Government Credit and Trade War

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Motivation

- International trade is a key part of the global economy
  - Global trade size: $32 trillion in 2016 (e.g., WTO (2016))
  - Recent US-China trade war

- Governments play a key role in trade in many countries across the globe
  - Trade policy such as tariffs, quotas, and subsidy
    - Chinese data: Brandt et. al. (2017), Fan, Li, and Yeaple (2015), Khandelwal, Schott and Wei (2013), Kee and Tang (2016), Yu (2014), etc.
    - Non-Chinese data: De Loecker et. al. (2016), De Loecker (2011), Amiti and Konings (2007), Pavcnik (2002), Petia and Khandelwal (2011), etc.

- How government-directed credit affect trade receives little attention in literature
  - Government credit is booming across the globe in recent years, tens of trillion Euros (e.g., Lucas (2014) and Elliott (2011))
  - Government could distort the credit allocation for mercantilism
  - Government credit could facilitate international trade, especially for credit constraint firms (e.g., Manova, Wei, and Zhang (2015))

Research Question and Main Findings

- Research Question: How Chinese government credit affect domestic firms' export activities across the industry supply chain in China and in other countries?

- Data: proprietary data of government-directed credit in China (i.e., The China Development Bank) and the population transaction level data of trade

- CDB industry loans to the upstream industry help private firms' export in the downstream industry
  - Higher export amount, more export countries, more product varieties, and lower export price

- The increased export volume with lower price from China leads to decreases in employment and performance of the US firms in the same industry. In contrast, the US firms in downstream industries use the cheaper intermediate goods imported from China and perform better subsequently (e.g., Wang, Wei, Yu, and Zhu (2018) and Huang, Lin, Liu and Tang (2018)).

Contribution

- This paper adds to the growing literature on how government intervenes the international trade
  - Government credit serves as another essential government intervention in international trade
  - Evidence against the argument that Chinese government promotes mercantilism

- Trace the effects of government credit on firms' export activities across supply chain

- New angle to the recent trade tensions between the US and China
  - Crowding-in vs. crowding-out effects on US firms of the cheaper goods imported from China

- Explore exogenous variation in the flows of government credit
  - Use predicted timing of municipal politicians' turnover as the instrument for allocation of government credit

Data

- Provincial industry-level loan dataset from the China Development Bank
  - Province-Industry level loan data covers 31 provinces in China in 95 different industries, 1998 to 2013 (e.g. Electric Power, Coal Mining and Dressing, Telecommunications, Railway, Tobacco, Software, etc).

- China Customs Data
  - Universe of all export/import transactions, 2000 to 2013
  - Detailed information: transaction amount, name of the goods, price, destination, etc.
  - We exclude trade intermediary firms. In total, there are 560K firms in our sample.

Institutional Background

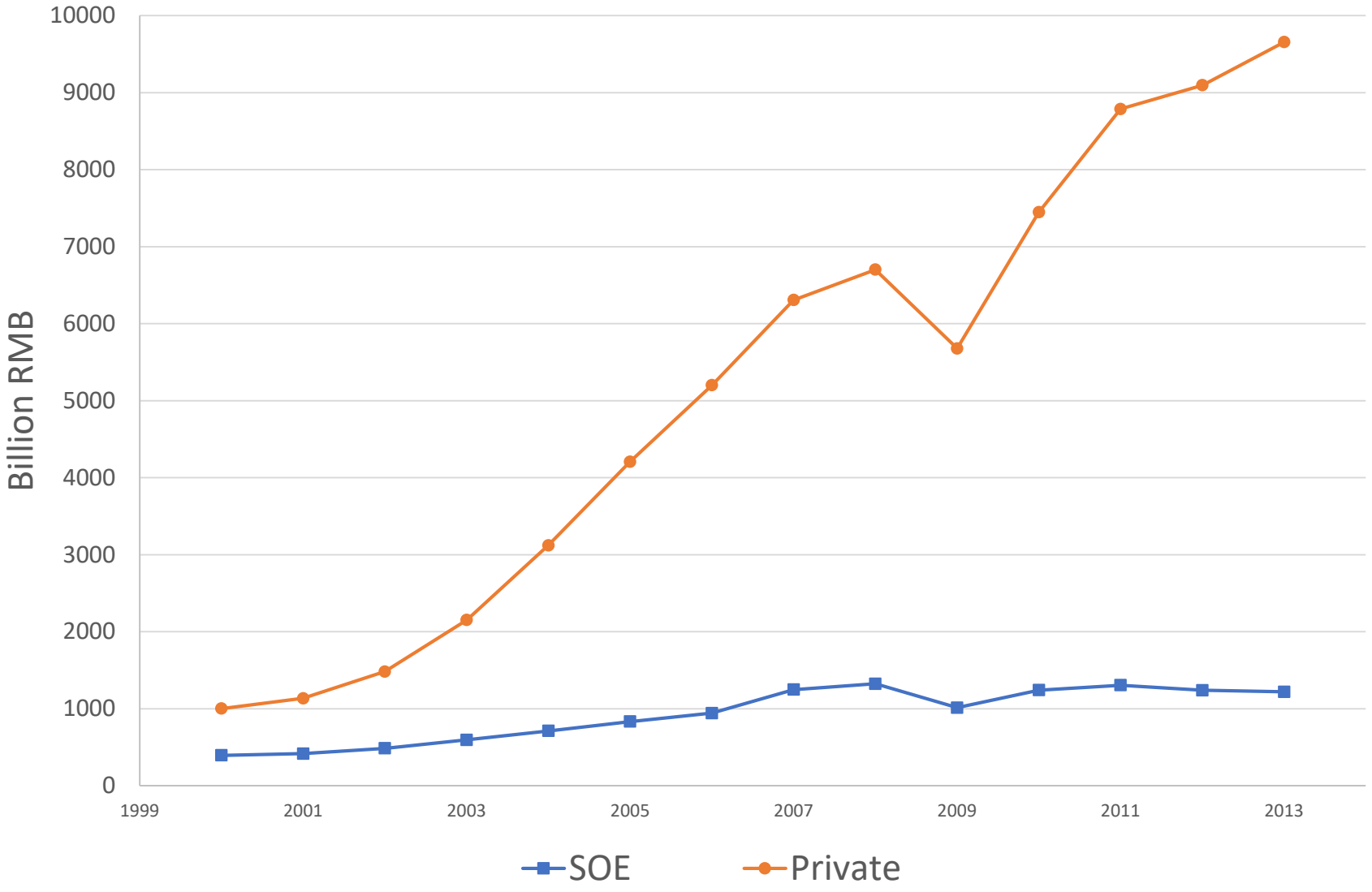
Government-directed Credit

- China Development Bank (CDB), is a government entity to provide **subsidized** credit to infrastructure projects and SOEs in basic and strategic industries
- Biggest policy bank in China, as well as in the world
  - Total asset: RMB 14.34 trillion, as of 2016

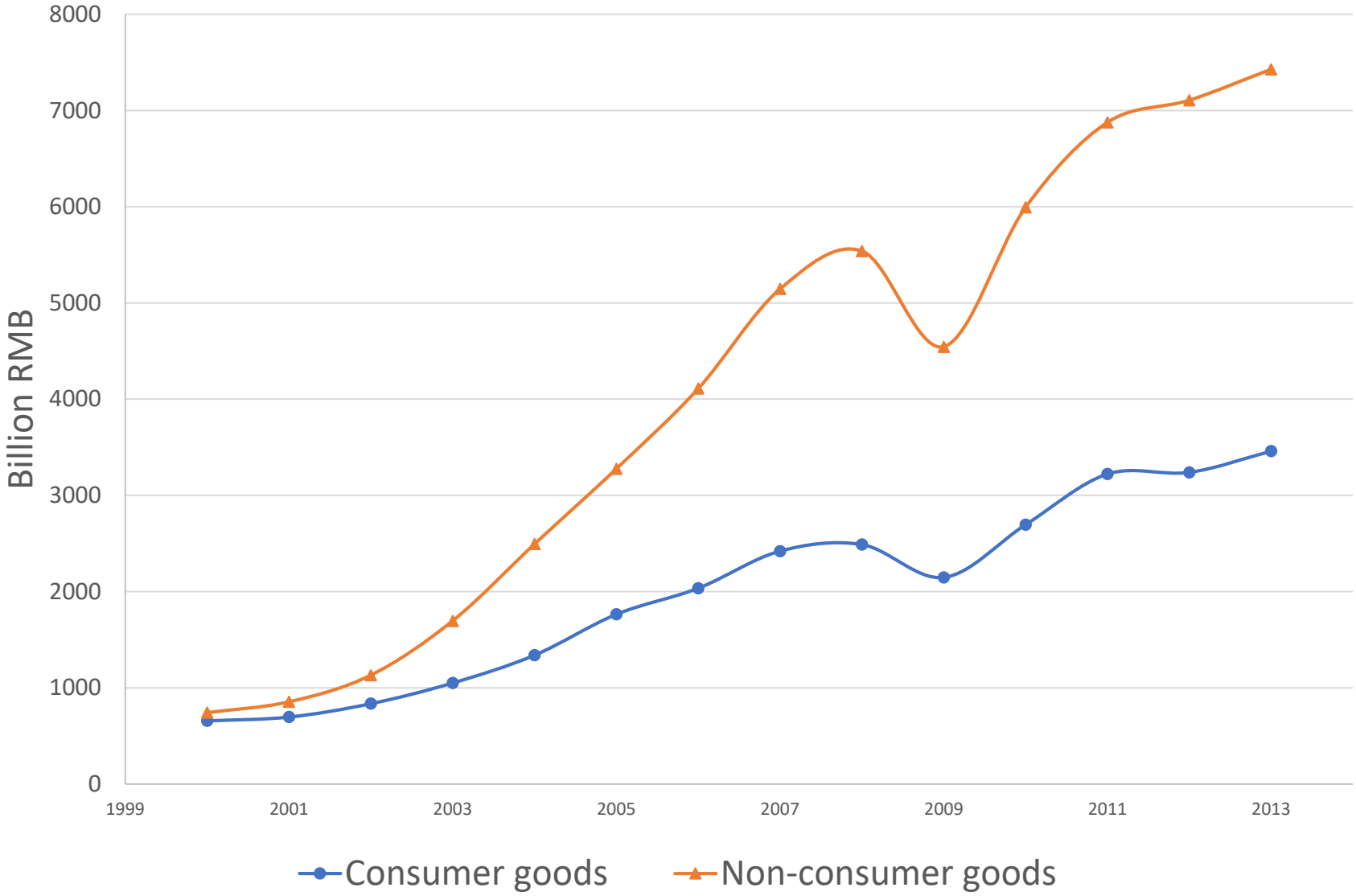
The CDB vs. Other Banks in China

- CDB vs. Export–Import Bank (EXIM) Bank of China
  - CDB is much larger in size (14.34 vs. 3.33 trillion assets)
  - Overlapped businesses
  - EXIM mainly give loans to exporters directly. We focus on how government credit to upstream loan affect downstream firms
- CDB vs. Commercial Banks
  - CDB has closer relationships and lend heavily to local governments
  - Local politicians play bigger roles in CDB loan allocations

China's Export Amount



Consumer vs. Intermediate Export



Example: Huawei

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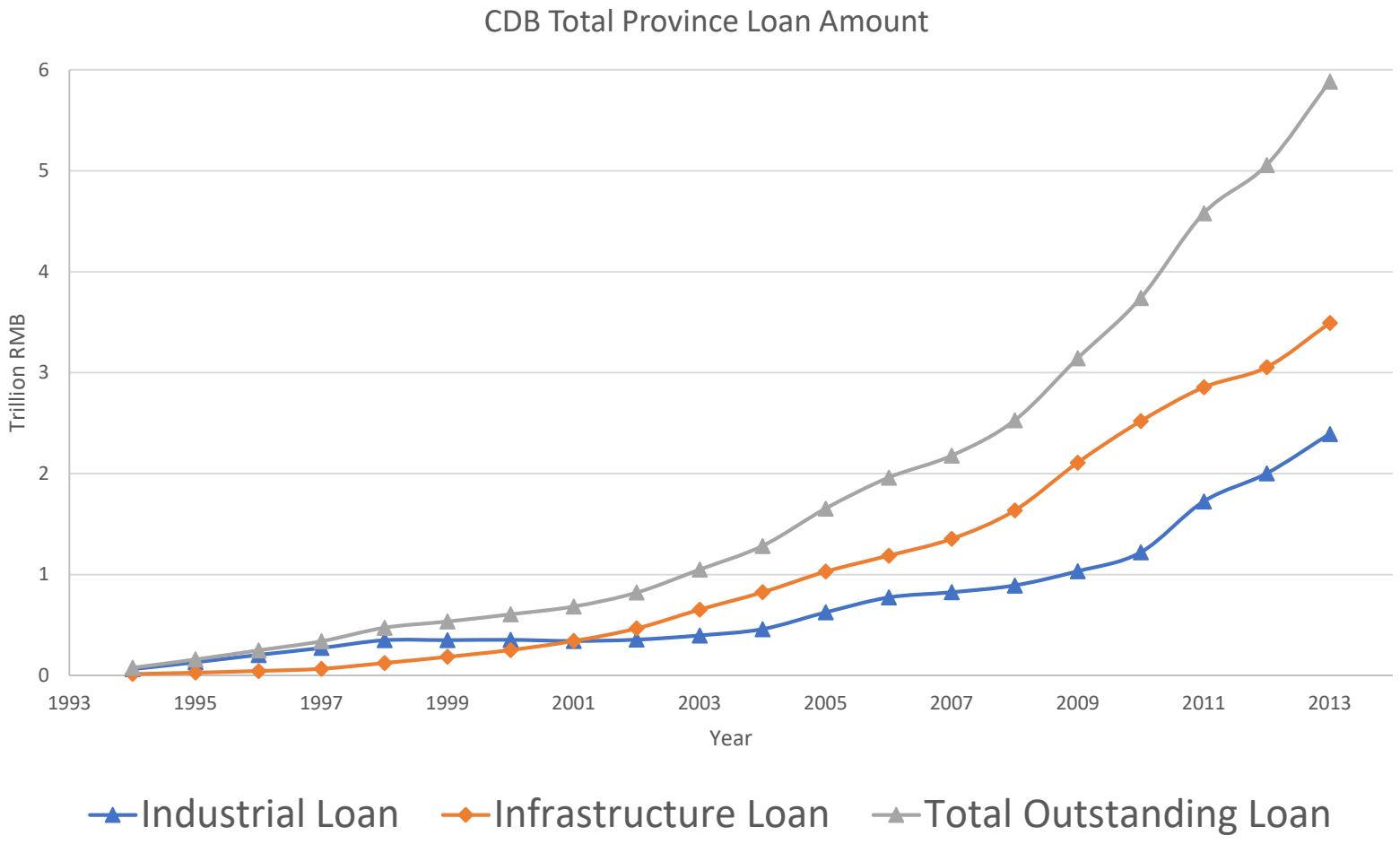
Huawei's Export to **All countries** from 2000 to 2013			
Rank	product_name	Export_amount (billion USD)	Percent
1	Cellular network base station	15.099	20%
2	Data transmission equipment	7.375	10%
3	Wireless network interface controller	7.353	10%
4	**Cell phone**	7.178	10%
5	Other equipment, parts, and accessories	6.939	9%

Time Trend of CDB Loans (Trillion RMB)



CDB loans and Trade (OLS)

Panel A: Effect of Direct Loan on SOEs

	(1) *LogExport*	(2) *LogNumDestinations*	(3) *LogNumProducts*
LogDirectLoan	0.0011	0.0000	-0.0002
	(0.8)	(0.0)	(-0.3)
Controls	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes
Province×Year FE	Yes	Yes	Yes
Observations	60,164	60,164	60,164
Adjusted R-squared	0.697	0.747	0.684

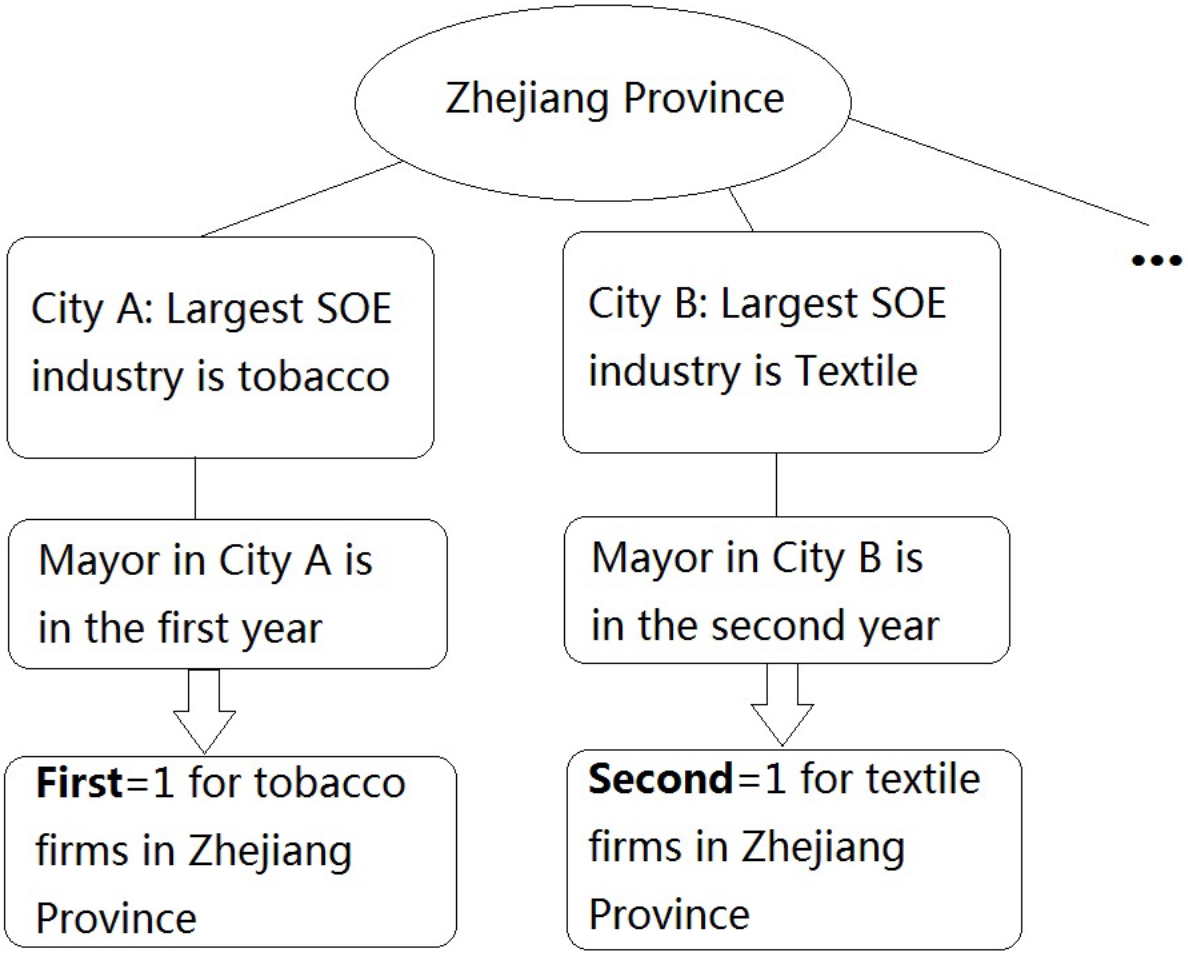
Panel B: Effect of Upstream Loan on Private Firms

	(1) *LogExport*	(2) *LogNumDestinations*	(3) *LogNumProducts*
LogUpstreamLoan	0.0018***	0.0008***	0.0013***
	(4.6)	(3.7)	(7.0)
Controls	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes
Province×Year FE	Yes	Yes	Yes
Observations	577,579	577,579	577,579
Adjusted R-squared	0.771	0.798	0.735

Establish Causal Effect of CDB Credit

- CDB credit allocations are endogenous
- IV approach – explore exogenous variation from local politicians' turnover timing (Ru, 2018)
  - City leaders have strong incentive to borrow as much as possible and as early as possible from the CDB to boost GDP, due to promotion concern (Li and Zhou (2005))
  - Different cities have different 5-year political turnover cycles
- Industry distributions for SOEs are stable across cities and over time
  - The cities within the same province usually focus on different industries. On average, there are 10 cities in each province, focusing on 5 different industries.
  - The industry that the city's SOEs focus on does not change much over time; 42% of the cities do not change the top industry from 1998 to 2009; 40% change once.
- Match city-level turnover with province-level industry loan

Instrumental Variable



Instrumental Variable

	Predicted Turnover *Log(City Loan)*	Actual Turnover *Log(City Loan)*
First_Year	1.0329***	1.1103***
	(14.2)	(2.9)
Second_Year	0.7593***	0.8910***
	(10.8)	(3.1)
Third_Year	0.5224***	0.6088***
	(8.2)	(3.2)
Fourth_Year	0.2538***	0.3118***
	(4.7)	(3.0)
Controls & FE	Yes	Yes
Observations	3,130	2,685
Adjusted R-squared	0.897	0.886

Horizontal Industry Loans (2SLS)

SOEs	(1) *LogExport*	(2) *LogNumDestinations*	(3) *LogNumProducts*	(4) *Export/Sales*
Log(Direct Loan)	0.0402***	0.0169**	0.0125**	0.0016
	(2.9)	(2.6)	(2.2)	(1.0)
Observations	52,458	52,458	52,458	52,458
Adjusted R-squared	0.748	0.790	0.739	0.765
Firm & Macro Controls	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes
Province-Year FE	Yes	Yes	Yes	Yes
Wald F-stat	85.97	85.97	85.97	85.97

Private Firms	(1) *LogExport*	(2) *LogNumDestinations*	(3) *LogNumProducts*	(4) *Export/Sales*
Log(Direct Loan)	0.0028	0.0059***	0.0031	-0.0009
	(0.6)	(2.6)	(1.6)	(-1.3)
Observations	562,772	562,772	562,772	562,772
Adjusted R-squared	0.811	0.833	0.785	0.809
Firm & Macro Controls	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes
Province-Year FE	Yes	Yes	Yes	Yes
Wald F-stat	459.5	459.5	459.5	459.5

Upstream Industry Loans (2SLS)

SOEs	(1) *LogExport*	(2) *LogNumDestinations*	(3) *LogNumProducts*	(4) *Export/Sales*
Log(Upstream Loan)	0.0234	0.0158	0.0080	0.0034
	(1.1)	(1.6)	(0.9)	(1.3)
Observations	44,978	44,978	44,978	44,978
Adjusted R-squared	0.757	0.793	0.742	0.764
Firm & Macro Controls	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes
Province-Year FE	Yes	Yes	Yes	Yes
Wald F-stat	28.46	28.46	28.46	28.46

Private Firms	(1) *LogExport*	(2) *LogNumDestinations*	(3) *LogNumProducts*	(4) *Export/Sales*
Log(Upstream Loan)	0.0198***	0.0136***	0.0123***	0.0026***
	(4.7)	(6.3)	(6.2)	(3.4)
Observations	519,197	519,197	519,197	519,197
Adjusted R-squared	0.814	0.834	0.784	0.808
Firm & Macro Controls	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes
Province-Year FE	Yes	Yes	Yes	Yes
Wald F-stat	507.6	507.6	507.6	507.6

CDB loans and Export Price (2SLS)

	(1)	(2)	(3)	(4)
	SOE	SOE	Private	Private
	LogPrice	*LogWTPrice*	*LogPrice*	*LogWTPrice*
LogUpstreamLoan	-0.0089	-0.0109	-0.0065***	-0.0069***
	(-0.9)	(-1.0)	(-2.7)	(-2.8)
Controls	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes
Province×Year FE	Yes	Yes	Yes	Yes
Product FE	Yes	Yes	Yes	Yes
Observations	208,598	208,598	2,349,154	2,349,154
Adjusted R-squared	0.728	0.720	0.661	0.646
Wald F-test	24.41	24.41	366.7	366.7

Summary: Effect of CDB Loan

- **Positive spillover effects** of upstream government industry credit on **private sectors** in the downstream in terms of export

- Increases in trade volumes and decreases in goods prices

- Next step: study the effects of these cheaper imported goods from China in the US economy
  - Link the US firms with imported goods from China by industry
  - Use estimated export volumes and prices caused by CDB credit

Increased trade volumes and US firm activities

Panel A: Horizontal Effect	(1)	(2)	(3)	(4)	(5)
	LogAsset_US	*PPE/Assets_US*	*LogSale_US*	*NI/Asset_US*	*LogEmployees_US*
Estimated_LogDirectExport	-0.1934***	-0.0162***	-0.1165***	-0.0386	-0.0869***
	(-12.2)	(-6.9)	(-6.7)	(-0.3)	(-7.2)
Firm FE	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes
Observations	56,686	56,655	48,460	56,408	45,700
Adjusted R-squared	0.927	0.829	0.942	0.313	0.962

Panel B: Upstream Effect	(1)	(2)	(3)	(4)	(5)
	LogAsset_US	*PPE/Assets_US*	*LogSale_US*	*NI/Asset_US*	*LogEmployees_US*
Estimated_LogUpstreamExport	0.0521***	0.0025	0.0271**	-0.1102	0.0317***
	(4.5)	(1.1)	(2.1)	(-0.7)	(2.7)
Firm FE	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes
Observations	42,068	42,023	35,860	41,873	33,330
Adjusted R-squared	0.944	0.831	0.957	0.309	0.964

Decreased goods prices and US firm activities

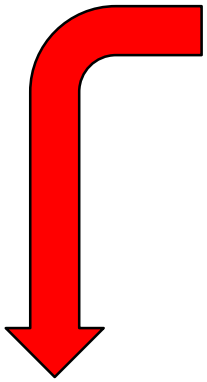
Panel A: Horizontal Effect	(1)	(2)	(3)	(4)	(5)
	LogAsset_US	*PPE/Assets_US*	*LogSale_US*	*NI/Asset_US*	*LogEmployees_US*
Direct_PriceChange	0.1497***	0.0123***	0.0646***	0.0307*	0.0450***
	(11.7)	(7.3)	(5.5)	(1.8)	(4.7)
Firm FE	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes
Observations	56,686	56,655	48,460	48,128	45,700
Adjusted R-squared	0.927	0.828	0.941	0.555	0.962

Panel B: Upstream Effect	(1)	(2)	(3)	(4)	(5)
	LogAsset_US	*PPE/Assets_US*	*LogSale_US*	*NI/Asset_US*	*LogEmployees_US*
Upstream_PriceChange	0.0007	-0.0036**	-0.0209**	-0.0495***	-0.0177**
	(0.1)	(-2.3)	(-2.2)	(-3.1)	(-2.0)
Firm FE	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes
Observations	42,068	42,023	35,860	36,041	33,330
Adjusted R-squared	0.944	0.831	0.957	0.572	0.964

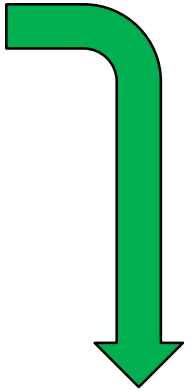
Impacts on the US industries

CDB credit to ferrous metal industry (RMB 593 Billion)

Firms in machinery, parts, and accessories
RMB 2,338 Billion export to the US



US firms produce same goods:
19% drop in assets
12% drop in sales
9% drop in employment



US firms in downstream industries:
5% increase in assets
3% increase in sales
3% increase in employment

Conclusion

- The paper documents the evidence of the effects of government credit on firm export activities
- Trace the different effects of government credit along different levels of the industry supply chain
  - CDB industrial loans to SOEs significantly help SOEs' export but not private firms in the same industry
  - CDB industrial loans to upstream industry benefit private firms' export in the downstream industry
- Impact of government credit in China on US domestic firm activities via trade
  - Cheaper goods imported from China have crowd out US firms in the same industry
  - Cheaper intermediate goods imported from China crowd in US firms in downstream industries
- Use pre-determined political turnover timing as the instrument for CDB loans to establish causality