

# How Trade Uncertainty Affects Supply-Chain Financing: **The Role of Banks**

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Supply Chains in a Changing Global Landscape

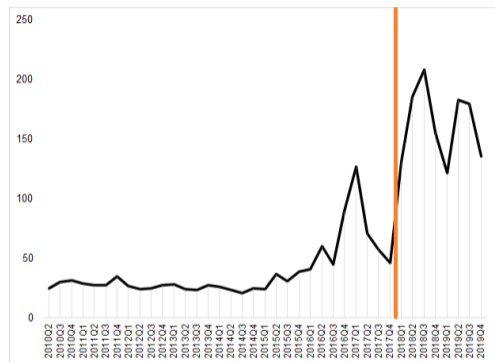
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The views and conclusions are those of the authors and do not necessarily indicate concurrence by the Federal Reserve system, their staff, or policies.

# Motivation—An Era of High Global Uncertainty

- A material concern since the GFC
- COVID-19 pandemic, war, climate, Brexit
- Trade: deglobalization/fragmentation, supply chain disruptions, reshoring
- Uncertainty changes investment, spending, trade finance needs
- Trade policy uncertainty spiked in 2018, stayed high
- Tariffs were imposed on selected sectors starting in Feb 2018

Figure: Trade Policy Uncertainty Index



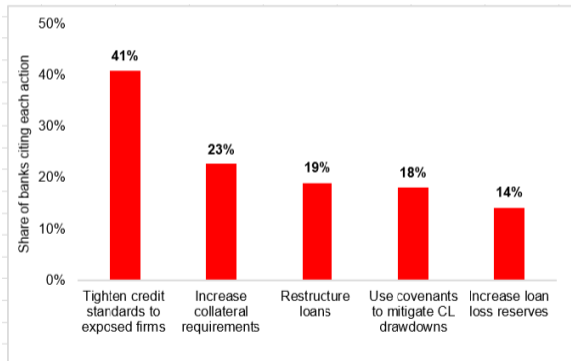
Source: "Trade Policy Uncertainty Index" from Caldara et al. (2020).

# Motivation—Lesson of GFC: Role of Financial Sector

... banks' and financial institutions as potential amplifiers

- Banks actions can amplify contractionary impulses from uncertainty shocks
- This presentation:
  - ▶ Focus on pre-pandemic trade tensions and their **financial and real effects through banks**
  - ▶ Examine effects on banks' lending decisions, especially for trade-oriented firms
  - ▶ Use detailed lending data for large U.S. banks

Figure: Bank Actions to Mitigate Trade Risks



Source: Federal Reserve Senior Loan Officer Opinion Survey (SLOOS), April 2019.

# Results: Trade Uncertainty Reduces Lending to Firms

... with negative (amplifying) effects for the real economy

- 1 Banks respond to an increase in trade uncertainty by reducing credit supply across *all* firms
- 2 Uncertainty-exposed banks curtail lending especially to
  - ▶ directly affected firms
  - ▶ firms dependent on trade finance
  - ▶ firms exposed to global value chains
  - ▶ firms that are key buyers and suppliers in the U.S. production network
- 3 The effects of trade *uncertainty* are stronger than those of trade *policy* (tariffs)

# Our Analytic Approach & Conjectures

## Analytic approach:

- Study the period of largely unanticipated increases in trade uncertainty and changes in tariffs during 2018–2019
- Define a bank's **exposure to trade uncertainty** as the pre-“trade war” (end-2017) loan share to high-uncertainty sectors
- Study the relation between a bank's **exposure** to the volume and terms of the bank's new loans (rate, maturity, collateral), emphasize differences between borrowing firms in terms of exposure to trade (global supply chains)
- Finally, is trade uncertainty more disruptive than the policy change itself?

**Key conjecture:** Banks that are more hit by trade uncertainty reduce the supply of loans more, especially to firms that are closest to the source of the shock

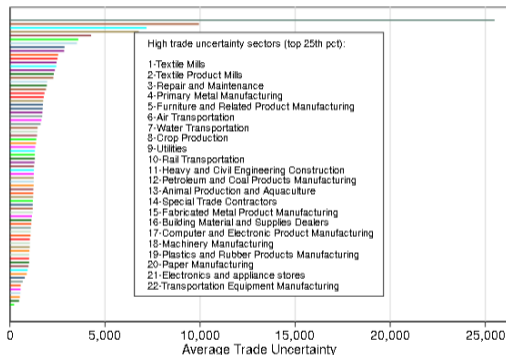
# Our Data

... combine extensive micro data on bank lending with data on uncertainty and tariffs, and bank and firm characteristics

- FR Y-14Q (U.S. "Credit Register"): Data on large commercial loans ( $> \$1$  mn) reported by banks subject to stress tests (US BHCs  $> \$50$  bn in assets) . Use [new loan originations, inclusive of trade finance](#), to domestic and foreign firms.
- Data on bank characteristics
- Data on trade uncertainty for individual firms based on textual analysis of earnings call transcripts, aggregated at the sector level [Hassan et al. \(2019\)](#)
- Data on trade tariffs at the sector level [Flaen and Pierce \(2019\)](#)

# Sectors Hit by Trade Uncertainty

## Sectoral Trade Uncertainty 2018–2019



- Average firm-level trade uncertainty measured at sector level
  - Rank sectors by level of trade uncertainty
  - Define “high-uncertainty sectors” as  $> 75$ th percentile
- ⇒ Most sectors are in manufacturing, some in agriculture

Note: Non-financial sectors are listed in descending order of uncertainty. Source: Authors' calculations using data from [Hassan et al. \(2019\)](#).

# Key Result #1

- Banks that are more hit by trade uncertainty reduce the supply of loans more
- More exposed banks also raised loan rates and demanded more collateral and left maturities unchanged, but effects are statistically weaker
- Credit demand (average utilization rate) from the average firm increased

Dependent variable	(1)	(2)	(3)	(4)	(5)
			<b>Loan amount (log)</b>		
					<i>Horse race</i>
Bank exposure to <b>uncertainty</b>	<b>-0.874***</b>	<b>-0.552*</b>			<b>-0.942***</b>
Bank exposure to <b>tariffs</b>			<b>-0.462**</b>	<b>-0.305</b>	<b>0.076</b>
Bank FE	Y	Y	Y	Y	Y
Firm × Quarter FE	Y	Y	Y	Y	Y
Firm × Bank FE		Y		Y	

OLS on bank-firm-quarter loan-level data (samples of 80K obsm, about 20K firms per year). Sample contains new loans granted between 2016 and 2019 to domestic nonfinancial firms. Bank characteristics include size (log-assets), capital (common equity/total assets) and deposits (core deposits/liabilities). All regressions include bank FEs, firm × quarter FEs; every other regression includes firm × bank FEs. SEs double clustered at the quarter and bank-firm level. Significance: \*\*\* 1%, \*\*5%, \*10%, and # 20%.



# Dimensions of firm heterogeneity

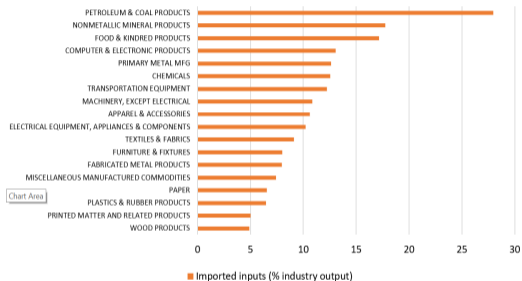
Four critical differences across firms in regards to closeness to the shock

- 1 **Directly affected** firms vs. others  
⇒ Firms in high-uncertainty sectors ( $>$  75th pctile uncertainty score)
- 2 Firms reliant on **trade finance loans** vs. others  
⇒ Trade finance loans: 25% of all loans
- 3 Firms with high **exposure to Global Value Chains**  
⇒ Above 75th pctile share of imported inputs in (i) industry output; and (ii) total intermediate inputs
- 4 Firms that are **central in the U.S. production network**  
⇒ Above-median buyer and supplier (summed up) coefficients, capturing those sectors that are important buyers or supplier of units of production, *directly and indirectly*, vis-a-vis all other sectors

# Examples of Differences Across Firms & Sectors

## Sectors with High Exposure to GVCs

High Share of imported inputs in total industry output



Note: 3-digit NAICS sectors are listed in descending order of (average) exposure to GVCs over 2016–2017. Sectors with high import content are petroleum & coal products, mineral products, computers/electronics, metal and chemical manufacturing. Source: Authors' calculations using data from Sources: U.S. Bureau of Economic Analysis (BEA), IO tables.

- Sectors that are major **buyers** of products
  - ▶ PST (incl. legal services and computer design)
  - ▶ manufacturing (chemicals, primary/fabricated metals)
- Sectors that are major **suppliers** of products
  - ▶ manufacturing (chemicals, primary/fabricated metals, computers and electronics)
  - ▶ water transportation
  - ▶ agriculture (crop production, animal production, aquaculture, food)
- These characteristics are positively correlated.

## Key Result #2: Differences Across Firms

Banks that are more hit by trade uncertainty reduce the supply of loans relatively more for firms in sectors with tariffs and firms reliant on trade finance loans

Dependent variable	(1)	(2)	(3)	(4)
		Loan amount (log)		
Bank exposure to <b>uncertainty</b> × <b>Directly affected firm</b>	<b>-0.693**</b>		<b>-0.566**</b>	
Bank exposure to <b>uncertainty</b> × Other borrower	<b>-0.976***</b>		<b>-0.387</b>	
Bank exposure to <b>tariffs</b> × <b>Trade finance firm</b>		<b>-1.892***</b>		<b>-1.005***</b>
Bank exposure to <b>tariffs</b> × Other borrower		<b>-0.556**</b>		<b>-0.258</b>
pvalue t-test Ho: directly affected = other borrower	0.155		-	
pvalue t-test Ha: trade finance > other borrower		0.001		-
Bank FE	Y	Y	Y	Y
Firm × Quarter FE	Y	Y	Y	Y

## Key Result #2: Differences Across Firms

Banks that are more hit by trade uncertainty reduce the supply of loans relatively more for firms in sectors with higher import content and thus more exposed to Global Value Chains

Dependent variable	(1)	(2)	(3)	(4)
		Loan amount (log)		
Bank exposure to <b>uncertainty</b> $\times$ <b>High GVC exposure</b> <sup>1</sup>	<b>-1.646***</b>		<b>-0.807***</b>	
Bank exposure to <b>uncertainty</b> $\times$ <b>Low GVC exposure</b> <sup>1</sup>	<b>-0.590**</b>		<b>-0.184</b>	
Bank exposure to <b>uncertainty</b> $\times$ <b>High GVC exposure</b> <sup>2</sup>		<b>-1.412***</b>		<b>-0.637**</b>
Bank exposure to <b>uncertainty</b> $\times$ <b>Low GVC exposure</b> <sup>2</sup>		<b>-0.689**</b>		<b>-0.257</b>
pvalue t-test Ho: high > low GVC exposure	0.002	0.016	-	-
Bank FE	Y	Y	Y	Y
Firm $\times$ Quarter FE	Y	Y	Y	Y

High GVC exposure<sup>1</sup> refers to the share of imported inputs in total industry output above 75th percentile. High GVC exposure<sup>2</sup> refers to the share of imported inputs in total intermediate inputs above 75th percentile of the cross-sectional sectoral distribution.

## Key Result #2: Differences Across Firms

Banks that are more hit by trade uncertainty reduce the supply of loans relatively more for firms in sectors that are more central as buyers and suppliers of production units from or two the rest of the U.S. economy

Dependent variable	(1)	(2)	(3)	(4)
	Loan amount (log)			
Bank exposure to <b>uncertainty</b> × Major Buyer <sup>1</sup>	-1.646***		-0.807***	
Bank exposure to <b>uncertainty</b> × Other sector <sup>1</sup>	-0.590**		-0.184	
Bank exposure to <b>uncertainty</b> × Major Supplier <sup>2</sup>		-1.412***		-0.637**
Bank exposure to <b>uncertainty</b> × Other sector <sup>2</sup>		-0.689**		-0.257
pvalue t-test Ho: major buyer/supplier > other sector	-	-	-	-
Bank FE	Y	Y	Y	Y
Firm × Quarter FE	Y	Y	Y	Y

# Conclusions

- Trade **uncertainty reduces the supply of bank loans** across all firms (above and beyond the effect of trade policy)
- This effect is **economically large**
  - ▶ Because of uncertainty, quarterly loan growth dropped 0.5 ppts in 2018–2019 compared to 4.2% average growth in 2015–2017
  - ▶ High-uncertainty banks grew their loan books by 3.9 ppts less than low-uncertainty banks (75 – 25th pctile)
- **Credit contraction is stronger for trade-oriented firms**
- **Credit contraction has adverse effects on the real economy**
  - ▶ Banks especially curtail loans earmarked for investment and term loans
  - ▶ Firms are unable to substitute across lenders, which dampens total debt, capital expenditure, and asset growth
- **Financial intermediaries can amplify the effects of uncertainty and real shocks!**