balance sheets, but rather completely offset the reduction in the supply of credit to exposed manufacturing firms with the rise in lending to non-exposed industries.

Overall these results adds to the literature on the role of banks' internal capital markets (e.g., Gan, 2007; Houston et al., 2007; Desai et al., 2008; Gilje et al., 2016; Cortes and Strahan, 2017; Chakraborty et al., 2018; Cuñat et al., 2018; Martin et al., 2018), which tends to focus on how banks propagate either positive or negative shocks across different geographical regions or lending types. Instead, we document banks reallocation of loan portfolios across different industries, as in Martin et al. (2018) and De Jonghe et al. (2019). From this point of view, the rise of Chinese imports can be interpreted as a negative shock to the ability to repay debt obligations to firms operating in industries facing this extra amount of competition, and banks used their internal capital markets to reallocate their portfolios away from these industries. This mechanism resembles the theory emphasized by Stein (1997) and Scharfstein and Stein (2000), in which a constrained business reallocates its limited resources from the least deserving project to the most profitable ones. In this sense, our closest paper is Chakraborty et al. (2018), which documents how banks' exposure to the housing

Table 9: Bank Exposure to China and Credit Supply - Firm-Level and Bank-Level Evidence.

	Dependent Variable: $\Delta C_{f,s,2000-2006}$				Dependent Variable: $\Delta C_{b,2000-2006}$
	Exposed Manufacturing	Non-Exposed Manufacturing	Services	Construction	All Banks
	(1) OLS	(2) OLS	(3) OLS	(4) OLS	(5) OLS
$\Delta \hat{I}P_{b,2000-2006}$	6.800** (2.874)	7.183*** (2.162)	8.282** (3.356)	7.457** (3.667)	
$\Delta IP_{s,2000-2006}$	-37.888*** (14.186)				
$\Delta IP_{b,2000-2006}$					10.235 (6.495)
Sector 1-digit & Province Fixed Effects	YES	YES	YES	YES	NO
Credit Demand Controls	YES	YES	YES	YES	YES
Firm & Sector Controls	YES	YES	YES	YES	NO
Bank Controls	NO	NO	NO	NO	YES
R^2	0.314	0.309	0.248	0.318	0.121
Observations	25,189	36,699	17,076	21,076	162

Note: Columns (1) - (4) of this table report the results of a regression in which the dependent variable is $\Delta C_{f,s,2000-2006}$, the change in the credit of firm f in sector s between 2000 and 2006, and the independent variables are the change in bank import penetration defined at the firm-level $\Delta \hat{I}P_{b,2000-2006}$ and the change in sectoral import penetration $\Delta IP_{s,2000-2006}$, firm controls as in Table 6, sector controls defined as the sector average of the variables used as firm controls, 1-digit sector fixed effects, province fixed effects, and credit demand controls in the form of the estimated firm-fixed effect from the bank-firm-level regressions. In all these four columns, standard errors clustered at the industry-location-size level are reported in brackets. Column (5) reports the results of a regression in which the dependent variable is $\Delta C_{b,2000-2006}$, the change in the credit of bank b between 2000 and 2006, and the independent variables are the change in bank import penetration $\Delta IP_{b,2000-2006}$ and bank controls, such as the size of the balance sheet, the liquidity ratio, leverage, the fraction of NPLs, ROA, sector specialization, province specialization, relationship lending, and estimated firm fixed effects from the bank-firm-level regressions, which are then defined at the bank level by weighting the fixed-effect of each firm with the share of credit of that firm over the overall credit position of the bank. In this case, standard errors clustered at the bank level are reported in brackets. *, **, and *** indicate statistical significance at the 10%, 5% and 1%, respectively.

price boom generate a crowding-out of credit from commercial lending towards mortgage lending. The next section shows that our findings do not hinge on the crowding-out channel emphasized by Chakraborty et al. (2018), and that the effects of bank exposure to China on bank portfolio reallocation hold above and beyond bank exposure to the housing price boom in the early 2000s.

4 The Portfolio Reallocation To Construction

The reallocation of credit supply from exposed manufacturing to non-exposed industries – and especially to construction – could be driven by confounding factors that in the early 2000s were shaping changes in the sectoral allocation of credit. For instance, Chakraborty et al. (2018), Cuñat et al. (2018), Martin et al. (2018) show that banks reacted to the housing boom by shifting their loans to construction firms and mortgage lending. In addition, bank exposure to China competition could also capture a variation in lending policies associated to the process of structural transformation out of manufacturing (e.g., Bustos et al., 2016, 2017). Nevertheless, this possibility looks less likely as it is inconsistent with the fact that exposed bank adjusted their loan portfolios even within the manufacturing sector, from exposed to non-exposed industries. This section shows that the effect of bank exposure to China on the surge in lending towards construction holds above and beyond these alternative channels.

We first run a placebo exercise to show that the effects of bank exposure to Chinese imports on credit supply does not capture any other systematic confounding factor. To do so, we change the definition of bank exposure by focusing on bank specialization in non-exposed manufacturing firms as of 2000, and evaluate whether also this alternative measure implies a change in credit across sectors from 2000 to 2006. Bank specialization is defined as in Equation (6), with the only difference that we now focus on those manufacturing firms which operate in sectors which have *not* been affected by Chinese import competition. Table 10 reports the results of this placebo. We find that although banks specialized

in non-manufacturing firms tend to diversify their portfolios and reduce their exposure to these firms, there is no reallocation whatsoever to other sectors, and especially to construction firms. This finding confirms that the portfolio switching towards the construction sector does indeed depend on bank exposure to China, defined as the exposure of bank corporate loan portfolios towards firms operating in sectors facing the highest degree of competition from Chinese goods. Hence, our empirical strategy isolates the role of rising foreign imports on banks' credit supply policies and does not capture any alternative confounding factor,

Table 10: Placebo Exercise.

	Dependent Variable: $\Delta C_{b,f,s,2000-2006}$			
	Exposed Manufacturing	Non-Exposed Manufacturing	Services	Construction
	(1) OLS	(2) OLS	(3) OLS	(4) OLS
Credit to Non-Exp Manuf _{b,2000} / Total Credit _{b,2000}	0.052 (0.036)	-0.092*** (0.033)	0.063 (0.044)	0.029 (0.044)
Firm Fixed Effects	YES	YES	YES	YES
Bank Controls	YES	YES	YES	YES
R^2	0.409	0.450	0.534	0.503
Observations	75,395	94,521	33,092	46,774

Note: This table reports the results of regressions at the bank-firm level as in Table 7 in which the main independent variable is bank specialization in non-exposed manufacturing firms, defined as the share of credit to these firms in the overall bank corporate loan portfolio, as of 2000.

such as any systematic rebalancing of bank portfolios out of the manufacturing sectors and towards construction firms.

Then, we dig deeper on the factors that determine bank portfolio reallocation to the construction firms. First, we show that banks' exposure to Chinese imports generates a surge in the supply of credit towards the construction industry which holds above and beyond bank exposure to the early 2000s housing boom. To do

so, we add to our baseline regression two further controls. Column (1) of Table 11 introduces the share of mortgage-backed credit in overall bank credit as of 1997, a variable that Martin et al. (2018) use to capture bank exposure to the housing price boom and the related shifts in bank lending towards construction. Instead, Column (2) introduces a measure of house price change defined at the bank-level using the same approach of Chakraborty et al. (2018): we weight the house price change in a given province with the share of credit that a given bank allocates to that province, and then sum over all provinces. Chakraborty et al. (2018) show that a higher housing appreciation at the bank-level predicts a shift in credit out of the corporate sector towards mortgages. The results of Table 11 highlight that the coefficients associated to the change in the supply of credit to construction firms due to bank exposure to Chinese competition keeps being highly statistically significant even after controlling for these additional measures of bank exposure to house price boom of the early 2000s.

Then, we highlight that the credit reallocation to construction depends on the characteristics of the local economic activity faced by banks. Indeed, banks reallocate their loan portfolios to construction firms in case they operate in areas with fewer outside opportunities out of both exposed manufacturing and construction firms. We measure the investment opportunities that all banks face in a given province p in 2000 as

$$IO_{p,2000} = \frac{\sum_b C_{b,p,2000}^{\text{ExpManuf}}}{\sum_b \left(C_{b,p,2000}^{\text{ExpManuf}} + C_{b,p,2000}^{\text{NonExpManuf}} + C_{b,p,2000}^{\text{Serv}} \right)} \quad (12)$$

which defines for each province the fraction of bank lending that goes to exposed manufacturing firms over the bank lending to all firms but those operating in construction. This variable takes higher values if in a given province there are fewer opportunities out both exposed manufacturing firms and construction firms. If a bank operates in these areas, then the only way it may reshuffle its loan portfolio out of exposed manufacturing firms is by raising lending to construction companies. The result in Column (3) confirms this hypothesis by showing that

Table 11: The Loan Portfolio Reallocation Towards Construction.

	Dependent Variable: $\Delta C_{b,f,s,2000-2006}$		
	(1) OLS	(2) OLS	(3) OLS
$\Delta IP_{b,2000-2006}$	4.842*** (0.707)	1.195* (0.724)	4.388*** (0.747)
$\Delta IP_{b,2000-2006} \times IO_{p,2000}$			13.294*** (4.425)
Mortgage-Backed Credit _{b,1997} / Total Credit _{b,1997}	0.332*** (0.026)		0.319*** (0.026)
Δ House Price _{b,2000-2006}		0.162*** (0.041)	0.085** (0.043)
Firm Fixed Effects	YES	YES	YES
Bank Controls	YES	YES	YES
R^2	0.506	0.503	0.516
Observations	46,774	46,774	46,774

Note: This table reports the results of regressions at the bank-firm level as in Table 4, in which we consider additional control variables. Column (1) adds the share of mortgage-backed credit in overall bank credit as of 1997. Column (2) adds a measure of house price change defined as the bank-level, which weights the changes in house price at the province level with the shares of credit that a given bank gives to each province. Column (3) considers the two former controls, and adds the interaction of bank exposure to Chinese imports $\Delta IP_{b,2000-2006}$ with a variable $IO_{p,2000}$, which defines (the inverse of) bank investment opportunities outside of exposed manufacturing-firms and construction firms for each province p .

the coefficient on the interaction between $\Delta IP_{b,2000-2006}$ and $IO_{p,2000}$ is highly positive and statistically significant.

This finding indicates that the increase in the supply of credit to construction firms is stronger if banks operate in areas with fewer investment opportunities out of exposed manufacturing industries. The marked spatial agglomeration of manufacturing industries (e.g., Krugman, 1991; Ellison and Glaeser, 1997; Ellison et al., 2010) implies that banks with highly geographically concentrated lending could mainly shield their balance sheet from the decline in profitability of the industries competing with Chinese imports by shifting their loans to construction firms.

5 Real Effects

The previous sections have shown that banks exposed to Chinese import competition have reshuffled their corporate loan portfolios, by cutting the supply of credit to firms operating in sectors directly competing with Chinese goods, while raising the lending towards non-exposed industries, and in particular towards construction firms. In this section we evaluate whether the bank portfolio reallocation shaped only the dynamics of the corporate loan market, or if it had real effects by affecting the economic activity of Spanish firms.

To quantify the real effects of the bank portfolio reallocation, we focus on three key outcomes: value added, sales, and the number of employees. Then, we study to what extent the change in each of these variables between 2000 and 2006 has been influenced by the direct exposure of each firm to Chinese competition, $\Delta IP_{s,2000-2006}$, and by the exposure of the banks associated with each firm $\Delta \hat{IP}_{b,2000-2006}$, which is defined as in Equation (9). To do so, we focus on multi-bank firms and run the regression

$$\begin{aligned} \Delta Y_{f,s,2000-2006} = & \beta_1 \Delta IP_{s,2000-2006} + \beta_2 \Delta \hat{IP}_{b,2000-2006} + \mathbf{X}'_{f,s,2000} \beta_3 + \dots \\ & \dots + \mathbf{X}'_{s,2000} \beta_4 + \delta_s + \delta_{\text{province}} + \hat{\delta}_f + \epsilon_{f,2000-2006} \end{aligned} \quad (13)$$

where $\Delta Y_{f,s,2000-2006}$ is the relative change between 2000 and 2006 of one of the three real outcomes of firm f operating in industry s (i.e., value added, sales, and employment).

Importantly, each regression includes a set of firm characteristics $\mathbf{X}'_{f,s,2000}$, which consist of leverage, the liquidity ratio, the return on assets, and size measured in logarithm of assets, a set of sector characteristics $\mathbf{X}'_{s,2000}$, which consist of the sectoral averages of each firm control, and both sectoral and province fixed effects. In addition, we also control for the firm fixed effect as estimated in the baseline bank-firm-level regression on the change in credit, such as that we can control for the estimated firm credit demand.

Table 12 reports the results for the regression on the change in value added across exposed manufacturing firms, non-exposed manufacturing firms, services firms, and construction firms, whereas Table 13 and Table 14 report similar

results for the case in which the dependent variable is the change in total sales and the change in the number of employees, respectively.

The credit supply channel of foreign import penetration had large real effects. In addition to confirming the findings of previous studies indicating that rising imports depressed the economic activity of firms operating in sector subject to the competition of Chinese goods, we highlight a new channel through which these firms experienced a further drop in their real outcomes triggered by the cut in the supply of credit from exposed banks. This novel mechanism accounts for between one third and two thirds of the negative effects due to firms' direct exposure to foreign imports. On the one hand, a one-standard deviation increase in the direct sectoral exposure to Chinese imports reduced sales, value added, and employment in exposed manufacturing firms between 2000 and 2006 by 24.1%, 17.2%, and 10%, respectively. On the other hand, a one-standard deviation increase in bank exposure to Chinese imports reduced sales, value added, and employment in exposed manufacturing firms by 8.3%, 6%, and 7.5%.

Banks' portfolio reallocation triggered a surge in the real outcomes on firms in non-exposed sectors. This channel is only relevant for construction firms, as the effects on non-exposed manufacturing firms and services firms is not statistically significant. A one-standard deviation increase in bank exposure to China raised sales, value added, and employment of the construction sector between 2000 and 2006 by roughly 6%.

The rationale of the differential effects of bank credit reallocation towards non-exposed sectors on the real effects of firms operating in industries, with only construction companies experiencing a surge in their economic activity, is twofold. First, although banks reallocate their loan portfolios towards firms in all these non-exposed sectors, the evidence on the surge in credit supply to construction firms is stronger and more robust across all specifications. Second, while the rise in lending towards non-exposed manufacturing and services firms worked only through the intensive margin, the extra supply of credit to construction firms was channeled both through the intensive and extensive margin. This is relevant

Table 12: Real Effects - Value Added.

	Dependent Variable: Δ Value Added $_{f,s,2000-2006}$							
	Exposed Manufacturing		Non-Exposed Manufacturing		Services		Construction	
	(1) OLS	(2) IV	(3) OLS	(4) IV	(5) OLS	(6) IV	(7) OLS	(8) IV
$\Delta\hat{IP}_{b,2000-2006}$	-2.764* (6.374)	-3.618** (1.753)	-1.869 (5.635)	-2.416 (1.477)	-1.891 (6.374)	-1.620 (2.079)	3.404* (5.635)	6.543*** (1.816)
$\Delta IP_{s,2000-2006}$	-0.699*** (0.526)	-0.057 (0.154)						
Sector 1-digit Fixed Effects	YES	YES	YES	YES	YES	YES	YES	YES
Province Fixed Effects	YES	YES	YES	YES	YES	YES	YES	YES
Credit Demand Controls	YES	YES	YES	YES	YES	YES	YES	YES
Firm Controls	YES	YES	YES	YES	YES	YES	YES	YES
Sector Controls	YES	YES	YES	YES	YES	YES	YES	YES
R^2	0.097	-	0.095	-	0.083	-	0.106	-
Observations	23,555	23,555	35,441	35,441	15,181	15,181	18,173	18,173

This table reports the results of a regression in which the dependent variable is the change in the value added of firm f between 2000 and 2006, and the independent variables are the change in bank import penetration defined at the firm level $\Delta\hat{IP}_{b,2000-2006}$ and the change in sectoral import penetration $\Delta IP_{s,2000-2006}$, firm controls in Table 6, sector controls defined as the sector average of the variables used as firm controls, 1-digit sector fixed effects, province fixed effects, and credit demand controls in the form of the estimated firm-fixed effect from the bank-firm-level regressions. Columns (2), (4), (6), and (8) report the results for the case in which the regression is estimated using IV, in which $\Delta\hat{IP}_{b,2000-2006}$ and $\Delta IP_{s,2000-2006}$ are instrumented using $\Delta\hat{IP}_{b,2000-2006}^*$ and $\Delta IP_{s,2000-2006}^*$, respectively. These instruments are derived by exploiting the change in the sectoral import penetration of a pool of non-E.U. advanced economies. In all cases, standard errors clustered at the industry-location level are reported in brackets. *, **, and *** indicate statistical significance at the 10%, 5% and 1%, respectively.

Table 13: Real Effects - Sales.

	Dependent Variable: $\Delta\text{Sales}_{f,s,2000-2006}$							
	Exposed Manufacturing		Non-Exposed Manufacturing		Services		Construction	
	(1) OLS	(2) IV	(3) OLS	(4) IV	(5) OLS	(6) IV	(7) OLS	(8) IV
$\Delta\hat{I}P_{b,2000-2006}$	-3.404* (1.770)	-4.590** (2.040)	-1.324 (1.827)	-1.427 (2.056)	-0.897 (2.184)	-1.117 (2.971)	4.334* (2.418)	5.811** (2.347)
$\Delta IP_{s,2000-2006}$	-0.699*** (0.526)	-0.057 (0.154)						
Sector 1-digit Fixed Effects	YES	YES	YES	YES	YES	YES	YES	YES
Province Fixed Effects	YES	YES	YES	YES	YES	YES	YES	YES
Credit Demand Controls	YES	YES	YES	YES	YES	YES	YES	YES
Firm Controls	YES	YES	YES	YES	YES	YES	YES	YES
Sector Controls	YES	YES	YES	YES	YES	YES	YES	YES
R^2	0.111	-	0.098	-	0.067	-	0.106	-
Observations	23,555	23,555	35,441	35,441	15,181	15,181	18,173	18,173

Note: This table reports the results obtained by the same regressions of Table 12 with the only difference that the dependent variable is the change of firm sales between 2000 and 2006.

Table 14: Real Effects - Employees.

	Dependent Variable: $\Delta\text{Employees}_{f,s,2000-2006}$							
	Exposed Manufacturing		Non-Exposed Manufacturing		Services		Construction	
	(1) OLS	(2) IV	(3) OLS	(4) IV	(5) OLS	(6) IV	(7) OLS	(8) IV
$\Delta\hat{I}P_{b,2000-2006}$	-0.538** (0.237)	-0.667*** (0.212)	-0.049 (0.193)	0.060 (0.213)	0.078 (0.275)	-0.097 (0.350)	0.374* (0.210)	0.547*** (0.208)
$\Delta IP_{s,2000-2006}$	-0.065*** (0.019)	-0.032 (0.023)						
Sector 1-digit Fixed Effects	YES	YES	YES	YES	YES	YES	YES	YES
Province Fixed Effects	YES	YES	YES	YES	YES	YES	YES	YES
Credit Demand Controlx	YES	YES	YES	YES	YES	YES	YES	YES
Firm Controls	YES	YES	YES	YES	YES	YES	YES	YES
Sector Controls	YES	YES	YES	YES	YES	YES	YES	YES
R^2	0.045	-	0.050	-	0.035	-	0.055	-
Observations	23,555	23,555	35,441	35,441	15,181	15,181	18,173	18,173

Note: This table reports the results obtained by the same regressions of Table 12 with the only difference that the dependent variable is the change in the number of firm employees between 2000 and 2006.

as Midrigan and Xu (2014) show that changes in firms' financial frictions have larger aggregate effects when propagating through the extensive margin, whereas the intensive margin amplification is small.

These results add to the debate on the effects of rising Chinese competition on advanced economies. The literature so far has highlighted how firms operating in sectors more exposed to competitive pressures from Chinese imports experienced a sharp drop in profitability, sales, employment, capital expenditures, and innovation (e.g., Xu, 2012; Acemoglu et al., 2016; Bloom et al., 2016; Pierce and Schott, 2016; Autor et al., 2017a; Hombert and Matray, 2018). We add to these findings on two dimensions. First, we highlight a novel amplification channel, through which changes in the supply of credit towards firms in exposed manufacturing industries generate a further drop in firms' economic activity. Second, bank exposure to China implies a reallocation of bank lending towards non-exposed sectors. In particular, this spillover effect has generated a rise in the economic activity of the construction firms.

6 Conclusion

This paper studies the effects of the rising Chinese import penetration in the early 2000s on the Spanish corporate loan market. In particular, we show that banks have reshuffled their loan portfolios by cutting the supply of credit to firms in exposed sectors, and increased the lending to non-exposed industries. Then, we investigate the real effects of the changes in credit supply due to banks' exposure to the rise of China. We look at the changes of firms' value added, sales, and employment between 2000 and 2006 and find that firms in sectors exposed to Chinese competition have suffered a further decline in their economic activity due to the cut in the supply of credit. Quantitatively, this channel accounts for between a third and two thirds of the reduction in firms' economic activity due to their direct exposure to Chinese imports. Overall, these results highlight a novel amplification channel through which the rise of Chinese imports have affected manufacturing industries in advanced economies.

References

- Acemoglu, D., D. Autor, D. Dorn, G. Hanson, and B. Price.** 2016. Import Competition and the Great U.S. Employment Sag of the 2000s. *Journal of Labor Economics*, 34, 141-98.
- Amiti, M., and D. Weinstein.** 2018. How Much do Idiosyncratic Bank Shocks Affect Investment? Evidence from Matched Bank-Firm Loan Data. *Journal of Political Economy*, 126, 525-87.
- Arce, O., R. Gimeno, and S. Mayordomo.** 2018. Making Room for the Needy: The Credit-Reallocation Effects of the ECB's Corporate QE. *Mimeo*.
- Autor, D., D. Dorn, and G. Hanson.** 2013. The China Syndrome: Local Labor Market Effects of Import Competition in the United States. *American Economic Review*, 103, 2121-68.
- Autor, D., D. Dorn, G. Hanson, and K. Majlesi.** 2017a. Importing Political Polarization? The Electoral Consequences of Rising Trade Exposure. *Mimeo*.
- Autor, D., D. Dorn, G. Hanson, G. Pisano, and P. Shu.** 2017b. Foreign Competition and Domestic Innovation: Evidence from U.S. Patents. *Mimeo*.
- Autor, D., D. Dorn, G. Hanson, and J. Song.** 2014. Trade Adjustment: Worker Level Evidence. *Quarterly Journal of Economics*, 129, 1799-860.
- Barrot, J.-N., E. Loualiche, M. Plosser, and J. Sauvagnat.** 2018. Import Competition and Household Debt. *Mimeo*.
- Barrot, J.-N., E. Loualiche, and J. Sauvagnat.** 2019. The Globalization Risk Premium. *Journal of Finance*, forthcoming.
- Bentolilla, S., M. Jensen, and G. Jimenez.** 2018. When Credit Dries Up: Job Losses in the Great Recession. *Journal of the European Economic Association*, 16, 650-95.
- Bernard, A., B. Jensen, and P. Schott.** 2006. Survival of the Best Fit: Exposure to Low-Wage Countries and the (Uneven) Growth of U.S. Manufacturing Plants. *Journal of International Economics*, 68, 219-37.

- Bloom, N., M. Draca, and J. Van Reenen.** 2016. Trade Induced Technical Change? The Impact of Chinese Imports on Innovation, IT, and Productivity. *Review of Economic Studies*, 83, 87-117.
- Bonaccorsi di Piatti, E., and E. Sette.** 2016. Did the Securitization Market Freeze Affect Bank Lending During the Financial Crisis? Evidence from a Credit Register. *Journal of Financial Intermediation*, 25, 54-76.
- Brandt, L., J. Van Biesebroeck, and Y. Zhang.** 2012. Creative Accounting or Creative Destruction? Firm-Level Productivity Growth in Chinese Manufacturing. *Journal of Development Economics*, 97, 339-51.
- Bustos, P., B. Caprettini, and J. Ponticelli.** 2016. Agricultural Productivity and Structural Transformation: Evidence from Brazil. *American Economic Review*, 106, 1320-65.
- Bustos, P., G. Garber, and J. Ponticelli.** 2017. Capital Accumulation and Structural Transformation. *Mimeo*.
- Chakraborty, I., I. Goldstein, and A. MacKinlay.** 2018. Housing Price Booms and Crowding-out Effects in Bank Lending. *Review of Financial Studies*, 31, 2806-53.
- Chodorow-Reich, G.** 2014. The Employment Effects of Credit Market Disruptions: Firm-level Evidence from the 2008-9 Financial Crisis. *Quarterly Journal of Economics*, 129, 1-59.
- Cortes, K., and P. Strahan.** 2017. Tracing Out Capital Flows: How Financially Integrated Banks Respond to Natural Disasters. *Journal of Financial Economics*, 125, 182-99.
- Cingano, F., F. Manaresi, and E. Sette.** 2016. Does Credit Crunch Investment Down? New Evidence on the Real Effects of the Bank-Lending Channel. *Review of Financial Studies*, 29, 2737-73.
- Cuñat, V., D. Cvijanovic, and K. Yuan.** 2018. Within-Bank Spillovers of Real Estate Shocks. *Review of Corporate Finance Studies*, 7, 157-93.

- De Jonghe, O., H. Dewachter, K. Mulier, S. Ongena, and G. Schepens.** 2019. Some Borrowers are More Equal than Others: Bank Funding Shocks and Credit Reallocation. *Review of Finance*, forthcoming.
- Delgado, J., V. Salas, and J. Saurina.** 2007. Joint Size and Ownership Specialization in Bank Lending. *Journal of Banking and Finance*, 31, 3563-83.
- Desai, M., C. Fritz Foley, and K. Forbes.** 2008. Financial Constraints and Growth: Multinational and Local Firm Responses to Currency Depreciations. *Review of Financial Studies*, 21, 2857-87.
- Ellison, G., and E. Glaeser.** 1997. Geographic Concentration in U.S. Manufacturing Industries: A Dartboard Approach. *Journal of Political Economy*, 105, 889-927.
- Ellison, G., E. Glaeser, and W. Kerr.** 2010. What Causes Industry Agglomeration? Evidence from Co-agglomeration Patterns. *American Economic Review*, 100, 1195-213.
- Feenstra, R., H. Ma, and Y. Xu.** 2017. US Exports and Employment. *Mimeo*.
- Gan, J.** 2007. The Real Effects of Asset Market Bubbles: Loan- and Firm-Level Evidence of a Lending Channel. *Review of Financial Studies*, 20, 1941-73.
- Gilje, E., E. Loutskina, and P. Strahan.** 2016. Exporting Liquidity: Branch Banking and Financial Integration. *Journal of Finance*, 71, 1159-84.
- Hombert, J., and A. Matray.** 2018. Can Innovation Help U.S. Manufacturing Firms Escape Import Competition from China? *Journal of Finance*, 73, 2003-39.
- Houston, J., C. James, and D. Marcus.** 1997. Credit Market Frictions and the Role of Internal Capital Markets in Banking. *Journal of Financial Economics*, 46, 135-64.
- Hsieh, C.-T., and P. Klenow.** 2009. Misallocation and Manufacturing TFP in China and India. *Quarterly Journal of Economics*, 124, 1403-48.
- Hsieh, C.-T., and R. Ossa.** 2016. A Global View of Productivity Growth in China. *Journal of International Economics*, 102, 209-24.

- Huber, K.** 2018. Disentangling the Effects of a Banking Crisis: Evidence from German Firms and Counties. *American Economic Review*, 108, 868-98.
- Jimenez, G., A. Mian, J.-L. Peydro, and J. Saurina.** 2019. The Real Effects of the Bank Lending Channel. *Journal of Monetary Economics*, forthcoming.
- Jimenez, G., S. Ongena, J.-L. Peydro, and J. Saurina.** 2012. Credit Supply and Monetary Policy: Identifying the Bank Balance-Sheet Channel with Loan Applications. *American Economic Review*, 102, 2301-26.
- Jimenez, G., S. Ongena, J.-L. Peydro, and J. Saurina.** 2014. Hazardous Times for Monetary Policy: What do Twenty-Three Million Bank Loans say About the Effects of Monetary Policy on Credit Risk-Taking? *Econometrica*, 82, 463-505.
- Kashyap, A., and J. Stein.** 1995. The Impact of Monetary Policy on Bank Balance Sheets. *Carnegie-Rochester Conference Series on Public Policy*, 42, 151-95.
- Khwaja, A. and A. Mian.** 2008. Tracing the Impact of Bank Liquidity Shocks: Evidence from an Emerging Market. *American Economic Review*, 98, 1413-42.
- Krugman, P.** 1991. Increasing Returns and Economic Geography. *Journal of Political Economy*, 99, 483-99.
- Martin, A., E. Moral-Benito, and T. Schmitz.** 2018. The Financial Transmission of Housing Bubbles: Evidence from Spain. *Mimeo*.
- Midrigan, V., and D. Xu.** 2014. Finance and Misallocation: Evidence from Plant-Level Data. *American Economic Review*, 104, 422-458.
- Paravisini, D., V. Rappoport, and P. Schnabl.** 2017. Specialization in Bank Lending: Evidence from Exporting Firms. *Mimeo*.
- Pierce, J., and P. Schott.** 2016. The Surprisingly Swift Decline of US Manufacturing Employment. *American Economic Review*, 106, 1632-62.
- Scharfstein, D., and J. Stein.** 2000. The Dark Side of Internal Capital Markets: Divisional Rent Seeking and Inefficient Investment. *Journal of Finance*, 55, 2537-64.

- Stein, J.** 1997. Internal Capital Markets and the Competition for Corporate Resources. *Journal of Finance*, 52, 111-33.
- Valta, P.** 2012. Competition and the Cost of Debt. *Journal of Financial Economics*, 105, 661-82.
- Xu, J.** 2012. Profitability and Capital Structure: Evidence from Import Penetration. *Journal of Financial Economics*, 106, 427-46.
- Zhu, X.** 2012. Understanding China's Growth: Past, Present, and Future. *Journal of Economic Perspectives*, 26, 103-24.

BANCO DE ESPAÑA PUBLICATIONS

WORKING PAPERS

- 1801 OLYMPIA BOVER, LAURA HOSPIDO and ERNESTO VILLANUEVA: The impact of high school financial education on financial knowledge and choices: evidence from a randomized trial in Spain.
- 1802 IGNACIO HERNANDO, IRENE PABLOS, DANIEL SANTABÁRBARA and JAVIER VALLÉS: Private Saving. New Cross-Country Evidence Based on Bayesian Techniques.
- 1803 PABLO AGUILAR and JESÚS VÁZQUEZ: Term structure and real-time learning.
- 1804 MORITZ A. ROTH: International co-movements in recessions.
- 1805 ANGELA ABBATE and DOMINIK THALER: Monetary policy and the asset risk-taking channel.
- 1806 PABLO MARTÍN-ACEÑA: Money in Spain. New historical statistics. 1830-1998.
- 1807 GUILHERME BANDEIRA: Fiscal transfers in a monetary union with sovereign risk.
- 1808 MIGUEL GARCÍA-POSADA GÓMEZ: Credit constraints, firm investment and growth: evidence from survey data.
- 1809 LAURA ALFARO, MANUEL GARCÍA-SANTANA and ENRIQUE MORAL-BENITO: On the direct and indirect real effects of credit supply shocks.
- 1810 ROBERTO RAMOS and CARLOS SANZ: Backing the incumbent in difficult times: the electoral impact of wildfires.
- 1811 GABRIEL JIMÉNEZ, ENRIQUE MORAL-BENITO and RAQUEL VEGAS: Bank lending standards over the cycle: the role of firms' productivity and credit risk.
- 1812 JUAN S. MORA-SANGUINETTI and ROK SPRUK: Industry vs services: do enforcement institutions matter for specialization patterns? Disaggregated evidence from Spain.
- 1813 JAMES CLOYNE, CLODOMIRO FERREIRA and PAOLO SURICO: Monetary policy when households have debt: new evidence on the transmission mechanism.
- 1814 DMITRI KIRPICHEV and ENRIQUE MORAL-BENITO: The costs of trade protectionism: evidence from Spanish firms and non-tariff measures.
- 1815 ISABEL ARGIMÓN, CLEMENS BONNER, RICARDO CORREA, PATTY DUIJM, JON FROST, JAKOB DE HAAN, LEO DE HAAN and VIKTORS STEBUNOV: Financial institutions' business models and the global transmission of monetary policy.
- 1816 JOSE ASTURIAS, MANUEL GARCÍA-SANTANA and ROBERTO RAMOS: Competition and the welfare gains from transportation infrastructure: evidence from the Golden Quadrilateral of India.
- 1817 SANDRA GARCÍA-URIBE: Multidimensional media slant: complementarities in news reporting by US newspapers.
- 1818 PILAR CUADRADO, AITOR LACUESTA, MARÍA DE LOS LLANOS MATEA and F. JAVIER PALENCIA-GONZÁLEZ: Price strategies of independent and branded dealers in retail gas market. The case of a contract reform in Spain.
- 1819 ALBERTO FUERTES, RICARDO GIMENO and JOSÉ MANUEL MARQUÉS: Extraction of inflation expectations from financial instruments in Latin America.
- 1820 MARIO ALLOZA, PABLO BURRIEL and JAVIER J. PÉREZ: Fiscal policies in the euro area: revisiting the size of spillovers.
- 1821 MARTA MARTÍNEZ-MATUTE and ALBERTO URTASUN: Uncertainty, firm heterogeneity and labour adjustments. Evidence from European countries.
- 1822 GABRIELE FIORENTINI, ALESSANDRO GALESÌ, GABRIEL PÉREZ-QUIRÓS and ENRIQUE SENTANA: The rise and fall of the natural interest rate.
- 1823 ALBERTO MARTÍN, ENRIQUE MORAL-BENITO and TOM SCHMITZ: The financial transmission of housing bubbles: evidence from Spain.
- 1824 DOMINIK THALER: Sovereign default, domestic banks and exclusion from international capital markets.
- 1825 JORGE E. GALÁN and JAVIER MENCÍA: Empirical assessment of alternative structural methods for identifying cyclical systemic risk in Europe.
- 1826 ROBERTO BLANCO and NOELIA JIMÉNEZ: Credit allocation along the business cycle: evidence from the latest boom bust credit cycle in Spain.
- 1827 ISABEL ARGIMÓN: The relevance of currency-denomination for the cross-border effects of monetary policy.
- 1828 SANDRA GARCÍA-URIBE: The effects of tax changes on economic activity: a narrative approach to frequent anticipations.
- 1829 MATÍAS CABRERA, GERALD P. DWYER and MARÍA J. NIETO: The G-20 regulatory agenda and bank risk.
- 1830 JACOPO TIMINI and MARINA CONESA: Chinese exports and non-tariff measures: testing for heterogeneous effects at the product level.
- 1831 JAVIER ANDRÉS, JOSÉ E. BOSCA, JAVIER FERRI and CRISTINA FUENTES-ALBERO: Households' balance sheets and the effect of fiscal policy.

- 1832 ÓSCAR ARCE, MIGUEL GARCÍA-POSADA, SERGIO MAYORDOMO and STEVEN ONGENA: Adapting lending policies when negative interest rates hit banks' profits.
- 1833 VICENTE SALAS, LUCIO SAN JUAN and JAVIER VALLÉS: Corporate cost and profit shares in the euro area and the US: the same story?
- 1834 MARTÍN GONZÁLEZ-EIRAS and CARLOS SANZ: Women's representation in politics: voter bias, party bias, and electoral systems.
- 1835 MÓNICA CORREA-LÓPEZ and BEATRIZ DE BLAS: Faraway, so close! Technology diffusion and firm heterogeneity in the medium term cycle of advanced economies.
- 1836 JACOPO TIMINI: The margins of trade: market entry and sector spillovers, the case of Italy (1862-1913).
- 1837 HENRIQUE S. BASSO and OMAR RACHEDI: The young, the old, and the government: demographics and fiscal multipliers.
- 1838 PAU ROLDÁN and SONIA GILBUKH: Firm dynamics and pricing under customer capital accumulation.
- 1839 GUILHERME BANDEIRA, JORDI CABALLÉ and EUGENIA VELLA: Should I stay or should I go? Austerity, unemployment and migration.
- 1840 ALESSIO MORO and OMAR RACHEDI: The changing structure of government consumption spending.
- 1841 GERGELY GANICS, ATSUSHI INOUE and BARBARA ROSSI: Confidence intervals for bias and size distortion in IV and local projections – IV models.
- 1842 MARÍA GIL, JAVIER J. PÉREZ, A. JESÚS SÁNCHEZ and ALBERTO URTASUN: Nowcasting private consumption: traditional indicators, uncertainty measures, credit cards and some internet data.
- 1843 MATÍAS LAMAS and JAVIER MENCÍA: What drives sovereign debt portfolios of banks in a crisis context?
- 1844 MIGUEL ALMUNIA, POL ANTRÀS, DAVID LÓPEZ-RODRÍGUEZ and EDUARDO MORALES: Venting out: exports during a domestic slump.
- 1845 LUCA FORNARO and FEDERICA ROMEI: The paradox of global thrift.
- 1846 JUAN S. MORA-SANGUINETTI and MARTA MARTÍNEZ-MATUTE: An economic analysis of court fees: evidence from the Spanish civil jurisdiction.
- 1847 MIKEL BEDAYO, ÁNGEL ESTRADA and JESÚS SAURINA: Bank capital, lending booms, and busts. Evidence from Spain in the last 150 years.
- 1848 DANIEL DEJUÁN and CORINNA GHIRELLI: Policy uncertainty and investment in Spain.
- 1849 CRISTINA BARCELÓ and ERNESTO VILLANUEVA: The risk of job loss, household formation and housing demand: evidence from differences in severance payments.
- 1850 FEDERICO TAGLIATI: Welfare effects of an in-kind transfer program: evidence from Mexico.
- 1851 ÓSCAR ARCE, GALO NUÑO, DOMINIK THALER and CARLOS THOMAS: A large central bank balance sheet? Floor vs corridor systems in a New Keynesian environment.
- 1901 EDUARDO GUTIÉRREZ and ENRIQUE MORAL-BENITO: Trade and credit: revisiting the evidence.
- 1902 LAURENT CAVENAILE and PAU ROLDAN: Advertising, innovation and economic growth.
- 1903 DESISLAVA C. ANDREEVA and MIGUEL GARCÍA-POSADA: The impact of the ECB's targeted long-term refinancing operations on banks' lending policies: the role of competition.
- 1904 ANDREA ALBANESE, CORINNA GHIRELLI and MATTEO PICCHIO: Timed to say goodbye: does unemployment benefit eligibility affect worker layoffs?
- 1905 CORINNA GHIRELLI, MARÍA GIL, JAVIER J. PÉREZ and ALBERTO URTASUN: Measuring economic and economic policy uncertainty, and their macroeconomic effects: the case of Spain.
- 1906 CORINNA GHIRELLI, JAVIER J. PÉREZ and ALBERTO URTASUN: A new economic policy uncertainty index for Spain.
- 1907 SERGIO PUENTE and ELENA VOZMEDIANO: Minimum and bargained wages: pass-through and labor market performance.
- 1908 SERGIO MAYORDOMO and OMAR RACHEDI: The China syndrome affects banks: the credit supply channel of foreign import competition.