Government Credit and International Trade

HONG RU and ENDONG YANG[1]

May 2024

Abstract

Using transaction-level trade data from China Customs and loan data from the China Development Bank (CDB), we find that CDB credit to strategic industries at the top of supply chains leads to lower prices, higher volume, and more product varieties and destinations for exports for firms in downstream industries. These positive spillovers stem from reduced intermediate goods prices and increased trade credit from upstream to downstream firms caused by CDB loans. Notably, this surge in import activity displaces U.S. firms within the same industry but bolsters downstream U.S. firms' business performance and employment.

[1] Corresponding author: Ru, Nanyang Technological University Nanyang Business School, S3-B1A-07, 50 Nanyang Avenue, Singapore, 639798 (email: hongrucn@icloud.com; Tel: (65) 6790-4661; Fax: (65) 6791-3236); Yang, University of Macau Faculty of Business Administration, Avenida da Universidade, Macau (email: endongyang@um.edu.mo). We thank Nittai Bergman, Hans Degryse, Haichao Fan, Zuzana Fungacova, Jian Gao, Lei Gao, Jarrad Harford (Editor), Yang Jiao, Chen Lin, Shu Lin, Ernest Liu, Randall Morck, Yi Huang, Orkun Saka, Julien Sauvagnat, Antoinette Schoar, Kang Shi, Philip Strahan, Anjan Thakor, Robert Townsend, Pengfei Wang, Shang-Jin Wei, Danyang Xie, Bing Xu, Haoxiang Zhu, and an anonymous referee. We are grateful for valuable comments and suggestions received from the following events: AEA Poster 2020, ABFER 2019, SFS Cavalcade North America 2019, the SERC 2019 Conference, CESifo/BOFIT Workshop on Banking and Institutions 2019, and UIBE International Conference in Finance 2018. We also thank Chinese University of Hong Kong (Shenzhen), Nanyang Technological University, and Xiamen University seminar participants for their comments. We gratefully acknowledge the financial support received from the Ministry of Education, Singapore, under its Tier 1 RG134/20., the National Science Foundation of China [72302003], the Multi-Year Research Grant from the University of Macau [MYRG-GRG2023-00011-FBA], and in-kind support for data access from the China Development Bank. To the authors' knowledge, no conflicts of interest, financial or otherwise, exist. The views presented are our own, and we are solely responsible for any errors.

I. Introduction

International trade, a vital part of the global economy, is influenced by government policies (e.g., Grossman and Rogoff (1995)).[2] Despite the recent growing literature on the economic consequences of government-subsidized credit (e.g., Kaboski and Townsend (2012), Lucas (2016), Ru (2018), and Huang, Pagano, and Panizza (2020)), there is limited empirical evidence on how government credit affects international trade across the supply chain.[3] This paper contributes to the debate by investigating the influence of China's government-subsidized credit as a novel channel on export activities and its spillover effects across the supply chain in the U.S., its largest bilateral trade partner.[4]

Specifically, we harness extensive export transaction data from China and province-industry-level loan data from the China Development Bank (CDB), leading to two pivotal discoveries. First, CDB's subsidized loans to China's strategic upstream industries at the top of the supply chain (e.g., energy and mining) generate positive spillovers for downstream firms by lowering the prices of intermediate input products and enabling upstream firms to extend more trade credit to downstream firms. These spillovers result in reduced export prices, increased volumes, more destinations, and greater product varieties for downstream industries. Second, the increased export volume with lower prices from China crowds out the U.S. firms in the same

---

[2] The total trade transaction volume reached approximately USD 25 trillion in 2019 (approximately 28.5% of global GDP). See this report for further details on recent global trade activities. International trade has also been shown to affect cross-border mergers and to transmit merger activities across countries (e.g., Harford, Schonlau, and Stanfield (2019), Ahmad, de Bodt, and Harford (2021)).

[3] Liu (2019) shows the importance of the input-output linkages across the supply chain for the transmission of government industrial policies in China.

[4] There is a growing literature on the trade frictions between the U.S. and China (e.g., Ding, Fan, and Lin (2018), He, Pan, Shim, and Xu (2019), Amiti, Redding, and Weinstein (2020), Fotak, Lee, Megginson, and Salas (2023), and Huang, Lin, Liu, and Tang (2023)).

industry in terms of employment and performance. By contrast, the U.S. firms in downstream industries benefit from the cheaper intermediate goods imported from China and subsequently perform better. We provide novel evidence on how government credit reshapes trade activities, especially for spillovers across the supply chain to other countries.

Our primary data, sourced from China Customs, encompasses all export and import transactions between 2000 and 2013. Each transaction provides detailed information, such as product price, quantity, transportation method, destination country, firm name, and location, allowing us to examine the dynamics of China's export activities. Additionally, we draw on loan records from the China Development Bank, the world's premier policy bank, with RMB 18.2 trillion in total assets in 2022. Our sample incorporates CDB loans extended to 46 industries, segregated into 9 upstream and 37 downstream sectors, using upstreamness indexes based on the input-output (IO) matrix as per Antràs, Chor, Fally, and Hillberry (2012).[5] We define each firm's key upstream industry in the China Customs data as the industry providing the majority of its inputs.

Utilizing these data, we first conduct OLS regressions of firm export activities on CDB credit to the firm's own industry and upstream industry. In line with the existing literature, we employ export volume, the number of export destinations, the number of products, and the number of destination-product pairs at the firm-year level to capture firms' ability to overcome fixed costs for market entry or new product introduction (Becker, Chen, and Greenberg (2013), Manova, Wei, and Zhang (2015)). We find that CDB loans to the firm's upstream industry are strongly positively associated with its export activities for firms in downstream industries. In contrast, CDB loans to the firm's industry show weak positive correlations with its export

[5] See Section IV.A for a detailed discussion.

activities. The findings suggest that government credit to upstream industries positively impacts downstream firms' exports.

We further investigate how CDB credit to upstream industries affects downstream firms through two channels. First, we scrutinize the pass-through via the intermediate goods channel across the supply chain. We observe a negative relationship between CDB loans to upstream industries (e.g., mining) and their product prices, primarily intermediate goods for downstream industries. This leads to a similar negative correlation between the cost of goods sold by downstream firms and CDB loans to their upstream counterparts, emphasizing the intermediate goods channel's critical role. Simultaneously, we investigate the financial channel, assessing how CDB credit affects trade credit across the supply chain. We find a positive correlation between CDB loans to upstream industries, upstream firms' accounts receivable, and downstream firms' accounts payable. This suggests that CDB credit can traverse from upstream to downstream industries via trade credit, establishing another vital conduit for the positive spillover of CDB credit on downstream exports. In a nutshell, CDB credit facilitates trade activities through both intermediate goods and financial channels.[6]

One potential caveat regarding identification is the non-random allocation of CDB credit by the government. To establish causality, we use the exogenous variation from predetermined predicted municipal politicians' turnover cycles. City secretaries of the Communist Party of China (CPC) in Chinese municipalities have promotions tied to local economic performance (Li and Zhou (2005)), incentivizing them to borrow and invest early in their five-year tenure. We

[6] We also discover that larger CDB loans to downstream industries correlate with increased average prices of goods produced by upstream firms and higher accounts receivable. This correlation indicates that downstream CDB loans may boost demand for upstream goods, thus driving up average prices and resulting in higher accounts receivable when downstream customers receive more CDB loans.

identify each city's largest state-owned enterprises (SOEs) industry (i.e., focal industry), often predetermined by historical reasons. We then interact the dummy variable for focal industries in a province's cities with the dummy for the first three years of cities' secretaries' term, using the interaction term as the instrument for province-industry level CDB loans.[7]

Our first-stage regression indicates that provinces significantly increase their borrowing from CDB for key city industries during a city secretary's initial three-year term. Second-stage regressions confirm that CDB loans markedly enhance the export activities of downstream firms within the same province. Specifically, a one standard deviation rise in CDB upstream loans leads to approximately 38.4% more export volume, 25.7% additional destinations, 21.1% more products, and 30.4% more destination-product pairs for downstream firms. These effects outperform direct CDB loans, aligning with the fact that roughly 90% of CDB loans serve the nine upstream industries. In addition, 2SLS regressions show that CDB loans lower upstream firms' product prices and raise accounts receivable and payable, underscoring the spillover effects of government credit on the economy. Overall, the increased export volume induced by CDB loans contributes an average of 0.685% to China's annual GDP.

A concern with the instrumental variables in the 2SLS pertains to whether they impact export activities exclusively through CDB loans. In China, local politicians can influence firm export activities via tax incentive schemes (e.g., income tax and value-added tax), subsidies, and treaties for foreign investors. Moreover, local politicians might seek alternative financial and fiscal resources to invest in the local economy, such as loans from other banks, land sales, and fiscal transfers. We test all these channels, finding neither statistically nor economically

[7] We find that city secretaries borrow significantly larger amount of CDB loans during the first three years of their terms. Our main findings are consistent if we use city mayor's turnover to construct the instrument. We thank the referee for this very beneficial suggestion.

significant associations with local politician turnover cycles. While our results do not preclude the possibility that local politicians use these policies to influence local exports, the exclusion condition depends on these channels not correlating with predetermined politician turnover cycles, as supported by our data.

Lastly, we explore how lower-priced exports from China, propelled by government credit, impact foreign firms, particularly in U.S.-China trade. By calculating the price drop of Chinese exports due to CDB loans and regressing U.S. firms' performance and employment on these estimated reductions, we reveal that decreased Chinese import prices, prompted by CDB credit, crowded out U.S. firms in the same industry. Conversely, reduced prices of upstream goods from China enhance downstream U.S. firms' assets, sales, and employment, benefiting from affordable inputs. We further explore spillover heterogeneity on U.S. downstream firms from cheaper Chinese imports. Positive spillover effects intensify in high-unemployment states but weaken for firms impacted by tariff increases during the U.S.-China trade war, implying strategic tariff avoidance on primary input imports by the U.S. government.

We contribute to several strands of the literature. First, our study contributes to the extensive literature on government policies in international trade, which has primarily focused on trade policy, tariffs, and the role of financial institutions (e.g., Pavcnik (2002), Topalova and Khandelwal (2011), Khandelwal, Schott, and Wei (2013), Fan, Li, and Yeaple (2015), De Loecker, Goldberg, Khandelwal, and Pavcnik (2016), Brandt, Van Biesebroeck, Wang, and Zhang (2017)). Numerous studies have found that strong financial institutions facilitate trade, especially for sectors relying more on external finance (e.g., Kletzer and Bardhan (1987), Beck (2002), Ju and Wei (2010), Becker et al. (2013), Manova (2013)). Recent literature also documents the negative effects of credit constraints on trade at the firm level (e.g., Amiti and

Weinstein (2011), Minetti and Zhu (2011), Fan, Lai, and Li (2015), Manova et al. (2015), Muûls (2015), Paravisini, Rappoport, Schnabl, and Wolfenzon (2015)). However, few studies specifically examine how government-directed credit affects trade despite its growing size globally in recent years (e.g., Lucas (2016)). Our research fills this gap by documenting a substantial positive spillover of government credit on downstream firms' exports in boosting export volume, destination variety, and product diversity, which is passed through via input-output linkages.[8] This finding suggests that government credit may help firms overcome market failures (e.g., Atkinson and Stiglitz (1980), Stiglitz (1993)), such as financing entry into new markets.[9] Moreover, we identify two critical mechanisms for the positive spillovers of government credit—cheaper intermediate goods and trade credit transmission across industries—offering policymakers an enhanced understanding of potential spillovers and the mechanisms involved in government credit allocation.[10]

Second, our study sheds light on the literature by differentiating the crowding-out and crowding-in effects of cheaper Chinese exports on U.S. firms from a supply chain perspective. Wang, Wei, Yu, and Zhu (2018) find that imported intermediate goods from China increase employment for downstream U.S. firms, while Huang, Lin, et al. (2020) note negative stock

[8] Some prior studies highlight the direct effects of government subsidies, with Westphal (1990) attributing Korea's export competitiveness to selective industrial policies, and He et al. (2019) suggesting that removing subsidies on China's state-owned enterprises and credit constraints on private firms could spur economic transition, reduce trade imbalance, and increase welfare.

[9] This paper also relates to the literature on China's economy and the state's role, showcasing the beneficial aspects of government-subsidized credit and its core mechanisms. While state-ownership plays a key role in China's financial market, leading to distorted resource allocation and potential system risks (e.g., Allen, Qian, and Qian (2005), Song and Xiong (2018), Cong, Gao, Ponticelli, and Yang (2019), Liu (2019), Huang et al. (2020)), our study highlights its brighter and constructive facets.

[10] Our findings on the two channels of government credit transmission are also linked to another strand of the literature on the pass-through of monetary policy via banks (e.g., Bernanke (1983), Kashyap and Stein (1994), He and Krishnamurthy (2013), Drechsler, Savov, and Schnabl (2017)).

market reactions to new tariffs in 2018 for U.S. firms using Chinese imports in production. While crowding-out effects on U.S. firms in horizontal industries align with previous studies on the negative impact of Chinese exports on U.S. employment (e.g., Autor, Dorn, and Hanson (2013), Acemoglu, Autor, Dorn, Hanson, and Price (2016), Pierce and Schott (2016)), we also demonstrate that reduced prices of intermediate goods from China benefit downstream U.S. firms. The finding of these countervailing effects not only holds significant policy implications for the U.S.-China trade war (e.g., Ding, Fan, and Lin (2018), He et al. (2019), Amiti et al. (2020); Huang, Lin et al. (2020)) but also provides useful insights to the ongoing debate about government credit and trade frictions, which are prevalent throughout the world (OECD (2018), (2019)).

The rest of this paper is organized as follows. Section II describes China's institutional background. In Section III, we present our data and summary statistics. Section IV provides the empirical results, and Section V concludes.

II. Institutional Background

A. China's Economic Reform and Trade Policies

Initiated in 1978 under Deng Xiaoping, China's economic reforms—encompassing tariff and trade barrier reductions and deregulations—catalyzed a substantial growth in trade volume. For instance, by 2001, the tariff rate had plunged from 56% to 15%, with over 60% of imports being tariff-free, propelling trade from $20 billion at the start of the reform to over $500 billion. China's induction into the World Trade Organization in 2001, after 15 years of negotiation, accelerated this surge in international trade, with firms rapidly expanding to global markets. Tariffs on industrial products further dropped to 8.9% by 2010. This momentum pushed total trade volumes from nearly $510 billion in 2001 to an overwhelming $4.1 trillion in 2013, surpassing the U.S. to become the largest trading nation globally.[11]

Although functioning within a market economy, China's state capitalism enables government control over economic activities through corporatized agencies and state-owned enterprises (SOEs). Scholars have posited that government trade policies may have a mercantilist nature (Brander and Spencer (1985), Rodrik (1995), (2013)). China has faced criticism for its export-oriented mercantilist policies, including industrial strategies and credit support (Godement, Parello-Plesner, and Richard (2011), Hormats (2011), Atkinson (2012)). Notably, the government employs multiple subsidization techniques for industries such as steel, including direct cash and resource grants, land grants, credit subsidies, tax incentives, preferential loans, and directed credit from state-owned banks (Price, Weld, Nance, and Zucker (2006)). Such policies have been effective, with steel exports quadrupling between 1998 and 2005. However, this approach led to tensions, with the U.S., under former President Trump, initiating an investigation into imposing tariffs on over $50 billion worth of Chinese products in 2018. This marked the start of the U.S.-China trade war, as Trump cited China's "unfair trade practices" as the motivation for the move.

B. The China Development Bank and its Role

The China Development Bank is the largest policy bank in China and operates under the direct control of the State Council. As the world's largest development finance institution, it holds total assets of RMB 16.5 trillion as of 2019. The CDB provides medium- to long-term subsidized credit to support China's long-term economic and social development strategies, particularly in underdeveloped areas and bottlenecked industries.

The CDB differs from major commercial banks in China in several ways. For example, it

[11] See Hu, Li, Lin, and Wei (2023) for more details.

offers heavily subsidized loans with interest rates averaging 100 basis points lower than those of commercial banks with similar characteristics. In addition, the CDB issues policy loans targeting strategic industries and infrastructure projects in China, while commercial banks primarily focus on profit-driven ventures in wealthier provinces. The CDB also maintains longer and closer relationships with local governments than commercial banks, assisting many local governments in building financing vehicles to raise debt for them (Gao, Ru, and Tang (2021)).[12]

Playing a crucial role in supporting local enterprises as they expand abroad, the CDB provides approximately RMB 120 billion and 98 billion in credit lines to Huawei and Zhongxing, respectively. The bank also provides over RMB 245 billion in loans to leading solar panel manufacturers in China, which primarily export to overseas markets. The CDB focuses its lending on strategic industries in China, such as the production and supply of electricity and heat, coal mining and dressing, petroleum and natural gas extraction, raw chemical materials and chemical products, and petroleum processing and coking. These industries account for roughly 88.2% of total CDB loans outstanding for all 46 industries in our sample (see Figure A1 in the Online Appendix). They are at the top of the supply chain in China and provide essential intermediate goods to downstream companies, such as manufacturing firms. This paper examines how subsidized CDB loans to upstream industries impact the entire supply chain by passing through to downstream firms.

III. Data, Variables, and Summary Statistics

A. China Customs Data

[12] There are five major nationwide commercial banks in China: Agriculture Bank of China (ABC), Bank of China (BOC), China Construction Bank (CCB), Industrial and Commercial Bank of China (ICBC), and Bank of Communication (BoCom). For more detailed discussions on China's banking system, see Section 1 of the Online Appendix.

Our trade data record the universe of firms' exports and imports at the transaction level from 2000 to 2013, collected and made available by the China Customs Office (e.g., Manova and Zhang (2009)). The data report the free-on-board value of firm exports by product and country for more than 200 destinations and over 7,000 products identified by Chinese eight-digit Harmonized System (HS) codes.[13] For each transaction, the data contain variables such as the ID and name of the exporter/importer, trade volume, unit price, type of trade, transportation method, location of the customs office where the transaction was processed, region or city in China where the product was exported from or imported to, and potential transfer country or region.

We follow the standard approach used in the literature (e.g., Ahn, Khandelwal, and Wei (2011), Kee and Tang (2016)) to exclude export-import firms that do not engage in manufacturing but serve exclusively as intermediaries between domestic producers (buyers) and foreign buyers (producers).[14] We also drop observations with missing values for important firm characteristics (e.g., ownership type, location, and industry). Overall, the number of exporting manufacturing firms in our sample increased from 55,182 in 2000 to 210,927 in 2013, with the number of export transactions increasing from 2,826,286 in 2000 to 6,688,085 in 2013.[15]

We construct four main firm-year-level dependent variables to capture the export

[13] Product classification is consistent across countries at the six-digit HS level. The number of distinct product codes included in the Chinese eight-digit HS system is comparable to that included in the ten-digit HS classification for the U.S.

[14] We use keywords in firm names to identify intermediate firms. We search for Chinese characters that mean "trading," "importer," and "exporter." In pinyin (Romanized Chinese), these terms are: "jin4chu1kou3," "jing1mao4," "mao4yi4," "ke1mao4" and "wai4jing1." The percentage of export amounts of these trade intermediaries decreased from 32% in 2000 to 20% in 2013 in terms of total exports, suggesting that our sample represents the vast majority of China's export volume.

[15] In the Online Appendix, we plot several graphs to summarize the export activities. Figure A2 shows the time trend of total export amounts from 2000 to 2013. Figure A3 shows the top five export industries in China for the early and ending years of our sample period. Figure A4 shows the top ten destinations by total export amounts. Figure A5 classifies exported goods to non-consumer goods (intermediate goods) versus consumer goods (final goods) and shows that most exports from China were intermediate goods.

activities of Chinese firms. First, *LogExport* represents the logarithm of firm export volume and serves as a direct and commonly used metric of export performance. To account for credit constraints that can hinder firms' exports on extensive margins due to costs associated with entering new markets or introducing new products, we employ *LogNumDestinations* and *LogNumProducts*, which represent the logarithm-transformed number of export destinations and product types, respectively, following Bernard, Jensen, Redding, and Schott (2007) and Muûls (2015). We also calculate *LogNumDestProducts*, which represents the logarithm-transformed number of destination-product pairs, to evaluate firms' ability to offset the fixed costs associated with entering new markets with different products, a measure adopted by Manova et al. (2015). Finally, we estimate the average price level of exported goods using two firm-product-year-level proxies. For each firm-year within a four-digit HS code, we determine the simple (trade volume weighted) average price across all transactions, resulting in *LogPrice* (*LogWTPrice*). Detailed definitions of these variables can be found in the Appendix Table.

B. CDB Loan and Politician Profile Data

Our proprietary CDB loan data contain information on outstanding loan amounts and issuances at the province-industry-year level for mainland China from 1994 to 2013. CDB industry classifications are comparable to U.S. 2-digit SIC codes. We match CDB loans to firms included in China Customs data at the province-industry-year level.[16] We define a CDB loan as a *DirectLoan* for a firm if the loan is allocated to the firm's province and industry. For example, suppose the CDB loan granted to province *p* and industry *k* is valued at 10 million in 2005. In

[16] The raw CDB loan data cover 95 industries for 31 provinces in China. After matching with the firm-level data from China Customs and the CIC, our sample contains CDB loans to 46 industries and 31 provinces between 2000 and 2013. These 46 industries in our sample mainly cover the basic and strategic sectors in upstream (e.g., mining, oil, and gas) and manufacturing sectors in downstream (e.g., textiles, manufacture of machinery and equipment).

that case, the *DirectLoan* for firms located in province *p* and operating in industry *k* is valued at 10 million in 2005. We also construct the variable *UpstreamLoan* (*DownstreamLoan*) for a firm if CDB loans are provided to the firm's key upstream (downstream) industry in the same province.

We use the national IO matrix of 2007 from the National Bureau of Statistics of China to construct upstream-downstream industry links. The IO matrix has a more detailed industry classification of 135 industries than the CDB classification (46 industries in our sample). Despite this discrepancy, the two classifications align significantly, with most industries appearing in both. In cases where industries do not match exactly, the IO matrix provides a more granular classification. To illustrate, the textile industry, as defined in the CDB classification, is partitioned into five different industries within the IO matrix. Thus, we manually align these two industrial classifications by aggregating the 135 IO industries to the CDB industry classification. For each industry *k*, we select the industry that provides the highest supply of inputs as its key upstream industry. The key downstream industry is similarly defined.

For identification, we employ local politician turnover cycles to construct the instrument for CDB loans. We have manually gathered data on local Chinese politicians, including detailed information such as gender, age, and birthplace for all city secretaries and mayors. This data is at the city-month level across 334 cities from 1949 to 2013. Section IV.C provides a detailed discussion of our identification strategy.

C. Chinese Industry Census (CIC) Data

Our CIC data cover all manufacturing firms in China with annual sales of RMB 5 million or more (the threshold increased to RMB 20 million in 2011) from 1998 to 2013, collected by the National Bureau of Statistics of China. This firm-year level data includes attributes such as location, industry, and registration type, as well as accounting information such as total assets, total debt, net income, and workforce numbers.

To understand how CDB credit influences supply chains, we create three dependent variables at the firm-year level from this data. We use the logarithm of the cost of goods sold (COGS), represented as *LogCOGS*, for downstream firms. This allows us to assess whether CDB loans to upstream firms lower their product prices, resulting in decreased COGS for downstream firms. Additionally, we construct *LogAccRect*, representing the logarithm of accounts receivable for upstream firms, and *LogAccPay*, representing the logarithm of accounts payable for downstream firms. These measures enable us to examine whether CDB loans motivate upstream firms to extend trade credit to downstream firms.

D. Data on U.S. Firms

Our data start with all public firms in Compustat from 2000 to 2013, where we can obtain information on multiple performance metrics and the number of workers. We exclude firms whose industries do not import from China, as we cannot gauge the effect of Chinese exports on these firms. Specifically, we analyze the total assets, fixed assets, sales, and the number of employees of U.S. firms.

E. Summary Statistics

Our primary sample includes firm-year observations merged between the China Customs data and CDB loan data from 2000 to 2013, covering 1,501,445 firm-year observations. The Appendix Table presents detailed explanations for each variable.

Panel A of Table 1 presents the summary statistics for the firm-year level data from 2000 to 2013. An average firm has an annual export amount of RMB 49.758 million and exports to 7.6 markets with six different groups of products. The median values for *Export*, *NumDestinations*, and *NumProducts* are 5.058, 3, and 2, respectively, suggesting that there are many large exporters. The mean (median) value of a direct loan is approximately RMB 753 (67) million, while the mean (median) upstream loan is valued at approximately RMB 949 (94) million. These statistics align with the CDB's agenda to lend to strategic industries, which are more likely to be upstream industries.

Panel B shows the summary statistics for the average price of the exported products. We have a much larger number of observations because the sample data is aggregated at the firm-product-year level. The simple average prices are close to the trading-amount-weighted average prices. Panel C shows the summary statistics of the U.S. firms included in the analysis of the implications of Chinese exports for U.S. firms.

[Place Table 1 about here]

IV. Empirical Analyses and Results

A. Baseline Results

We begin by examining the association between CDB loans and Chinese firms' export activities. To formally test this association, we estimate the following regression model at the firm-year level:

$$(1)\quad Y_{i,t} = \alpha + \beta_1 LogUpstreamLoan_{i,t} + \beta_2 LogDirectLoan_{i,t} + \mu_i + \eta_{p\times t} + \varepsilon_{i,t},$$

where $Y_{i,t}$ denotes the four dependent variables representing the export volume and extensive margins, *LogExport, LogNumDestinations, LogNumProducts,* and *LogNumDestProducts*, for firm *i* in year *t*. *LogDirectLoan* is the natural logarithm of the outstanding CDB loan amounts granted to the province and industry of firm *i* in year *t*. *LogUpstreamLoan* is the natural logarithm of the outstanding CDB loan amounts granted to the province of firm *i* and its key upstream industry. μ_i indicates firm fixed effects included to mitigate the concern that unobserved time-invariant firm characteristics may drive our results. $\eta_{p\times t}$ indicates province×year fixed effects that condition out the province-time trends. We cluster standard errors at the firm level.

Panel A of Table 2 shows the regression results. *LogDirectLoan* has positive coefficients in all columns, with statistical significance in columns (2)-(4), suggesting that CDB loans positively correlate with export activities within the same industry. Moreover, the coefficients for *LogUpstreamLoan* are also positive across columns (1)-(4) and are significant at the 1% level. This implies that CDB loans to strategic upstream industries, such as energy and mining, have notable positive spillover effects on the export activities of downstream industries, such as manufacturing, surpassing the impacts of direct CDB loans.

The full sample analysis findings shown in Panel A may be influenced by several potential countervailing implications of CDB credit on export activities. For instance, the CDB mainly lends to SOEs and may crowd out private firm export activities, particularly for firms operating in upstream industries that receive most CDB loans. To further substantiate the role of upstream-downstream industry linkages underlying the spillover effects of CDB credit, we follow Antràs et al. (2012) and rank industries across the supply chain by calculating upstreamness indexes. Specifically, 9 of 46 industries in our dataset with the highest upstreamness scores are classified as upstream industries, and the rest are classified as downstream industries (e.g., manufacturing industries).[17] Approximately 91% of the goods from

[17] In particular, we replicate the method used in Antràs et al. (2012) to calculate industry "upstreamness" (or the average distance to the final use) for the 46 industries included in our sample under CDB classifications. A higher value of the upstreamness index indicates a more upstream industry, which tends to be involved in processing raw materials. Conversely, a low upstreamness index value suggests that the industry is a downstream industry with a significant amount of its output going directly to the end user. The top nine upstream industries have an average upstreamness score of 5.406. They are Nonferrous

firms in these upstream industries are intermediate goods purchased directly by downstream firms as inputs for production. As discussed in Section II.B, the CDB primarily targets strategic industries at the top of the supply chain; in our sample of 46 industries, approximately 90% of CDB loans flow to these nine upstream industries. This result reconciles the findings in Panel A, showing that CDB loans to upstream industries have larger positive effects than direct CDB loans.

In Panel B, we perform the regressions of export activities on CDB direct loans for the subsample of firms in the nine upstream industries. The coefficients of *LogDirectLoan* are positive but only statistically significant in column (1), consistent with anecdotal evidence that most CDB loans are intended for strategic industries at the top of the supply chain, which do not export much. For firms in this upstream subsample, we also control for the CDB loans allocated to firms' key downstream industries. The coefficients of *LogDownstreamLoan* in all four columns are insignificantly different from zero, suggesting that CDB loans to the downstream industries do not discernibly affect the export activities of firms in the upstream industries. The insignificance of such results may not be surprising, given that most of the CDB loans are extended to firms in the upstream industries.

In Panel C, we repeat the regressions applied in equation (1) for the subsample of firms in the downstream industries. We find that CDB direct loans to these downstream industries are positively associated with export activities, as suggested by the positive and significant

metals mining and dressing, Petroleum and natural gas extraction, Coal mining and dressing, Chemical fibers manufacturing, Ferrous metals mining and dressing, Production and supply of electricity and heat, Raw chemical materials and chemical products, Smelting and pressing of nonferrous metals, and Petroleum processing and coking. The other 37 industries have an average upstreamness score of 3.391. In addition, we use the data provided by Antràs et al. (2012) for China, and the first five industries with the highest scores are Mining and quarrying, Coke and refined petroleum products, Electricity, Chemicals, and Iron and steel, which are consistent with our classification of the nine upstream industries.

coefficients of *LogDirectLoan* in columns (2) to (4). More importantly, the positive and significant coefficients of *LogUpstreamLoan* in all four columns show that CDB loans to upstream industries have larger positive effects, which are stronger than what we find in Panel A since these downstream industries depend heavily on their upstream suppliers.

[Place Table 2 about here]

To confirm the robustness of our results, we conduct various tests. Initially, we account for all upstream industries when calculating loans, not just the key industry. The positive and significant coefficients of our new measure, *LogWTUpstreamLoan*, mirror previous results (Online Appendix Table A1, Panel A). Additionally, firms may source from suppliers in other provinces, even though the costs might be higher due to geographic distance (e.g., Da, Gurun, Li, and Warachka (2021), Giroud (2013)). We accumulate our loans at the national-industry-year level. The results (Table A1, Panel B) consistently show positive and significant coefficients of *LogAllUpstreamLoan*. Finally, we control for time-varying firm characteristics by cross-referencing China Customs data with CIC data (e.g., Feenstra, Li, and Yu (2014), Fan, Lai, and Li (2015)). Despite the limited match (43% of manufacturing firms), the results (Table A1, Panel C) support our main findings, affirming the beneficial impact of CDB loans to upstream industries on downstream firms.

Taken together, these findings suggest significant positive spillovers of CDB credit to upstream industries on downstream export activities that are stronger than the direct effects of CDB loans to these downstream industries.[18] The results are consistent with the mandate of the

[18] As an additional robustness test, we regress export activities aggregated at the province-industry-year level on CDB loans. The results are shown in Table A2 in the Online Appendix, and we still find higher CDB upstream loans lead to significantly higher export volume. Furthermore, we examine the effects of CDB loans on the number of exporting firms, shedding light on firm export decisions, and find that both CDB direct loans and upstream loans increase the number of exporting firms.

CDB to provide subsidized government credit to strategic industries for the growth of China's economy.

B. Fundamental Mechanisms Underlying Upstream-Downstream Spillover Effects

In this subsection, we further study the fundamental channels of positive spillover effects, i.e., how CDB credit to upstream industries affects downstream firms. In particular, we explore two potential channels across the supply chain: 1) intermediate goods transactions between downstream and upstream industries and 2) financial transactions via trade credit between customers and suppliers.

1. Intermediate Goods Channel Underlying Upstream-Downstream Spillover Effects

First, we investigate how CDB credit to upstream industries affects downstream industries via intermediate goods across the supply chain. We perform regressions of export good prices on CDB direct loans outstanding for the subsample of nine upstream industries. Panel A of Table 3 shows the regression results. In column (1), we use the average price level as the dependent variable and find that the coefficient of *LogDirectLoan* is significantly negative. Moreover, in column (2), we find similar results using the export amount weighted average price level as the dependent variable. These findings suggest that subsidized CDB credit to upstream industries can lower the prices of their goods, which are mainly intermediate goods used by downstream firms as inputs, as discussed in Section IV.A. The positive and significant coefficients of *LogDownstreamLoan* suggest that higher CDB loans to the firms' downstream industries are associated with higher average prices of the goods produced by these firms.

Next, we examine whether downstream firms indeed benefit from the reduced price of goods sold by their key upstream firms. In Panel B of Table 3, we perform regressions of the COGS on *LogDirectLoan* and *LogUpstreamLoan* for the downstream firm subsample. In column

(1), the coefficient of *LogUpstreamLoan* is significantly negative. In column (2), we further control for province-level characteristics (i.e., the province's GDP and population), and the results remain unchanged. These findings suggest that downstream firms can enjoy significantly lower costs of goods in their productions when their upstream suppliers receive more subsidized CDB credit.

[Place Table 3 about here]

Taken together, the findings presented in Table 3 show that CDB credit to upstream industries can help them lower the price of goods sold, which are mostly intermediate goods. Such price reductions can be passed onto downstream firms, which enjoy significantly lower costs of goods sold. This mechanism serves as a fundamental channel underlying the positive spillover effects of CDB loans, passing through from upstream to downstream industries, as shown in Table 2.

2. Financial Channel Underlying Upstream-Downstream Spillover Effects

Second, we explore the potential pass-through between upstream and downstream firms via financial channels. Specifically, trade credit is one of the most crucial financing sources for corporations (e.g., Demirgüç-Kunt and Maksimovic (2001), Fisman and Love (2003)). On the one hand, using the subsample of firms in the nine upstream industries, we perform regressions of accounts receivable on CDB loans to those upstream industries. Panel A of Table 4 shows the results. In column (1), the coefficient of *LogDirectLoan* is significantly positive. In column (2), we find similar results when including province-level controls, suggesting that CDB loans to these nine upstream industries help them extend accounts receivable to their customer firms. The significant coefficient of *LogDownstreamLoan* suggests a weak positive association between CDB loans to the firm's downstream industry and the firm's accounts receivable.

On the other hand, we examine the pass-through to the accounts payable of downstream firms. Specifically, in Panel B of Table 4, we use the subsample of downstream firms and perform regressions of accounts payable on CDB direct and upstream loans for those firms. In columns (1) and (2), the coefficients of *LogUpstreamLoan* are both significantly positive, suggesting that CDB credit to the upstream suppliers could be passed onto downstream firms via trade credit.

[Place Table 4 about here]

In summary, the findings presented in Table 4 reveal another fundamental mechanism underlying the positive spillover effects of CDB loans passing through from upstream to downstream industries: Firms in upstream industries can extend more trade credit to downstream firms, which could help downstream firms mitigate financial constraints, such as fixed costs to enter new markets with broader product scopes, as demonstrated in Table 2.

C. Identification and Instrumental Variables

We cannot draw a causal connection between CDB loans and firms' export activities based on the results provided in the previous subsection because CDB credit allocations are not random. For example, private firms in certain provinces and industries may have better export opportunities and require more inputs from upstream industries. The CDB could lend to those upstream industries mainly due to such opportunities. In this subsection, we employ the two-stage least squares (2SLS) regressions to estimate the causal effects of CDB loans on export activities. In particular, we exploit the exogenous variations of CDB loan allocation using the predicted municipal politician turnover cycles.

Local politicians play a crucial role in obtaining credit from the CDB. In China, the CPC secretary at the municipal level (i.e., city secretary) serves as the leading politician of a city. The city secretary wields broad administrative power and controls in the city and is responsible for local economic development. Maskin, Qian, and Xu (2000) show that promotion is one of the most important career aspirations for politicians in China. It is well known that the promotion of local politicians depends heavily on their GDP performance (Li and Zhou (2005)). Given that it takes time for CDB loans to affect local GDP growth, career concerns incentivize city secretaries to borrow as soon and as much as possible from the CDB after taking office. The standard term for a city secretary in China is five years, and cities typically have different five-year turnover cycles. This allows us to explore the variations in CDB loan amounts brought by the different five-year turnover cycles in different cities.

Given the concern that the timing of politician turnovers can still be endogenous, we use the predicted turnover timing.[19] In particular, we use a simple way to predict turnover timing: the first year of the current city secretary's term is predicted by adding five years to the first year of the previous city secretary's term. If there is no previous turnover cycle, we assign the actual first year of the city secretary as the predicted first year. Because the predicted turnover cycle is predetermined, it is unlikely to be confounded with contemporaneous economic conditions.

Next, we interact the predicted city secretary turnover cycle with the city's focal industry defined using the CIC data and use the interaction as an instrument for province-industry level CDB loan amounts. The city's focal industry is identified as the industry in which the SOEs of the city have the largest total assets. The focal industry is vital to the city's economic development and does not change much over time.[20] The city secretary borrows more from the

[19] We follow Cole (2009) and Shue and Townsend (2013) in using predicted turnover cycles, which are predetermined and not correlated with concurrent political activities and economic conditions. Our main results also hold when we use actual turnover cycles, as shown in Table A4 in the Online Appendix.

[20] The CIC data contain more than 800 thousand firms from 2000 to 2013, making it appropriate to define the city's focal industry using this large and representative data. We follow the official classification of an SOE provided by the National

CDB for SOEs in the city's focal industry if the secretary is in the early years of the term, which we consider an exogenous shock to province-industry level CDB loans. Suppose the focal industry of city *c* is industry *k,* and city *c* belongs to province *p*. If there is a predicted politician turnover in city *c*, the new secretary of city *c* will borrow more for industry *k* once he or she takes office. As a result, CDB loans to industry *k* in province *p* increase. Formally, the regression can be represented as follows:

$$(2) \qquad LogProvLoan_{k,p,t} = \alpha + \beta_1 First3_{k,p,t} + \mu_k + \eta_{p\times t} + \varepsilon_{i,t},$$

where $LogProvLoan_{k,p,t}$ is the logarithm of the outstanding CDB loan amount in industry *k*, province *p,* and year *t*. $First3_{k,p,t}$ is the instrument for the CDB loans, which is a dummy variable that equals one if there is a city in province *p* whose focal industry is *k* in year *t* and the city's secretary is in the first three years of his or her term. μ_k represents the industry fixed effects and $\eta_{p\times t}$indicates the province×year fixed effects. We thus perform 2SLS regressions, and the second-stage regression is specified as follows:

$$(3) \qquad Y_{i,t} = \alpha + \beta_1 Log\widehat{UpstreamLoan}_{i,t} + \beta_2 LogDirectLoan_{i,t} + \mu_i + \eta_{p\times t} + \varepsilon_{i,t},$$

where $Y_{i,t}$ denotes the four dependent variables *LogExport, LogNumDestinations, LogNumProducts,* and *LogDestProducts* for firm *i* and year *t*. Firm fixed effects (μ_i) and province×year fixed effects ($\eta_{p\times t}$) are included to account for time-invariant firm-specific factors and province×year trends.

Table 5 presents the second-stage results of the 2SLS regressions for the sample of

Bureau of Statistics in China. In particular, SOEs include typical SOEs and collectively-owned enterprises (COEs), which are owned collectively by all residents in a community and are typically controlled by local governments (e.g., Song, Storesletten, and Zilibotti (2011)). We classify the remaining firms as private firms. More than 75% of CDB loans go to SOEs, hence we use this approach to define the focal industries as in Ru (2018).

downstream industries. We also trace the effects of CDB loans along the industry supply chain because the majority of loans were extended to strategic industries at the top of the supply chain. We find that the coefficients of *LogUpstreamLoan* are positive in all columns at the 1% significance level. The spillover effects across the industry supply chain are both statistically and economically significant. On average, a one standard deviation increase in *LogUpstreamLoan* to upstream industries leads to 38.4% (4.48%×8.582), 25.7% (2.99%×8.582), 21.1% (2.46%×8.582), and 30.4% (3.54%×8.582) increases in downstream firms' export amounts, the number of export countries, the number of export products, and the number of destination-product pairs, respectively. The coefficient of *LogDirectLoan* is only positive and statistically significant in column (2). Consistent with the OLS regressions, the effects of CDB upstream loans are more pronounced than those of CDB direct loans.

[Place Table 5 about here]

In addition, we perform the 2SLS regressions for the two fundamental channels underlying the CDB's positive spillovers. For the intermediate goods channel, as shown in Table 3, we run the 2SLS regressions of export good prices on CDB direct loans for the subsample of nine upstream industries by instrumenting CDB direct loans. Panel A of Table 6 reports the second-stage regression results. In column (1), the coefficient of *LogDirectLoan* is negative and significant at the 1% level, suggesting that an increase in *LogDirectLoan* to upstream industries leads to a decrease in the average price of their products. Moreover, in column (2), we use the export amount weighted average price level as the dependent variable and find similar results, consistent with OLS regression results shown in Table 3.

Next, we run the 2SLS regressions of the cost of goods sold on CDB direct and upstream loans for the subsample of downstream firms by instrumenting CDB upstream loans. Panel B of

Table 6 reports the second-stage regression results. In particular, the coefficients of *LogUpstreamLoan* are significantly negative, while the coefficients of *LogDirectLoan* are insignificant in both columns. For example, in column (1), the negative coefficient of *LogUpstreamLoan* suggests that an increase in *LogUpstreamLoan* leads to a decrease in the average cost of goods sold by downstream firms. Taken together, the 2SLS regression results shown in Table 6 are consistent with the OLS regressions shown in Table 3, suggesting that CDB credit to the upstream industries leads to lower prices for intermediate goods produced by these upstream industries and used as production inputs for firms in downstream industries.

[Place Table 6 about here]

As in Table 4, we also perform the 2SLS regressions for the financial channels. In Panel A of Table 7, we use the subsample of nine upstream industries to perform the 2SLS regressions of accounts receivable on CDB loans to those upstream industries by instrumenting *LogDirectLoan*. In column (1), the coefficient of *LogDirectLoan* is positive and significant, indicating that more CDB loans to the upstream industries lead to an increase in the accounts receivable of firms in such upstream industries. The results are similar in column (2), where we include province-level controls.

Next, we run the 2SLS regressions of accounts payable for downstream firms. Specifically, in Panel B of Table 7, we use the subsample of downstream firms and perform the regressions of accounts payable on CDB direct and upstream loans by instrumenting *LogUpstreamLoan*. The coefficients of *LogUpstreamLoan* are significantly positive in both columns, suggesting that the increase in *LogUpstreamLoan* leads to an increase in the accounts payable of downstream firms. Taken together, the 2SLS regression results shown in Table 7 are consistent with the OLS regressions shown in Table 4, implying that CDB credit to the upstream industries leads to significant extensions of trade credit from upstream firms to downstream firms. It serves as another fundamental mechanism underlying CDB credit's positive spillovers on export activities in downstream industries, as shown in Table 5.

[Place Table 7 about here]

In summary, government credit not only helps firms in the same industry but also benefits firms in downstream industries. Furthermore, from a back-of-the-envelope calculation, the increased export amount induced by CDB loans is estimated to account for an average of 0.685% of China's yearly GDP.[21] The economic magnitude of our findings is substantial. To put it in perspective, Zia (2008) shows that removing subsidized credit significantly decreases the exports of private firms, yet nearly half of such loans are assigned to publicly listed, financially unconstrained firms, implying an output loss to private firms of 0.75% of GDP. Moreover, Wacziarg and Welch (2008) find that countries with overall trade liberalization increased their average trade-to-GDP ratios by approximately 5% based on cross-country data from 1950 to 1998.

D. Key Identification Assumptions

For our instrumental variable (IV) approach, we consider a few critical assumptions. First, given that the timing of local politician turnover could be influenced by endogenous factors, like power struggles, we use predicted turnover cycles instead of actual ones as the instrument in the first stage. As reported in Table A3 Panel A (Online Appendix), the positive and significant coefficient of *First3* validates the impact of our instrument on the independent

[21] We utilize the estimated coefficients for CDB upstream loans (i.e., 0.0448) in Table 5 to perform the back-of-the-envelope calculation. First, we estimate the increase in export amounts induced by the change in CDB upstream loans for each firm in a given year. Next, we compute the yearly aggregate effects by summing the estimated increases in all firms' export amounts in our sample and then take the average across all the years.

variable—CDB loans at the province×industry level. Furthermore, the results indicate that the amount of CDB loans in a particular industry *k* and province *p* is significantly greater if any cities in *p* have a focal industry of *k* and concurrently have a secretary in the first three years of his or her term with strong incentives to borrow and invest, as discussed in Section IV.C. [22]

The second assumption central to our IV approach is the exclusion condition of our instrument in influencing the dependent variables through the instrumented endogenous variable. In our context, it means that the predicted turnover cycles of city secretaries should only affect export activities via CDB loans. Despite city secretaries' considerable discretion in shaping local economic policies (e.g., Xu (2011)), the exclusion condition requires that they do not significantly exploit these mechanisms earlier in their terms, rather than not using these tools at all.

To test this, we regress various potential channels through which local politicians might influence local export activities on the instrumental variable. These channels include overall tax rates, income tax rates, value-added tax rates, subsidies received by firms, and foreign equity. As indicated in columns (2) to (6) of Table A3 Panel A, none of these potential channels correlate significantly with our instrument.

In addition to these province-industry-year level analyses, we use data from 305 Chinese cities to examine whether local politician turnover timing aligns with other potential influences on exports, such as fiscal income, fiscal expenditures, land sales, loans from other financial institutions, and fiscal transfers. Regression results presented in Table A3 Panel B reveal that these alternative channels have no significant association with the politician turnover cycles. We

[22] Another concern of the 2SLS is the presence of weak IV problems. We conduct weak identification tests and report the Kleibergen-Paap (KP) Wald *F* statistics in the tables. All KP values suggest that our 2SLS tests do not suffer from weak identification problems.

also conduct additional analysis using actual turnover cycles (Table A4, Online Appendix), which yield consistent results.

Collectively, these findings uphold the exclusion condition for the IV: the effects of local politician turnover cycles on export activities operate through CDB lending rather than through alternative channels. Notably, in our case, the threshold for meeting the exclusion condition does not imply that city secretaries refrain from engaging in any of these other activities entirely. Provided that these alternative channels do not align with turnover timing (e.g., they do not display the same significant decreasing pattern over city secretaries' terms as CDB loans), our instrumental variable approach satisfies the exclusion condition.

E. Further Analysis: Spillovers on U.S. Firms

In this subsection, we explore the implications of surges in exports with lower-priced goods from China, fueled by CDB credit, on the U.S. economy. We focus on U.S. firms for two main reasons. First, the U.S. and China are the two largest economies worldwide, and their trade relationship is among the most impactful bilateral trade relationships globally. Second, the ongoing trade conflict between the U.S. and China has provoked considerable debate among academics and practitioners. China has faced criticism from trade partners for its perceived mercantilist trade policies (e.g., Price et al. (2006), Lim, Wang, and Zeng (2018)). Notably, former U.S. President Trump initiated a trade war with China, alleging "unfair trade practices." Many argue that it could inadvertently damage U.S. industrial sectors and households, potentially leading to unemployment in the U.S.[23] Therefore, it is important to understand how

[23] For example, CNN cites a report from Moody's Analytics, which estimates the current trade war with China cost U.S. 300,000 jobs through September 2019 (https://edition.cnn.com/2020/01/14/politics/cost-of-china-tariff-trade-war/index.html). An article in the New York Times reported that the cost of the trade war to the average U.S. family is about $460 in 2019 (https://www.nytimes.com/interactive/2019/business/economy/trade-war-costs.html).

Chinese exports, induced by government credit, affect the performance and employment of U.S. firms.

We begin by documenting that CDB loans lower the price of exported goods, as the changes in export prices caused by CDB credit could directly affect U.S. firms. To formally test this, we first use the 2SLS setting as follows:

$$(4) \qquad Price_{i,j,t} = \alpha + \beta_1 Log\widehat{UpstreamLoan}_{i,t} + \beta_2 LogDirectLoan_{i,t} + \mu_i + \eta_{p\times t} + \lambda_j + \varepsilon_{i,t},$$

where $Price_{i,j,t}$ denotes the simple average price (*LogPrice*) or trade amount weighted average price (*LogWTPrice*) of 4-digit product code *j* exported by firm *i* in year *t*. $Log\widehat{UpstreamLoan}_{i,t}$ represents the instrumented *LogUpstreamLoan* for firm *i* in year *t*. Firm fixed effects and province×year fixed effects are included as usual. We add product fixed effects (λ_j) in the regression to control for the impact of products' intrinsic characteristics on prices.

In Panel A of Table 8, we present the 2SLS regression results for the effects of CDB loans on export prices. We find that the coefficients of *LogUpstreamLoan* in both columns are negative and significant at the 1% significance level, indicating that CDB upstream loans decrease the average export prices of firms in downstream industries, which helps explain the increased export amounts. We perform another back-of-the-envelope calculation that reveals an estimated average price change (in USD) induced by CDB loans of -8.1% from 2000 to 2013 (i.e., -0.65% per year on average) for exports from China induced by CDB loans.[24] Considering

---

[24] We use the estimated coefficient for *LogUpstreamLoan* (-0.0714) from the 2SLS regression results in column (1) of Table 8 Panel A. For a firm *i* in year *t* that exports product *j*, we multiply the coefficient estimate, -0.0714, with the logarithm of CDB loans allocated to the firm's province and key upstream industry. This allows us to estimate the average price change for the firm-product pair in the given year. We utilize export data to all destinations, including the U.S. Next, for each year, we aggregate the average price change across all firm-product pairs by calculating the export amount weighted average price changes for all exported goods. We then compound these CDB-loans-induced yearly average price changes across all years in our sample period to obtain the -8.1% change in average prices induced by CDB loans.

that the RMB appreciated by approximately 25% against the USD during our sample period, CDB loans led to a 31.25% decrease in average export goods prices (in RMB) during this period. In short, the price reduction caused by CDB credit largely offsets the RMB appreciation in this period.

[Place Table 8 about here]

Next, we investigate the impacts of surging export volumes with lower-priced goods from China, caused by CDB credit, on U.S. firm activities. Wang et al. (2018) find that intermediate goods from China to the U.S. lead to increases in employment among U.S. firms in downstream industries. We adopt this industry supply chain perspective to investigate how exports from China affect the performance and employment of horizontal and downstream U.S. firms.

Due to the differences in industry classifications between the U.S. and China, we first align the 95 CDB industries with the 71 industries using the 2007 U.S. IO table from the Bureau of Economic Analysis.[25] We conduct a manual alignment of two industry classification systems, consolidating the 95 industries outlined by the CDB into the categories present in the U.S. IO table. Of the 71 industries specified in the U.S. IO table, 38, including the paper products and textile sectors, offer a direct one-to-one match with the CDB classification. For the remaining industries, the CDB system provides more detailed segments, which are therefore merged to match their corresponding U.S. IO categories. For instance, the food, beverage, and tobacco industries in the CDB classification are aggregated and paired with the food, beverage, and tobacco products category in the U.S. IO table classification.

[25] We choose the industry classification of the U.S. IO table because the goal is to identify the upstream-downstream industry link for U.S. firms, which is also done through the U.S. IO table.

To examine the impact of exports from China on U.S. firms across the supply chain, we construct the upstream-downstream link for U.S. firms using the U.S. IO table and identify the key upstream industry as the one that supplies the most inputs. For each of the 71 industries in the IO table, we estimate the change in average prices at the industry level. We use the estimated coefficients from the 2SLS regression results in Panel A of Table 8 to construct the average price changes for China's exports. In particular, we multiply the coefficient estimate (i.e., -0.0714 in column (1)) for the instrumented independent variable with the logarithm of CDB upstream loans to obtain the estimated export price changes. Then, for each industry *k* and year *t*, we compute the weighted average of all individual price changes using export amount as the weight, whose products fall into industry *k* and year *t*, and then multiply it by negative one to obtain $PriceDrop_{k,t}$, such that higher values indicate larger decreases in prices. This variable represents the average price decreases of China's exports in industry *k* and year *t*, induced by CDB loans.

For U.S. firm *i* whose primary industry is *k*, we define *PriceDrop_Direct* using $PriceDrop_{k,t}$, which measures direct competition from China for U.S. firms in the same industry. For upstream effects, we define *PriceDrop_Upstream* using $PriceDrop_{k',t}$, where k' is the key upstream industry of *k.* It measures the price changes of the output from the firm's key upstream industry that they source as inputs. The following model is estimated to investigate how China's exports with lower prices impact U.S. firms from both the direct competition channel and upstream spillover channel:

(5) $Y_{US_{i,k,t}} = \alpha + \beta_1 PriceDrop\_Direct_{k,t} + \beta_2 PriceDrop\_Upstream_{k,t} + \mu_i + \eta_t + \varepsilon_{i,t}$,

where $Y_{US_{i,k,t}}$ denotes a set of dependent variables measuring the performance and employment of U.S. firm *i* in year *t* whose primary industry is *k*. These dependent variables include the logarithm of total assets (*LogAsset*); tangibility (*PPE/Assets*) computed as property, plants, and equipment scaled by total assets; the logarithm of total sales (*LogSale*); and employment (*LogEmployees*). μ_i represents firm fixed effects, and η_t indicates year fixed effects.

We report the results in Panel B of Table 8. The coefficients of *PriceDrop_Direct* are significantly negative in columns (1) and (2), which suggests that when facing imports from China with reduced prices, U.S. firms in the same industry experience a decline in total and fixed assets. This crowding-out effect of China's exports is consistent with prior findings in the literature. By contrast, the coefficients of *PriceDrop_Upstream* are significantly positive in all columns, suggesting that the lower average prices of exports from China benefit downstream U.S. firms. The results imply that U.S. firms can use cheaper inputs from China, induced by CDB credit, in their productions, leading to increased investments in assets, employment, and sales. The finding of these countervailing effects has substantial policy implications regarding the recent trade war between the U.S. and China.

In addition, we examine the heterogeneity in the spillover effects of cheaper Chinese imports on downstream U.S. firms. We first explore the geographical variations of unemployment across U.S. states to investigate whether such positive spillovers are stronger in states with higher unemployment rates. We obtain the state-level unemployment rate from the U.S. Bureau of Labor Statistics and classify the states into two groups – high versus low – based on the median unemployment rate using the data in 1999, represented by a dummy variable *HighUnemployment*. We choose 1999 for two reasons: 1) We want to mitigate the endogeneity concerns by using a historical unemployment rate as our sample starts in 2000; 2) The state unemployment rates are highly persistent, so it can alleviate the concern of measurement errors. Table 9 Panel A reports the results. The coefficients of the interaction term between

HighUnemployment and *PriceDrop_Upstream* are positive and significant at the 1% significance level in all columns. This suggests that firms in high unemployment states benefit from cheaper inputs from China's upstream industries induced by CDB loans in terms of assets, sales, and employment, which enhances the positive spillovers of cheaper upstream inputs from China on job creation in the U.S.

Finally, we examine whether the opposing effects of increased imports from China have been taken into account in the recent trade war. Former U.S. President Donald Trump asked the United States Trade Representative (USTR) to investigate applying tariffs on US$50-60 billion worth of Chinese goods on March 22, 2018. We obtain the full list of the products for tariff increase in the USTR report and match the ten-digit product codes to the SIC industries using the concordance table provided by Pierce and Schott (2012). We construct a dummy variable, *TradeWarIndustry*, which equals one if the focal upstream industry of the U.S. firm is included in the list of tariff-increase industries and zero otherwise. In Panel B of Table 9, the negative and significant coefficients of *TradeWarIndustry* × *PriceDrop_Upstream* in all columns suggest that the positive spillover effects from cheaper Chinese inputs are significantly weaker for these selected firms. In other words, firms that benefit from cheaper Chinese inputs are less affected by tariff increases occurring from this trade war, implying that the U.S. government understands these countervailing effects of imports from China and strategically avoids raising tariffs on imports used primarily as inputs for U.S. firms in downstream industries.

[Place Table 9 about here]

In summary, Tables 8 and 9 uncover the dual effects of China's surge in lower-priced exports, stimulated by CDB loans, on U.S. industries. While increased competition from cheaper Chinese goods results in reduced assets for directly competing U.S. firms, those leveraging cheaper Chinese inputs see growth in assets, employment, and sales. Consequently, these nuanced dynamics underscore the importance of considering sector-specific impacts when formulating trade policies, as revealed by the strategic tariff increases during the U.S.-China trade war.

Furthermore, the implications of these findings are generalizable beyond China. In particular, trade conflicts, such as those involving subsidies and tariffs, are a global issue extending beyond the U.S.-China dynamic, affecting relationships like U.S.-EU, U.S.-Japan, EU-Japan, and EU-China, and even close allies like the U.S. and Canada.[26] Additionally, the OECD Economic Outlook ((2018), (2019)) note the increasing trend of discriminatory actions by G20 economies since 2012, highlighting that government support, particularly below-market loans from state banks, can disrupt international markets. However, the nature and extent of such support remain largely unexplored due to their complexity and lack of comprehensive data.

V. Conclusion

This paper examines how government-subsidized credit is passed through the supply chain and affects trade activities in the context of China. By merging unique loan data from the CDB with detailed, universal transaction-level data from China Customs, we find that CDB loans granted to upstream industries lead to a surge in export activities and a decrease in export prices for firms in downstream industries. Furthermore, the increase in the export amount with decreased prices from China, in turn, crowds in downstream U.S. firms regarding asset investment and employment, while the U.S. firms in the same industry are crowded out by this

[26] Trade disputes arise among various countries, such as the U.S.-EU, U.S.-Japan, EU-Japan, and EU-China. The Wall Street Journal has compiled a collection titled "Trade: Full Coverage," which features an array of WSJ articles addressing global trade disputes. It is worth noting that even close allies such as the U.S. and Canada have enduring longstanding trade frictions involving commodities like softwood lumber, solar goods, and dairy products.

direct competition from China's exports. These findings from the perspective of supply chains shed light beyond U.S.-China relations to broader, escalating trade frictions worldwide.[27] In addition, the world is currently under high inflationary pressure, and the U.S. is facing decades-high inflation; our findings of lower-priced exports induced by government credit may provide more insights into helping ease inflation.[28]

Moreover, the global prevalence of government-owned banks, such as Germany's KfW Bankengruppe and the Korea Development Bank, indicates a universal pattern of state-backed financing driving international trade. The assets of such national development finance institutions (DFIs) accounted for approximately 15% of GDP across developed countries in 2015, underscoring their substantial role in the global economy. As such, understanding the effects of government credit on international trade becomes critical. This comprehensive examination of the effects of government credit on trade, therefore, encourages policymakers to consider the broader impacts and spillovers of trade policies, extending their view beyond direct effects to encompass global implications.

REFERENCES

Acemoglu, D., D. Autor, D. Dorn, G. H. Hanson, and B. Price. "Import Competition and the Great US Employment Sag of the 2000s." *Journal of Labor Economics*, 34 (2016), S141–S198.

Ahmad, M. F., E. de Bodt, and J. Harford. "International Trade and the Propagation of Merger Waves." *The Review of Financial Studies*, 34 (2021), 4876–4925.

[27] For example, the Reagan administration began a trade war with Japan in 1987 mainly to restore domestic manufacturers, such as automakers; however, this move also cost U.S. jobs. Moreover, the Smoot-Hawley Act in 1930 raised tariffs on almost all imports to the U.S. to protect domestic jobs but potentially extended the Great Depression. The consequences of these policies are debatable and mixed.

[28] U.S. Treasury Secretary Janet Yellen has expressed the view that reducing tariffs on Chinese goods is a way to ease U.S. decades-high inflation in multiple occasions. See, for example, Reuters' article "Yellen says cutting some tariffs on Chinese goods could ease price pressures" in 2021 and WSJ's article "U.S. Considering Reducing Tariffs on China to Ease Inflation, Yellen Says" in 2022.

Ahn, J., A. K. Khandelwal, and S.-J. Wei. "The Role of Intermediaries in Facilitating Trade." *Journal of International Economics*, 84 (2011), 73–85.

Allen, F., J. Qian, and M. Qian. "Law, Finance, and Economic Growth in China." *Journal of Financial Economics*, 77 (2005), 57–116.

Amiti, M., S. J. Redding, and D. E. Weinstein. "Who's Paying for the US Tariffs? A Longer-Term Perspective." *AEA Papers and Proceedings*, 110 (2020), 541–546.

Amiti, M., and D. E. Weinstein. "Exports and Financial Shocks*." *The Quarterly Journal of Economics*, 126 (2011), 1841–1877.

Antràs, P., D. Chor, T. Fally, and R. Hillberry. "Measuring the Upstreamness of Production and Trade Flows." *American Economic Review*, 102 (2012), 412–416.

Atkinson, A. B., and J. E. Stiglitz. "Lectures on Public Economics." (1980). New York: McGraw-Hill.

Atkinson, Robert D. "Enough is enough: Confronting Chinese innovation mercantilism." *Information Technology and Innovation Foundation*, (2012).

Autor, D. H., D. Dorn, and G. H. Hanson. "The China Syndrome: Local Labor Market Effects of Import Competition in the United States." *The American Economic Review*, 103 (2013), 2121–2168.

Beck, T. "Financial Development and International Trade: Is There a Link?" *Journal of International Economics*, 57 (2002), 107–131.

Becker, B., J. Chen, and D. Greenberg. "Financial Development, Fixed Costs, and International Trade." *The Review of Corporate Finance Studies*, 2 (2013), 1–28.

Bernanke, B. S. "Nonmonetary Effects of the Financial Crisis in the Propagation of the Great Depression." *The American Economic Review*, 73 (1983), 257–276.

Bernard, A. B., J. B. Jensen, S. J. Redding, and P. K. Schott. "Firms in International Trade." *Journal of Economic Perspectives*, 21 (2007), 105–130.

Brander, J. A., and B. J. Spencer. "Export Subsidies and International Market Share Rivalry." *Journal of International Economics*, 18 (1985), 83–100.

Brandt, L., J. Van Biesebroeck, L. Wang, and Y. Zhang. "WTO Accession and Performance of Chinese Manufacturing Firms." *American Economic Review*, 107 (2017), 2784–2820.

Cole, S. "Fixing Market Failures or Fixing Elections? Agricultural Credit in India." *American Economic Journal: Applied Economics*, 1 (2009), 219–250.

Cong, L. W., H. Gao, J. Ponticelli, and X. Yang. "Credit Allocation Under Economic Stimulus: Evidence from China." *The Review of Financial Studies*, 32 (2019), 3412–3460.

Da, Z., U. G. Gurun, B. Li, and M. Warachka. "Investment in a Smaller World: The Implications of Air Travel for Investors and Firms." *Management Science*, 67 (2019), 417–435.

De Loecker, J., P. K. Goldberg, A. K. Khandelwal, and N. Pavcnik. "Prices, Markups, and Trade Reform." *Econometrica*, 84 (2016), 445–510.

Demirgüç-Kunt, A., and V. Maksimovic. "Law, Finance, and Firm Growth." *The Journal of Finance*, 53 (1998), 2107–2137.

Demirgüç-Kunt, A., and V. Maksimovic. "Firms as Financial Intermediaries: Evidence from Trade Credit Data." World Bank Policy Research Working Paper No. 2696, (2001).

Ding, H., H. Fan, and S. Lin. "Connect to Trade." *Journal of International Economics*, 110 (2018), 50–62.

Drechsler, I., A. Savov, and P. Schnabl. "The Deposits Channel of Monetary Policy." *The Quarterly Journal of Economics*, 132 (2017), 1819–1876.

Fan, H., E. L.-C. Lai, and Y. A. Li. "Credit Constraints, Quality, and Export Prices: Theory and

Evidence from China." *Journal of Comparative Economics*, 43 (2015), 390–416.
Fan, H., Y. A. Li, and S. R. Yeaple. "Trade Liberalization, Quality, and Export Prices." *The Review of Economics and Statistics*, 97 (2015), 1033–1051.
Feenstra, R. C., Z. Li, and M. Yu. "Exports and credit constraints under incomplete information: Theory and evidence from China." *The Review of Economics and Statistics*, 96 (2014), 729–744.
Fisman, R., and I. Love. "Trade Credit, Financial Intermediary Development, and Industry Growth." *The Journal of Finance*, 58 (2003), 353–374.
Fotak, V., H.S.G. Lee, W.L. Megginson, and J.M. Salas. "Selling Indulgences: The Political Economy of Tariff Exemption Grants." Working paper, (2023).
Gao, H., H. Ru, and D. Y. Tang. "Subnational Debt of China: The Politics-Finance Nexus." *Journal of Financial Economics*, 141 (2021), 881–895.
Giroud, X. "Proximity and Investment: Evidence from Plant-Level Data *." *The Quarterly Journal of Economics*, 128 (2013), 861–915.
Godement, F, J. Parello-Plesner, and A. Richard. "China's scramble for Europe. Eur. Counc. Foreign Relations." (2011).
Grossman, G. M., and K. Rogoff. "Handbook of International Economics," volume 3 (1995). Elsevier.
Harford, J., R. Schonlau, and J. Stanfield. "Trade Relationships, Indirect Economic Links, and Mergers." *Management Science*, 65 (2018), 3085–3110.
He, Y., S. Pan, K. Shim, and J. Xu. "Misallocation and Trade Imbalance: Theory and Evidence from China." Working paper, (2019).
He, Z., and A. Krishnamurthy. "Intermediary Asset Pricing." *American Economic Review*, 103 (2013), 732–770.
Hormats, R.D. "Addressing the Challenges of the China Model. U.S." Department of State. (2011). Available at https://2009-2017.state.gov/e/rls/rmk/20092013/2011/157205.htm.
Hu, Q., W. Li, C. Lin, and L. Wei. "What Causes Privatization? Evidence from Import Competition in China." *Management Science*, (2023).
Huang, Y., M. Pagano, and U. Panizza. "Local Crowding Out in China." *The Journal of Finance*, 75 (2020), 2855–2898.
Huang, Y., C. Lin, S. Liu, and H. Tang. "Trade Networks and Firm Value: Evidence from the U.S.-China Trade War." *Journal of International Economics*, 145 (2023), 103811.
Ju, J., and S.-J. Wei. "Domestic Institutions and the Bypass Effect of Financial Globalization." *American Economic Journal: Economic Policy*, 2 (2010), 173–204.
Kaboski, J. P., and R. M. Townsend. "The Impact of Credit on Village Economies." *American Economic Journal: Applied Economics*, 4 (2012), 98–133.
Kashyap, A.K. and J.C. Stein. "Monetary Policy and Bank Lending." National Bureau of Economic Research Working Paper Series No. 4317, (1994).
Kee, H. L., and H. Tang. "Domestic Value Added in Exports: Theory and Firm Evidence from China." *American Economic Review*, 106 (2016), 1402–1436.
Khandelwal, A. K., P. K. Schott, and S.-J. Wei. "Trade Liberalization and Embedded Institutional Reform: Evidence from Chinese Exporters." *American Economic Review*, 103 (2013), 2169–2195.
Kletzer, K., and P. Bardhan. "Credit Markets and Patterns of International Trade." *Journal of Development Economics*, 27 (1987), 57–70.
Li, H., and L.-A. Zhou. "Political Turnover and Economic Performance: The Incentive Role of

Personnel Control in China.” *Journal of Public Economics*, 89 (2005), 1743–1762.
Lim, C. Y., J. Wang, and C. (Colin) Zeng. “China’s ‘Mercantilist’ Government Subsidies, the Cost of Debt and Firm Performance.” *Journal of Banking & Finance*, 86 (2018), 37–52.
Liu, E. “Industrial Policies in Production Networks*.” *The Quarterly Journal of Economics*, 134 (2019), 1883–1948.
Lucas, D. “Credit policy as fiscal policy.” *Brookings Papers on Economic Activity*, *2016* (1), 1-57.
Manova, K. “Credit Constraints, Heterogeneous Firms, and International Trade.” *The Review of Economic Studies*, 80 (2013), 711–744.
Manova, K., S.-J. Wei, and Z. Zhang. “Firm Exports and Multinational Activity under Credit Constraints.” *The Review of Economics and Statistics*, 97 (2015), 574–588.
Manova, K. and Z. Zhang. “China’s Exporters and Importers: Firms, Products and Trade Partners.” National Bureau of Economic Research Working Paper Series, No. 15249, (2009).
Maskin, E., Y. Qian, and C. Xu. “Incentives, Information, and Organizational Form.” *The Review of Economic Studies*, 67 (2000), 359–378.
Minetti, R., and S. C. Zhu. “Credit Constraints and Firm Export: Microeconomic Evidence from Italy.” *Journal of International Economics*, 83 (2011), 109–125.
Muûls, M. “Exporters, Importers and Credit Constraints.” *Journal of International Economics*, 95 (2015), 333–343.
OECD. “OECD Economic Outlook,” *Volume 2018 Issue 2*, No. 104, OECD Publishing, Paris. *https://doi.org/10.1787/eco_outlook-v2018-2-en*.
OECD. “OECD Economic Outlook,” *Volume 2019 Issue 2*, No. 106, OECD Publishing, Paris, *https://doi.org/10.1787/9b89401b-en*.
Paravisini, D., V. Rappoport, P. Schnabl, and D. Wolfenzon. “Dissecting the Effect of Credit Supply on Trade: Evidence from Matched Credit-Export Data.” *The Review of Economic Studies*, 82 (2015), 333–359.
Pavcnik, N. “Trade Liberalization, Exit, and Productivity Improvements: Evidence from Chilean Plants.” *The Review of Economic Studies*, 69 (2002), 245–276.
Pierce, J. R., and P. K. Schott. “A concordance between ten-digit US Harmonized System Codes and SIC/NAICS product classes and industries.” *Journal of Economic and Social Measurement* 37, no. 1-2 (2012): 61-96.
Pierce, J. R., and P. K. Schott. “The Surprisingly Swift Decline of US Manufacturing Employment.” *American Economic Review*, 106 (2016), 1632–1662.
Price, A., C. Weld, D. Nance, and P. Zucker. “The China Syndrome: How Subsidies and Government Intervention Created the World’s Largest Steel Industry.” (2006). *Wiley Rein & Fielding LLP.*
Rodrik, D. “Political economy of trade policy.” *Handbook of International Economics*, 3 (1995), pp.1457-1494.
Rodrik, D. “The New Mercantilist Challenge.” *Project Syndicate,* (2013). Available at http://www.project-syndicate.org/commentary/the-return-of-mercantilism-by-dani-rodrik.
Ru, H. “Government Credit, a Double-Edged Sword: Evidence from the China Development Bank.” *The Journal of Finance*, 73 (2018), 275–316.
Shue, K., and R. Townsend. “Swinging for the fences: Executive reactions to quasi-random option grants.” *Chicago Booth Research Paper* 13-03 (2013).
Song, Z. M., and W. Xiong. “Risks in China’s Financial System.” *Annual Review of Financial Economics*, 10 (2018), 261–286.
Song, Z., K. Storesletten, and F. Zilibotti. “Growing Like China.” *American Economic Review*,

101 (2011), 196–233.
Stiglitz, J. E. “The Role of the State in Financial Markets.” *The World Bank Economic Review*, 7 (1993), 19–52.
Topalova, P., and A. Khandelwal. “Trade Liberalization and Firm Productivity: The Case of India.” *The Review of Economics and Statistics*, 93 (2011), 995–1009.
Wacziarg, R., and K. H. Welch. “Trade Liberalization and Growth: New Evidence.” *The World Bank Economic Review*, 22 (2008), 187–231.
Wang, Z., S.-J. Wei, X. Yu, and K. Zhu. “Re-Examining the Effects of Trading with China on Local Labor Markets: A Supply Chain Perspective.” National Bureau of Economic Research Working Paper Series, No. 24886, (2018).
Westphal, L. E. “Industrial Policy in an Export-Propelled Economy: Lessons from South Korea’s Experience.” *Journal of Economic Perspectives*, 4 (1990), 41–59.
Xu, C. “The Fundamental Institutions of China’s Reforms and Development.” *Journal of Economic Literature*, 49 (2011), 1076–1151.
Zia, B. H. “Export Incentives, Financial Constraints, and the (Mis)Allocation of Credit: Micro-Level Evidence from Subsidized Export Loans.” *Journal of Financial Economics*, 87 (2008), 498–527.

Appendix Table: Variable Definitions

This table provides detailed definitions of the main variables used in the analyses.

Variable	Definition	Source of Data
LogDirectLoan	The logarithm of *DirectLoan*. *DirectLoan* is the direct CDB outstanding loan amount (in hundred million RMB) at the province-industry-year level. A loan is defined as "direct" for a firm if the firm is in the same province and industry as the loan.	CDB Loan Data
LogUpstreamLoan	The logarithm of *UpstreamLoan*. *UpstreamLoan* is the upstream CDB outstanding loan amount (in hundred million RMB) at the province-industry-year level. The loan is defined as "upstream" for a firm if the loan is given to the upstream industry of the firm in the same province.	CDB Loan Data
LogDownstreamLoan	The logarithm of *DownstreamLoan*. *DownstreamLoan* is the downstream CDB outstanding loan amount (in hundred million RMB) at the province-industry-year level. The loan is defined as "downstream" for a firm if the loan is given to the downstream industry of the firm in the same province.	CDB Loan Data
LogExport	The logarithm of the export volume (in million RMB) of the firm in China Customs data. The variable is at the firm-year level.	China Customs
LogNumDestinations	The logarithm of the number of a firm's export destinations in China Customs data. The variable is at the firm-year level.	China Customs
LogNumProducts	The logarithm of the number of a firm's export product types, where the product type is measured by aggregating the eight-digit product code listed in China Customs data at the four-digit HS code level. The variable is at the firm-year level.	China Customs
LogNumDestProducts	The logarithm of the number of a firm's destination-product pairs. Product type is measured at the four-digit HS level. The variable is at the firm-year level.	China Customs
LogPrice	The logarithm of the average export price (in USD) measured at the firm-product-year level. We compute the simple average of prices at the eight-digit HS product level within a firm-year and aggregate them at the four-digit HS product level.	China Customs
LogWTPrice	The logarithm of the export-weighted-average export price (in USD) measured at the firm-product-year level. We compute average prices using the export amount as the weight at the eight-digit HS product level for a firm-year and aggregate them at the four-digit HS product level.	China Customs
LogCOGS	The natural logarithm of the cost of goods sold (in RMB).	CIC Data
LogAccRect	The natural logarithm of accounts receivable (in RMB).	CIC Data
LogAccPay	The natural logarithm of accounts payable (in RMB).	CIC Data
LogProvLoan	The logarithm of the CDB outstanding loan amount (in hundred million RMB) at the province-industry-year level.	CDB Loan Data
LogCityLoan	The logarithm of the CDB outstanding loan amount (in hundred million RMB) at the city-year level.	CDB Loan Data
OverallTax	The average overall tax rate (=total tax/sales) of firms within a province-industry pair for each year.	CIC Data

IncomeTax	The average income tax rate (=income tax/total profit) of firms within a province-industry pair for each year.	CIC Data
VAT	The average value-added tax rate (=value-added tax/sales) of firms within a province-industry pair for each year.	CIC Data
LogSubsidy	The logarithm of total subsidies (in thousand RMB) received by firms within a province-industry pair for each year scaled by their total assets.	CIC Data
ForeignCap	The sum of the foreign equity (in thousand RMB) of firms within a province-industry pair for each year scaled by their total equities.	CIC Data
LogFiscalInc	The logarithm of the city's fiscal income (in ten thousand RMB).	CSMAR
LogFiscalExp	The logarithm of the city's fiscal expenditure (in ten thousand RMB).	CSMAR
LogLand	The logarithm of the aggregate value of a city's land sales (in ten thousand RMB).	LandChina Website
LogBankLoan	The logarithm of the total loan balance of a city's financial institutions (in ten thousand RMB).	CSMAR
LogTransfer	The logarithm of a city's total fiscal transfer income (in ten thousand RMB).	EPS China Data
First3	A dummy variable equals one if there is a city secretary who is in the predicted first three years of his/her term and if the city's largest SOE industry (i.e., focal industry) is in the same industry as that of the provincial industry loans. The variable is at the province-industry-year level.	CIC and Politician Profile Data
First3A	A dummy variable equals one if there is a city secretary who is in the actual first three years of his/her term and if the city's largest SOE industry (i.e., focal industry) is in the same industry as that of the provincial industry loans. The variable is at the province-industry-year level.	CIC and Politician Profile Data
Year1-3	A dummy variable which equals one if a city secretary is in the predicted first three years of his/her term. The variable is at the city-year level.	Politician Profile Data
Year1-3A	A dummy variable which equals one if a city secretary is in the actual first three years of his/her term. The variable is at the city-year level.	Politician Profile Data
LogWTUpstreamLoan	The logarithm of the weighted average upstream loan amount (in hundred million RMB) computed as the weighted average of loan amounts to all upstream industries (excluding itself) with the weight being the direct consumption coefficient identified from the China IO table.	CDB Loan Data
LogAllUpstreamLoan	The logarithm of the sum of *UpstreamLoan* (in hundred million RMB) for all provinces for a given industry and year. The variable is at the industry-year level.	CDB Loan Data
LogNumFirms	The logarithm of the number of firms that export in a given province and industry for a year.	China Customs
LogAsset	The logarithm of a firm's total assets.	Compustat
PPE/Assets	The tangibility of a firm, computed as property, plants, and equipment divided by total assets.	Compustat
LogSale	The logarithm of a firm's total sales.	Compustat
LogEmployees	The logarithm of the number of employees in a firm.	Compustat

PriceDrop_Direct	The industry-year level average price reduction from China's export in the same industry resulted from CDB loans. See detailed explanation in Section IV.E.	China Customs and CDB Loan Data
PriceDrop_Upstream	The industry-year level average price reduction from China's export in the upstream industry resulted from CDB loans. See detailed explanation in Section IV.E.	China Customs and CDB Loan Data
HighUnemployment	A dummy variable that equals one if the unemployment rate of a firm's headquarters state is above the median in 1999 and zero otherwise.	U.S. Bureau of Labor Statistics
TradeWarIndustry	A dummy variable at the industry level that equals one if it is the key upstream industry of a firm and is listed for tariff increase in the U.S. section 301 report by USTR on March 22, 2018, the beginning of the 2018 China-U.S. trade war. We use the concordance table constructed by Pierce and Schott (2012) to link the HS product codes in the report and the SIC industries.	US Government Website

Table 1: Summary Statistics

This table shows the summary statistics of the main variables used in this study. Panel A reports the summary statistics at the firm-year level for Chinese firms. Export amounts are measured in millions of RMB, and CDB loans are measured in hundreds of millions of RMB. Panel B provides summary statistics for export prices at the firm-product-year level for Chinese firms, where the product is identified at the four-digit HS code level. Panel C reports summary statistics at the firm-year level for U.S. firms listed in Compustat. See the Appendix Table for detailed variable definitions.

Variables	N	Mean	SD	25%	Median	75%
Panel A: Firm-Year Level for Chinese Firms						
Export	1,501,445	49.758	762.959	1.075	5.058	19.495
NumDestinations	1,501,445	7.609	10.912	1.000	3.000	9.000
NumProducts	1,501,445	5.977	17.099	1.000	2.000	5.000
NumDestProducts	1,501,445	18.872	98.105	2.000	6.000	15.000
LogExport	1,501,444	1.452	2.254	0.072	1.621	2.970
LogNumDestinations	1,501,445	1.339	1.144	0.000	1.099	2.197
LogNumProducts	1,501,445	1.035	1.012	0.000	0.693	1.609
LogNumDestProducts	1,501,445	1.850	1.312	0.693	1.792	2.708
DirectLoan	1,501,445	7.533	21.629	0.040	0.673	4.426
UpstreamLoan	1,501,445	9.493	28.523	0.000	0.940	5.109
LogDirectLoan	1,501,445	-3.842	8.145	-3.219	-0.397	1.487
LogUpstreamLoan	1,501,445	-4.203	8.582	-18.421	-0.062	1.631
LogAccPay	1,898,245	12.623	5.515	12.692	14.462	15.767
LogAccRect	357,039	13.478	4.772	13.160	14.714	16.026
LogCOGS	2,640,373	17.093	1.769	16.151	17.090	18.066
Panel B: Firm-Product-Year Level for Chinese Firms						
LogPrice	9,654,875	1.918	2.433	0.362	1.480	2.884
LogWTPrice	9,654,875	1.915	2.471	0.344	1.465	2.868
Panel C: Firm-Year Level for U.S. Firms						
LogAsset	42,068	5.277	3.028	3.349	5.459	7.464
PPE/Assets	42,023	0.377	0.282	0.129	0.316	0.614
LogSale	35,860	5.494	2.888	3.900	5.834	7.471
LogEmployees	33,330	-0.101	2.602	-1.760	0.215	1.727

Table 2: Effects of CDB Loans on Export Activities (OLS)

This table reports the OLS regression results for the effects of CDB loans on firms' export activities by using China Customs data from 2000 to 2013. Export activities are measured at the firm-year level using the logarithm of export amount (*LogExport*), number of export destinations (*LogNumDestinations*), number of export product varieties (*LogNumProducts*), and number of export destination-product pairs (*LogNumDestProducts*). *LogDirectLoan* denotes the logarithm of direct CDB loans outstanding in the firm's industry and province. *LogUpstreamLoan* denotes the logarithm of CDB loans outstanding in the firm's upstream industry and province. Panel A shows the baseline regression results for the full sample. Panel B (C) shows the baseline results for firms in upstream (downstream) industries. Upstream industries include Nonferrous metals mining and dressing, Petroleum and natural gas extraction, Coal mining and dressing, Chemical fibers manufacturing, Ferrous metals mining and dressing, Production and supply of electricity and heat, Raw chemical materials and chemical products, Smelting and pressing of nonferrous metals, and Petroleum processing and coking based on the upstreamness index following Antràs et al. (2012). See the Appendix Table for detailed variable definitions. Standard errors are clustered at the firm level for all regressions, and *t*-statistics are reported in parentheses. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

	1	2	3	4
Dep. Var.	*LogExport*	*LogNumDestinations*	*LogNumProducts*	*LogNumDestProducts*
Panel A: Full Sample				
LogUpstreamLoan	0.0031***	0.0017***	0.0023***	0.0025***
	(10.03)	(11.80)	(17.10)	(14.07)
LogDirectLoan	0.0004	0.0007***	0.0002*	0.0004**
	(1.48)	(4.78)	(1.94)	(2.34)
Firm FE	Yes	Yes	Yes	Yes
Province×Year FE	Yes	Yes	Yes	Yes
Observations	1,501,443	1,501,445	1,501,445	1,501,445
Adjusted R^2	0.693	0.741	0.716	0.725
Panel B: Upstream Sample				
LogDirectLoan	0.0051***	0.0004	0.0008	0.0005
	(3.35)	(0.65)	(1.43)	(0.67)
LogDownstreamLoan	-0.0012	0.0002	0.0005	0.0005
	(-0.71)	(0.26)	(0.71)	(0.54)
Firm FE	Yes	Yes	Yes	Yes
Province×Year FE	Yes	Yes	Yes	Yes
Observations	121,974	121,974	121,974	121,974
Adjusted R^2	0.702	0.744	0.721	0.726
Panel C: Downstream Sample				
LogUpstreamLoan	0.0035***	0.0019***	0.0024***	0.0026***
	(11.00)	(12.40)	(17.22)	(14.48)
LogDirectLoan	0.0003	0.0007***	0.0003**	0.0004**
	(1.08)	(4.62)	(2.09)	(2.23)
Firm FE	Yes	Yes	Yes	Yes
Province×Year FE	Yes	Yes	Yes	Yes
Observations	1,468,598	1,468,600	1,468,600	1,468,600
Adjusted R^2	0.692	0.741	0.716	0.724

Table 3: Fundamental Channel: Intermediate Goods (OLS)

This table reports the OLS regression results for the effects of CDB loans on firms' COGS and export prices. Panel A shows the relationship between CDB loans and prices for firms in upstream industries. Panel B shows the association between CDB loans and COGS for firms in downstream industries. *LogPrice* and *LogWTPrice* are the average prices and export-amount weighted average prices, respectively. *LogCOGS* is the natural logarithm of costs of goods sold at the firm level. *LogDirectLoan* denotes the logarithm of direct CDB loans outstanding in the firm's industry and province. *LogDownstreamLoan* denotes the logarithm of CDB loans outstanding in the firm's downstream industry and province. *LogUpstreamLoan* denotes the logarithm of CDB loans outstanding in the firm's upstream industry and province. Firm-level controls include the logarithm of a firm's sales, *LogSale,* and the firm's leverage ratio, *Lev.* Province-level controls include the logarithm of GDP, *LogGDP*, and the logarithm of population, *LogPopu.* See the Appendix Table for detailed variable definitions. Firm fixed effects and province×year fixed effects are included. Standard errors are clustered at the firm level for all regressions, and *t*-statistics are reported in parentheses. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

Panel A: Reduction in Prices of Inputs from Upstream Firms

	1	2
Dep. Var.	*LogPrice*	*LogWTPrice*
LogDirectLoan	-0.0052***	-0.0050***
	(-8.35)	(-7.79)
LogDownstreamLoan	0.0063***	0.0062***
	(10.03)	(9.57)
Firm FE	Yes	Yes
Product×Year FE	Yes	Yes
Province×Year FE	Yes	Yes
Observations	452,722	452,722
Adjusted R^2	0.687	0.677

Panel B: COGS for Downstream Firms

	1	2
Dep. Var.	*LogCOGS*	*LogCOGS*
LogUpstreamLoan	-0.0001***	-0.0001***
	(-3.03)	(-3.03)
LogDirectLoan	-0.0000	-0.0000
	(-0.24)	(-0.24)
Firm controls	Yes	Yes
Province controls	No	Yes
Firm FE	Yes	Yes
Province×Year FE	Yes	Yes
Observations	2,640,373	2,640,373
Adjusted R^2	0.969	0.969

Table 4: Fundamental Channel: Trade Credit (OLS)

This table reports the OLS regression results for the effects of CDB loans on firms' trade credit. Panel A shows the association between CDB loans and accounts receivable for firms in upstream industries. Panel B shows the relationship between CDB loans and accounts payable for firms in downstream industries. *LogAccRect* and *LogAccPay* are the logarithm of accounts receivable and accounts payable, respectively. *LogDirectLoan* denotes the logarithm of direct CDB loans outstanding in the firm's industry and province. *LogDownstreamLoan* denotes the logarithm of CDB loans outstanding in the firm's downstream industry and province. *LogUpstreamLoan* denotes the logarithm of CDB loans outstanding in the firm's upstream industry and province. Firm-level controls include the logarithm of firm sales, *LogSale*, and the firm's leverage, *Lev.* Province-level controls include the logarithm of GDP, *LogGDP,* and the logarithm of population, *LogPopu.* See the Appendix Table for detailed variable definitions. Firm fixed effects and province×year fixed effects are included. Standard errors are clustered at the firm level for all regressions, and *t*-statistics are reported in parentheses. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

Panel A: Trade Credit Extension from Upstream Firms (Accounts Receivable)

	1	2
Dep. Var.	*LogAccRect*	*LogAccRect*
LogDirectLoan	0.0037**	0.0037**
	(2.02)	(2.02)
LogDownstreamLoan	0.0036*	0.0036*
	(1.69)	(1.69)
Firm controls	Yes	Yes
Province controls	No	No
Firm FE	Yes	Yes
Province×Year FE	Yes	Yes
Observations	357,039	357,039
Adjusted R^2	0.493	0.493

Panel B: Trade Credit Extension to Downstream Firms (Accounts Payable)

	1	2
Dep. Var.	*LogAccPay*	*LogAccPay*
LogUpstreamLoan	0.0014**	0.0014**
	(1.97)	(1.97)
LogDirectLoan	0.0032***	0.0032***
	(4.35)	(4.35)
Firm controls	Yes	Yes
Province controls	No	Yes
Firm FE	Yes	Yes
Province×Year FE	Yes	Yes
Observations	1,898,245	1,898,245
Adjusted R^2	0.459	0.459

Table 5: Causal Effects of CDB Loans on Export Activities (2SLS)

This table shows the two-stage least squares regression results for the effect of CDB loans on Chinese firms' export activities across the industry supply chain using *First3* as the instrumental variable for *LogUpstreamLoan* (excluding Beijing, Shanghai, Tianjin, and Chongqing) for firms in downstream industries. The dependent variables are the logarithm of export amount (*LogExport*), the number of export destinations (*LogNumDestinations*), the number of export product varieties (*LogNumProducts*), and the number of export destination-product pairs (*LogNumDestProducts*). *LogUpstreamLoan* denotes the logarithm of upstream CDB loans in the firm's upstream industry, which is at the province-industry-year level. *LogDirectLoan* denotes the logarithm of direct CDB loans for the firm in the same industry and province as the loan, which is at the province-industry-year level. See the Appendix Table for detailed variable definitions. Firm fixed effects and province×year fixed effects are included. Standard errors are clustered at the firm level for all regressions, and *t*-statistics are reported in parentheses. Kleibergen-Paap (KP) Wald *F*-statistics for weak identification tests are reported. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

	1	2	3	4
Dep. Var.	*LogExport*	*LogNumDestinations*	*LogNumProducts*	*LogNumDestProducts*
LogUpstreamLoan	0.0448***	0.0299***	0.0246***	0.0354***
	(6.87)	(9.67)	(8.81)	(9.69)
LogDirectLoan	-0.0003	0.0005***	0.0000	0.0001
	(-0.82)	(2.94)	(0.10)	(0.60)
Firm FE	Yes	Yes	Yes	Yes
Province×Year FE	Yes	Yes	Yes	Yes
Observations	1,294,794	1,294,796	1,294,796	1,294,796
KP Wald F-stat	1,517	1,517	1,517	1,517

Table 6: Fundamental Channel: Intermediate Goods (2SLS)

This table shows the two-stage least squares regression results for the effects of CDB loans on firms' COGSs and export prices. Panel A shows the impact of CDB loans on prices for firms in upstream industries. Panel B shows the causal effects of CDB loans on COGSs for firms in downstream industries. *LogCOGS* is the natural logarithm of costs of goods sold at the firm level. *LogPrice* and *LogWTPrice* are the average prices and export-amount weighted average prices, respectively. *LogDirectLoan* denotes the logarithm of direct CDB loans outstanding in the firm's industry and province. *LogDownstreamLoan* denotes the logarithm of CDB loans outstanding in the firm's downstream industry and province. *LogUpstreamLoan* denotes the logarithm of CDB loans outstanding in the firm's upstream industry and province. Firm-level controls include the logarithm of a firm's sales, *LogSale,* and the firm's leverage ratio, *Lev.* Province-level controls include the logarithm of GDP, *LogGDP*, and the logarithm of population, *LogPopu.* See the Appendix Table for detailed variable definitions. Firm fixed effects and province×year fixed effects are included. Standard errors are clustered at the firm level for all regressions, and *t*-statistics are reported in parentheses. Kleibergen-Paap (KP) Wald *F*-statistics for weak identification tests are reported. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

Panel A: Reduction in Prices of Inputs from Upstream Firms

	1	2
Dep. Var.	*LogPrice*	*LogWTPrice*
LogDirectLoan	-0.0921***	-0.0989***
	(-2.62)	(-2.70)
LogDownstreamLoan	0.0049***	0.0047***
	(6.16)	(5.70)
Firm FE	Yes	Yes
Product×Year FE	Yes	Yes
Province×Year FE	Yes	Yes
Observations	375,303	375,303
KP Wald F-stat	48.54	48.54

Panel B: COGS for Downstream Firms

	1	2
Dep. Var.	*LogCOGS*	*LogCOGS*
LogUpstreamLoan	-0.0017*	-0.0017*
	(-1.87)	(-1.87)
LogDirectLoan	-0.0000	-0.0000
	(-0.63)	(-0.63)
Firm controls	Yes	Yes
Province controls	No	Yes
Firm FE	Yes	Yes
Province×Year FE	Yes	Yes
Observations	2,354,317	2,354,317
KP Wald F-stat	1,878	1,878

Table 7: Fundamental Channel: Trade Credit (2SLS)

This table shows the two-stage least squares regression results for the effects of CDB loans on firms' trade credit. Panel A (B) shows the causal effects of CDB loans on accounts receivable (accounts payable) for firms in upstream (downstream) industries. *LogAccRect* and *LogAccPay* are the logarithms of accounts receivable and accounts payable, respectively. *LogDirectLoan* denotes the logarithm of direct CDB loans outstanding in the firm's industry and province. *LogDownstreamLoan* denotes the logarithm of CDB loans outstanding in the firm's downstream industry and province. *LogUpstreamLoan* denotes the logarithm of CDB loans outstanding in the firm's upstream industry and province. Firm-level controls include the logarithm of a firm's sales, *LogSale,* and the firm's leverage ratio, *Lev*. Province-level controls include the logarithm of GDP, *LogGDP,* and the logarithm of population, *LogPopu.* See the Appendix Table for detailed variable definitions. Firm fixed effects and province×year fixed effects are included. Standard errors are clustered at the firm level for all regressions, and *t*-statistics are reported in parentheses. Kleibergen-Paap (KP) Wald *F*-statistics for weak identification tests are reported. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

Panel A: Trade Credit Extension from Upstream Firms (Accounts Receivable)

	1	2
Dep. Var.	*LogAccRect*	*LogAccRect*
LogDirectLoan	0.1062*	0.1062*
	(1.90)	(1.90)
LogDownstreamLoan	0.0100*	0.0100*
	(1.67)	(1.67)
Firm controls	Yes	Yes
Province controls	No	Yes
Firm FE	Yes	Yes
Province×Year FE	Yes	Yes
Observations	267,412	267,412
KP Wald F-stat	102	102

Panel B: Trade Credit Extension to Downstream Firms (Accounts Payable)

	1	2
Dep. Var.	*LogAccPay*	*LogAccPay*
LogUpstreamLoan	0.3008***	0.3008***
	(3.09)	(3.09)
LogDirectLoan	0.0128***	0.0128***
	(3.92)	(3.92)
Firm controls	Yes	Yes
Province controls	No	Yes
Firm FE	Yes	Yes
Province×Year FE	Yes	Yes
Observations	1,710,239	1,710,239
KP Wald F-stat	67.84	67.84

Table 8: Impact of China's Cheaper Exports on U.S. Firms

This table shows the impact of China's exports on U.S. firms. Panel A shows the 2SLS results for the effect of CDB loans on exported goods prices at the firm-product-year level using *First3* as the instrumental variable for *LogUpstreamLoan*. The product is measured at the four-digit HS code level. *LogPrice* and *LogWTPrice* are the logarithm of the average prices and export-amount weighted average prices, respectively. Firm fixed effects, province×year fixed effects, and product fixed effects are included. Kleibergen-Paap (KP) Wald *F*-statistics for weak identification tests are reported. Panel B shows the OLS results of regressing U.S. firms' characteristics on export price reductions induced by CDB loans estimated using the coefficients from the results shown in Panel A. The sample includes North American public firms in Compustat from 2000 to 2013, where the firm's industry imports from China. The dependent variables are at the firm-year level: *LogAsset* is the logarithm of the firm's total assets; *PPE/Assets* measures tangibility defined as plants, property, and equipment divided by total assets; *LogSale* is the logarithm of the firm's total sales; *LogEmployees* is the logarithm of the number of employees in the firm. *PriceDrop_Direct* denotes the average price reduction from China's exports in the same industry resulting from CDB loans estimated using the 2SLS coefficient estimates shown in Panel A. *PriceDrop_Upstream* denotes the average price reduction from China's exports in the upstream industry. Firm fixed effects and year fixed effects are included. Standard errors are clustered by firm, and *t*-statistics are reported in parentheses. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

Panel A: Effects of CDB Loans on Export Prices

	1	2
Dep. Var.	*LogPrice*	*LogWTPrice*
LogUpstreamLoan	-0.0714***	-0.0807***
	(-6.02)	(-6.56)
LogDirectLoan	-0.0028***	-0.0029***
	(-12.22)	(-12.19)
Firm FE	Yes	Yes
Product ×Year FE	Yes	Yes
Province×Year FE	Yes	Yes
Observations	7,924,223	7,924,223
KP Wald F-test	533.9	533.9

Panel B: Impact on U.S. Firms

	1	2	3	4
Dep. Var.	*LogAsset*	*PPE/Assets*	*LogSale*	*LogEmployees*
PriceDrop_Direct	-0.0068***	-0.0016***	0.0002	-0.0019
	(-5.05)	(-7.66)	(0.16)	(-1.58)
PriceDrop_Upstream	0.0045***	0.0008***	0.0047***	0.0035***
	(4.05)	(3.90)	(3.77)	(3.08)
Firm FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Observations	42,068	42,023	35,860	33,330
Adjusted R^2	0.936	0.806	0.950	0.959

Table 9: Heterogeneous Effects of China's Cheaper Exports on U.S. Firms

This table reports the results on the heterogeneous effects of export price reduction induced by CDB loans on U.S. firms. The sample contains public firms from Compustat between 2000 and 2013, where the firm's industry imports from China. In Panel A, we construct a dummy variable, *HighUnemployment*, which equals one if the unemployment rate of a firm's headquarters state is above the median in 1999 and zero otherwise. In Panel B, we construct a dummy variable, *TradeWarIndustry*, which equals one if it is the key upstream industry of a firm and at the same time listed for tariff increase in the U.S. section 301 report by USTR at the beginning of the 2018 China-U.S. trade war. *PriceDrop_Direct* denotes the average price reduction from China's exports in the same industry resulting from CDB loans estimated using the 2SLS coefficient estimates in Panel A of Table 8. *PriceDrop_Upstream* denotes the average price reduction from China's exports in the upstream industry. Firm fixed effects and year fixed effects are included in all regressions. Standard errors are clustered at the firm level for all regressions, and *t*-statistics are reported in parentheses. *, **, and *** indicate the statistical significance at the 10%, 5%, and 1% levels, respectively.

	1	2	3	4
Dep. Var.	*LogAsset*	*PPE/Assets*	*LogSale*	*LogEmployees*
Panel A: Unemployment Rate Across States				
PriceDrop_Upstream	0.0109***	0.0008**	0.0101***	0.0080***
× *HighUnemployment*	(3.83)	(2.00)	(4.14)	(3.67)
PriceDrop_Upstream	-0.0029	0.0002	-0.0011	-0.0008
	(-1.26)	(0.72)	(-0.56)	(-0.51)
PriceDrop_Direct	-0.0067***	-0.0017***	0.0007	-0.0023**
	(-4.59)	(-7.65)	(0.47)	(-1.98)
Firm FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Observations	36,849	36,806	31,015	28,936
Adjusted R^2	0.931	0.801	0.948	0.958
Panel B: Industries Targeted by the 2018 Trade War				
PriceDrop_Upstream	-0.0149***	-0.0018***	-0.0124***	-0.0072*
× *TradeWarIndustry*	(-3.52)	(-3.64)	(-3.38)	(-1.86)
PriceDrop_Upstream	0.0056***	0.0009***	0.0057***	0.0039***
	(4.75)	(4.33)	(4.43)	(3.41)
PriceDrop_Direct	-0.0061***	-0.0015***	0.0008	-0.0015
	(-4.55)	(-7.25)	(0.61)	(-1.24)
TradeWarIndustry	-0.1376	-0.0037	-0.2463	-0.3033
	(-0.98)	(-0.26)	(-1.26)	(-1.45)
Firm FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Observations	42,068	42,023	35,860	33,330
Adjusted R^2	0.936	0.807	0.950	0.959

Online Appendix for

Government Credit and International Trade

Contents

1 Additional Background of China's Banking System

There are four types of banks in China's banking system. For commercial banks, they are classified into three groups: 1) big five state-controlled commercial banks, which are nationwide banks and control for approximately 45% of China's banking market shares (ICBC, ABC, BOC, CCB, and BoCom); 2) 12 joint-equity banks, which are also mainly state-owned nationwide banks with a focus on local businesses and control for approximately 17% of the market share; 3) 131 municipal commercial banks, which mainly focus on the businesses in their cities. The fourth type is policy banks, and there are three of them in China.

In particular, besides the CDB, there are two other policy banks in China: the Agricultural Development Bank of China (ADBC) and the Export-Import Bank of China (EXIM). The ADBC mainly lends to agricultural-related activities and focuses on rural areas. For the EXIM, compared with the CDB, there are two reasons why this paper focuses on CDB credit. First, we mainly investigate the spillover effects of government-subsidized credit across the supply chain. The CDB mainly supports basic and strategic industries at the top of the supply chain, which has substantial impacts on downstream manufacturing industries. By contrast, the EXIM bank targets specific firms in high-tech-intensive and high-value-added industries, such as mechanical and electronic products, which are typically at the bottom of the supply chain. In other words, the CDB and EXIM lend to different areas, and they complement each other. Hence, using CDB credit serves the main research question in this paper. Second, the size of the CDB is much larger than the EXIM bank, so the CDB has stronger and broader impacts on the Chinese domestic market. In 2013, the total assets for the CDB were RMB 8.18 trillion, while the number for the EXIM bank was RMB 1.89 trillion. Moreover, EXIM issues a significant amount of loans to foreign firms. The outstanding amount for EXIM's export seller's credit was RMB 399.56 billion (only 27.5% of the total EXIM loan amount), while the outstanding industrial loan amount for CDB was more than RMB 2 trillion. Furthermore, compared to EXIM credit, CDB credit is subsidized even more. For example, both the CDB and EXIM raise funds by issuing bonds, and the interest rates for CDB bonds are approximately 10-30 basis points lower than the EXIM bonds since CDB bonds enjoy the central government explicit guarantees that make the CDB bonds the same as treasury regarding credit risk and interest rate.[1]

[1] Professional rating agencies, including Moody's and Standard & Poor's, have retained CDB's rating at the same level as China's sovereign rating for many consecutive years (http://www.cdb.com.cn/English/gykh_512/khjj/). See also, http://politics.people.com.cn/n/2015/0619/c70731-27180232.html for a detailed report for CDB's explicit guarantees from central government. The data on bond yields can be found in the WIND database or China Central Depository & Clearing Co., Ltd. http://www.ccdc.com.cn/.

Figure A1: Top Five Industries with Largest CDB Loans

This figure shows the top five industries with the largest CDB outstanding loans in our sample for 2002. The amount for each industry is the sum of all CDB outstanding loan amounts across the 31 provinces in China. The unit is in billions RMB.

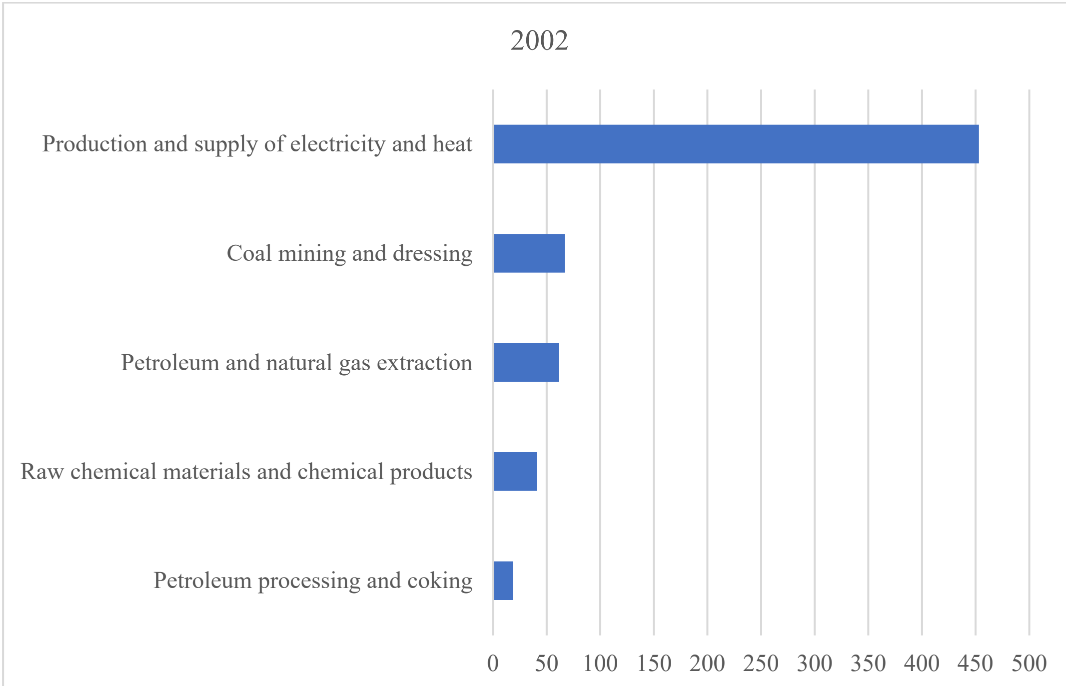

Figure A2: Export Amount by Firm Type

This figure shows the time trend of total export amounts for SOEs and private firms from 2000 to 2013. It is based on the sample containing only manufacturing firms (i.e., excluding trade intermediaries) in the China Customs data. SOEs denote firms that are state-owned enterprises or collectively-owned firms. Private denotes private firms. The unit is in billion RMB.

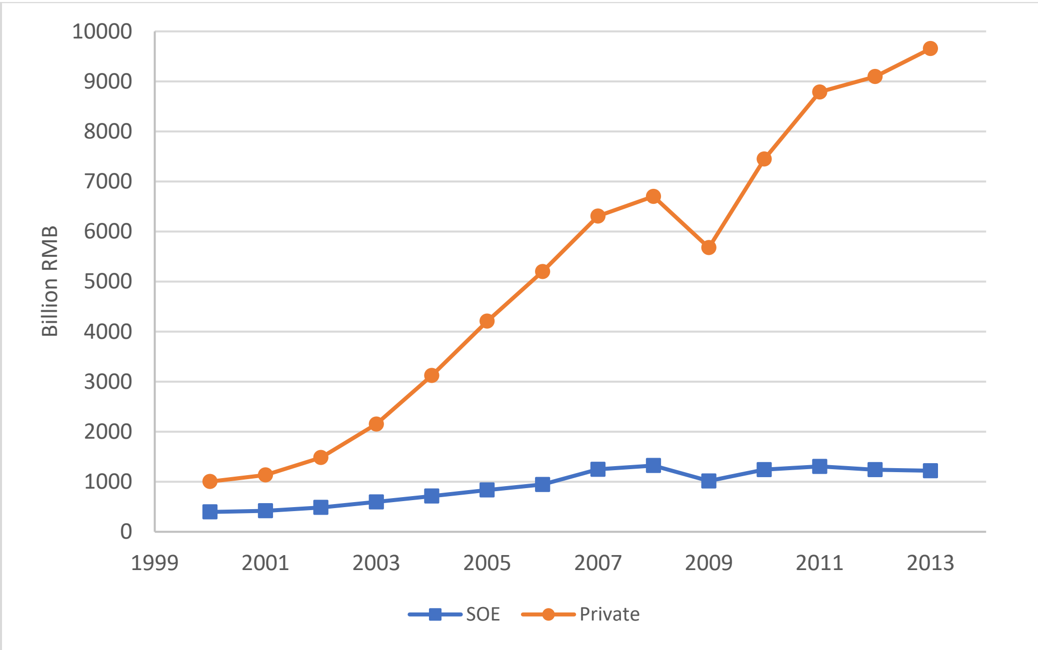

Figure A3: Top Five Export Industries

This figure shows the top five export industries ranked by export amounts for 2002 and 2013, respectively. The sample includes only manufacturing firms (i.e., excluding trade intermediaries) in the China Customs data from 2000 to 2013. The industry is at the two-digit CDB industry classification level, which is comparable with the U.S. two-digit SIC code. The top panel shows the largest five industries ranked by export amounts and the associated export amounts for 2002, while the bottom panel is for 2013. The unit is in billion RMB.

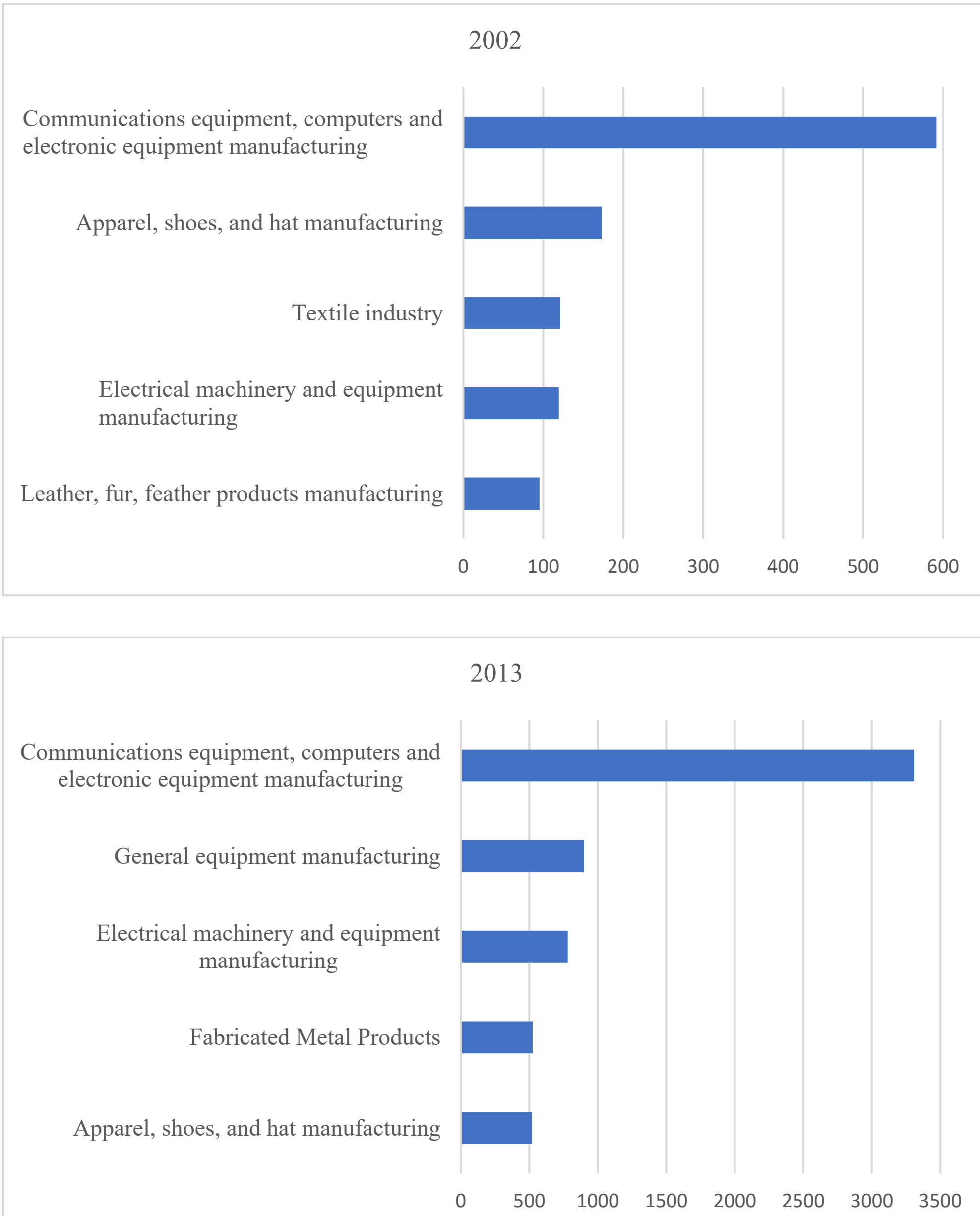

Figure A4: Top Ten Export Destination Countries

This figure shows the largest ten destination countries/territories ranked by total export amounts of Chinese firms from 2000 to 2013. Based on the population data of China Customs, we aggregate the export amount from all export transactions (i.e., exports by manufacturing firms and exports by intermediary firms) from 2000 to 2013 by destination countries and plot the total export amount for the top ten countries/territories (Hong Kong SAR is excluded). The unit is in trillion RMB.

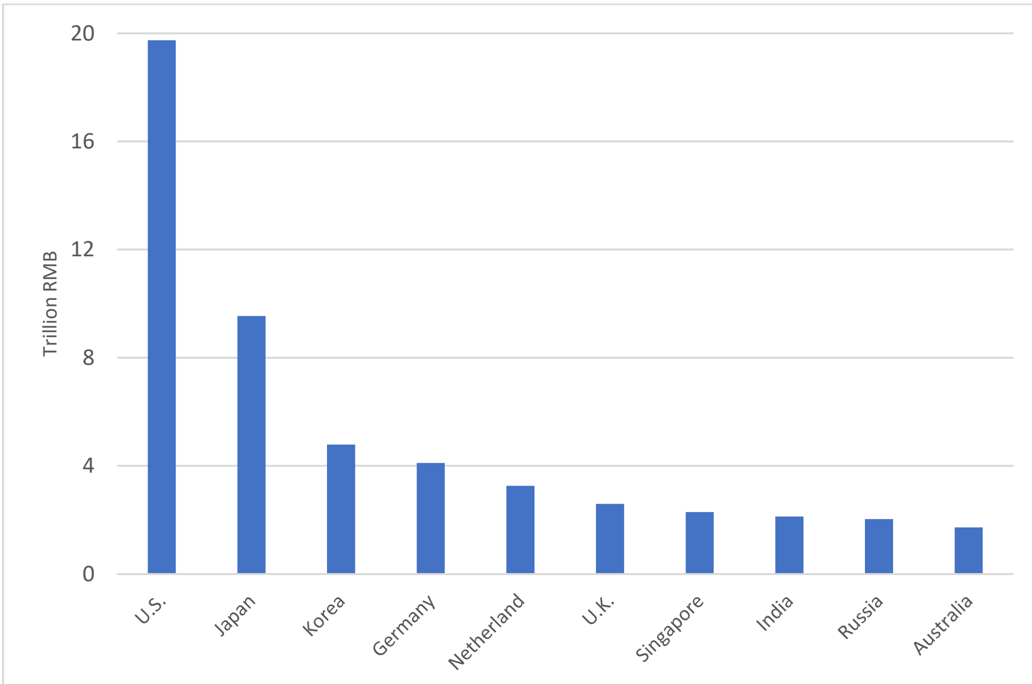

Figure A5: Export Amount by Type of Goods

This figure shows the time trend of export amounts for two types of exported goods: consumer goods and non-consumer goods. Based on the population data of China Customs, we aggregate the export amount from all export transactions (i.e., exports by manufacturing firms and exports by intermediary firms) from 2000 to 2013. Exported goods are classified as either raw materials, intermediate goods, capital goods, or consumer goods using the concordance table from HS standard product groups (UNCTAD-SoP), which is available at https://wits.worldbank.org/referencedata.html. We classify the first three types of goods into non-consumer goods group, and consumer goods are classified into consumer goods group. We plot the time trend of export amounts for the two groups. The unit is in billion RMB.

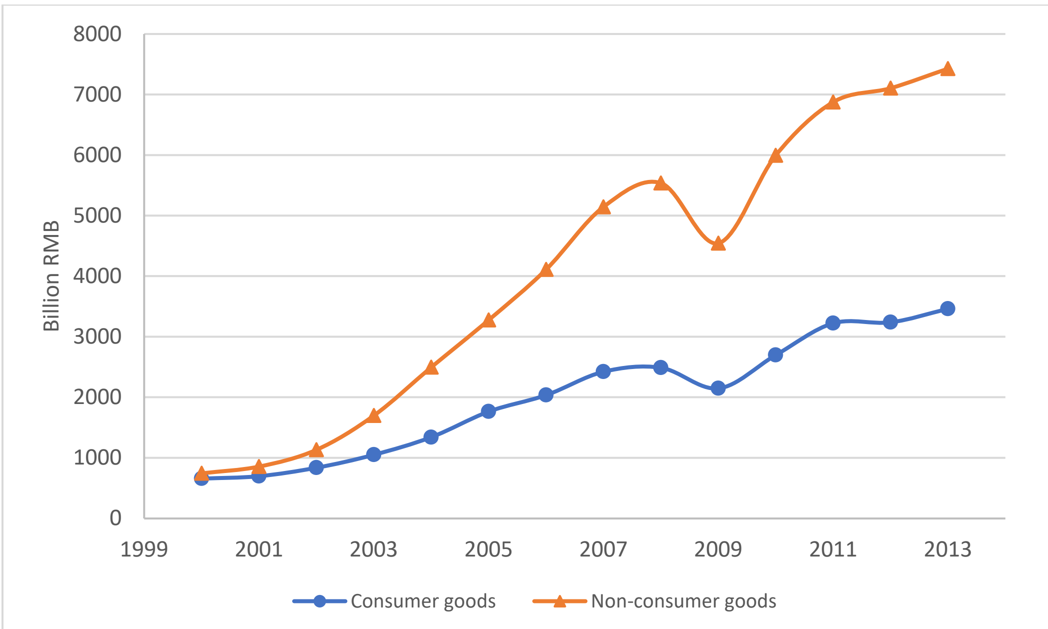

Table A1: Robustness Tests of CDB Loans' Impacts on Export

This table reports the regression results of robustness checks for the effects of CDB loans on export activities using the firms in downstream industries. In Panel A, we construct an alternative upstream loan measure, *LogWTUpstreamLoan,* by calculating the logarithm of the weighted average upstream loan amounts (excluding itself) across industries. In Panel B, we aggregate upstream CDB loans across provinces to the national-industry-year level. In Panel C, we repeat the analysis presented in Panel C of Table 2 for a subsample of firms matched with CIC data to obtain the firm-year level control variables. Control variables include the logarithm of a firm's total asset, the logarithm of firm sales, the logarithm of provincial GDP and population. See the Appendix Table for detailed variable definitions. Firm fixed effects and province×year fixed effects are included. Standard errors are clustered at the firm level, and *t*-statistics are reported in parentheses. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

	1	2	3	4
Dep. Var.	*LogExport*	*LogNumDestinations*	*LogNumProducts*	*LogNumDestProducts*
Panel A: Weighted Average Upstream Loan				
LogDirectLoan	0.0004	0.0007***	0.0004***	0.0005***
	(1.47)	(5.16)	(3.02)	(3.00)
LogWTUpstreamLoan	0.1161***	0.0365***	0.0520***	0.0578***
	(17.06)	(11.71)	(16.46)	(14.88)
Firm FE	Yes	Yes	Yes	Yes
Province×Year FE	Yes	Yes	Yes	Yes
Observations	1,451,799	1,451,801	1,451,801	1,451,801
Adjusted R^2	0.692	0.741	0.716	0.724
Panel B: CDB Loans at Industry Level				
LogDirectLoan	0.0002	0.0006***	0.0003*	0.0003**
	(0.71)	(4.42)	(1.96)	(2.06)
LogAllUpstreamLoan	0.0895***	0.0405***	0.0527***	0.0604***
	(25.41)	(23.10)	(34.08)	(29.55)
Firm FE	Yes	Yes	Yes	Yes
Province×Year FE	Yes	Yes	Yes	Yes
Observations	1,451,799	1,451,801	1,451,801	1,451,801
Adjusted R^2	0.692	0.741	0.717	0.725
Panel C: With Controls				
LogDirectLoan	0.0012***	0.0010***	0.0005***	0.0007***
	(3.32)	(5.41)	(2.97)	(3.43)
LogUpstreamLoan	0.0019***	0.0014***	0.0023***	0.0020***
	(5.01)	(6.91)	(12.92)	(8.83)
Controls	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes
Province×Year FE	Yes	Yes	Yes	Yes
Observations	655,452	655,452	655,452	655,452
Adjusted R^2	0.761	0.791	0.726	0.778

Table A2: Additional Robustness Tests at the Aggregate Level

This table reports the regression results for the effects of CDB loans on export activities at the province-industry-year level. Panel A shows the OLS regression results, and Panel B shows the corresponding 2SLS regression results. The dependent variables in this table are measured and aggregated at the province-industry-year level: the logarithm of export amount (*LogExport*), number of export destinations (*LogNumDestinations*), number of export product varieties (*LogNumProducts*), and number of export destination-product pairs (*LogNumDestProducts*). *LogNumFirms* is the logarithm of the number of firms that export in a given province and industry for each year. *LogDirectLoan* denotes the logarithm of direct CDB loan amount to a given province and industry. *LogUpstreamLoan* denotes the logarithm of upstream CDB loan amount to the upstream industry. Industry fixed effects and province×year fixed effects are included. Standard errors are clustered at the province×industry level for all regressions, and *t*-statistics are reported in parentheses. Kleibergen-Paap (KP) Wald *F*-statistics for weak identification tests are reported in Panel B. *, **, and *** indicate the statistical significance at the 10%, 5%, and 1% levels, respectively.

Panel A: Province-Industry Level Regressions (OLS)

	1	2	3	4	5
Dep. Var.	*LogExport*	*LogNumDestinations*	*LogNumProducts*	*LogNumDestProducts*	*LogNumFirms*
LogDirectLoan	0.0242***	0.0058***	0.0020**	0.0105***	0.0124***
	(5.33)	(3.81)	(2.55)	(5.93)	(7.49)
LogUpstreamLoan	0.0192***	0.0037***	0.0010	0.0076***	0.0085***
	(4.68)	(2.74)	(1.42)	(4.81)	(5.65)
Industry FE	Yes	Yes	Yes	Yes	Yes
Province×Year FE	Yes	Yes	Yes	Yes	Yes
Observations	10,790	10,790	10,790	10,790	10,790
Adjusted R^2	0.758	0.840	0.904	0.898	0.908

Panel B: Province-Industry Level Regressions (2SLS)

	1	2	3	4	5
Dep. Var.	*LogExport*	*LogNumDestinations*	*LogNumProducts*	*LogNumDestProducts*	*LogNumFirms*
LogDirectLoan	0.0095	0.0027	0.0028**	0.0072**	0.0071**
	(1.26)	(1.08)	(2.33)	(2.33)	(2.15)
LogUpstreamLoan	0.1776**	0.0299	-0.0112	0.0428	0.0709**
	(2.45)	(1.29)	(-1.07)	(1.58)	(2.47)
Industry FE	Yes	Yes	Yes	Yes	Yes
Province×Year FE	Yes	Yes	Yes	Yes	Yes
Observations	8,655	8,655	8,655	8,655	8,655
KP Wald F-stat	15.55	15.55	15.55	15.55	15.55

Table A3: Exclusion Conditions (Using Predicted Turnover)

This table reports the regression results for exclusion conditions using predicted political turnover cycles. Panel A shows the relationship between the instrument, *First3,* and CDB loans and several other potential channels at the province-industry-year level. Specifically, column (1) shows the first-stage results of regressing CDB provincial industry loan amounts on *First*3. *LogProvLoan* is the logarithm of annual province-industry outstanding CDB loans. *First3* is a dummy variable for whether a city secretary is in the predicted first three years of his/her term and where the city's largest SOE industry (i.e., focal industry) is in the same industry as that of provincial industry loans. Industry fixed effects and province×year fixed effects are included, and standard errors are clustered at the province level. Panel B regresses CDB city loans on the predicted city secretary's turnover cycle and shows the regression results of alternative channels for predicted political turnover at the city-year level. *LogCityLoan* is the logarithm of CDB total loans outstanding at the city-year level. *Year1-3* is a dummy variable that equals one if a city secretary is in the predicted first three years of his/her term. Control variables include city-level GDP, population, urban income, and the number of workers. City, year, and politician fixed effects are included, and standard errors are clustered at the city level. See the Appendix Table for detailed variable definitions. *t*-statistics are reported in parentheses. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

Panel A: Province-Industry Level

	1	2	3	4	5	6
	CDB Loan	Other Potential Channels				
Dep. Var.	*LogProvLoan*	*OverallTax*	*IncomeTax*	*VAT*	*Subsidy*	*ForeignCap*
First3	0.5005***	0.0009	0.0003	-0.0002	-0.0003	-0.0008
	(3.93)	(0.77)	(0.18)	(-0.29)	(-0.88)	(-0.53)
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes
Province×Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	5,573	5,573	5,573	5,573	5,573	5,573
Adjusted R^2	0.335	0.563	0.747	0.772	0.091	0.314

Panel B: City Level

	1	2	3	4	5
	Other Potential Channels				
Dep. Var.	*LogFiscalInc*	*LogFiscalExp*	*LogLand*	*LogBankLoan*	*LogTransfer*
Year1-3	-0.0133	0.0003	-0.0655	0.0287	0.0032
	(-1.08)	(0.03)	(-0.25)	(1.53)	(0.27)
Controls	Yes	Yes	Yes	Yes	Yes
City, Year, Politician FEs	Yes	Yes	Yes	Yes	Yes
Observations	2,036	2,036	2,304	1,992	4,224
Adjusted R^2	0.984	0.981	0.603	0.976	0.976

Table A4: Exclusion Conditions (Using Actual Turnover)

This table reports the regression results for exclusion conditions using actual political turnover cycles. Panel A shows the relationship between the instrument, *First3A*, and CDB loans outstanding and several other potential channels at the province-industry-year level. Specifically, column (1) shows the first-stage results of regressing CDB provincial industry loan amounts on *First3A*. *LogProvLoan* is the logarithm of annual province-industry outstanding CDB loan amounts. *First3A* is a dummy variable for whether a city secretary is in the actual first three years of his/her term and where the city's largest SOE industry (i.e., focal industry) is in the same industry as that of provincial industry loans. Industry fixed effects and province×year fixed effects are included, and standard errors are clustered at the province level. Panel B regresses CDB city loans on the actual city secretary's turnover cycle and shows the regression results of alternative channels on the actual political turnover at the city-year level. *LogCityLoan* is the logarithm of CDB total loans outstanding at the city-year level. *Year1-3A* is a dummy variable that equals one if a city secretary is in the actual first three years of his/her term. Control variables include city-level GDP, population, urban income, and the number of workers. City, year, and politician fixed effects are included, and standard errors are clustered at the city level. See the Appendix Table for detailed variable definitions. *t*-statistics are reported in parentheses. *, **, and *** indicate the statistical significance at the 10%, 5%, and 1% levels, respectively.

Panel A: Province-Industry level

	1	2	3	4	5	6
	CDB Loan	Other Potential Channels				
Dep. Var.	*LogProvLoan*	*OverallTax*	*IncomeTax*	*VAT*	*Subsidy*	*ForeignCap*
First3A	0.5257***	-0.0002	0.0001	0.0004	-0.0004	-0.0017
	(3.84)	(-0.15)	(0.03)	(0.63)	(-1.07)	(-1.06)
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes
Province×Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	5,575	5,575	5,575	5,575	5,575	5,575
Adjusted R^2	0.335	0.556	0.747	0.774	0.091	0.314

Panel B: City level

	1	2	3	4	5
	Other Potential Channels				
Dep. Var.	*LogFiscalInc*	*LogFiscalExp*	*LogLand*	*LogBankLoan*	*LogTransfer*
Year1-3A	-0.0185	0.0014	-0.0605	0.0222	0.0104
	(-1.58)	(0.14)	(-0.19)	(1.07)	(0.78)
Controls	Yes	Yes	Yes	Yes	Yes
City, Year, Politician FEs	Yes	Yes	Yes	Yes	Yes
Observations	2,084	2,084	2,291	2,023	4,170
Adjusted R^2	0.983	0.981	0.593	0.974	0.974