

Domestic credit supply in the face of trade policy uncertainty: how do banks adjust?

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How do banks adjust to trade policy uncertainty?

Motivation: China/US trade tensions, BREXIT, renegotiation of NAFTA, and geopolitical conflicts, such as Russia's invasion of Ukraine

Research question: How do banks respond?

- ① Higher trade policy uncertainty, banks tighten or loosen credit supply?
- ② Which bank factors mediate the response?

Data: We exploit micro-data from Mexico's **credit registry** (loan level), and **customs data** on firm's trade activities (transaction level), with **bank balance sheet** characteristics (bank level).

Identification: First use standard bank credit supply specification with fixed effects, second construct TPU shock series and estimate the model.

Results: With higher trade policy uncertainty, banks generally increase new loan issuance while raising interest rates and shortening tenors. Key factors are a bank's specialization in loan issuance, credit to trade firms, or foreign currency intermediation, and foreign parent status. We also find that new loans increase for both trade firms and non-trade firms.

Why study Mexico?

- Episode of high trade policy uncertainty TPU
 - Anti-Mexico rhetoric during 2016 U.S. election campaign
 - NAFTA renegotiation, policy changes and new agreement (USMCA)
- Real and financial linkages with trading partners
 - US and Canada: NAFTA signed in 1994
 - Mexico's Main trade partner is the US MexExports
 - Mexico is part of Global Value Chains MexGVC
 - Mexico experienced two waves of foreign bank entry BankEntry
- Developed financial sector
 - Bank-centric
 - Concentrated, 7 largest banks account for around 85% of banking sector assets, and 5 of these are foreign-owned
 - potential for spillovers, credit to firms that trade internationally relatively small in number but high in value

Data overview

- ① **Confidential loan-origination records for domestic corporate credit**
 - Borrowing firm, bank, amount, contract terms, product type, rate type, annual interest rate, purpose, and associated development program guarantees
- ② **Customs database:** export and import records
 - Firm identifier, destination/origin country, type of good
- ③ **Bank-level data:**
 - Bank's balance sheet and income statements
 - Cross-border balance-sheet items of resident banks
- ④ **Trade uncertainty, existing text-based measures**
 - U.S.-Mexico trade uncertainty news-based measure (Banco de México)
 - Trade Policy component of US EPU (Baker et al., 2016)
- ⑤ **Estimation period 2010–18, on monthly data**

Bank Data Summary Statistics

New Loans Summary Statistics

Initial tests show bank credit responds to TPU

	All firms		Trading	Non-trading
A. New Loans				
TPU	0.0335*** (-0.0004)	0.0118*** (-0.0002)	0.0105*** (-0.0003)	0.0128*** (-0.0002)
R-squared	0.034	0.753	0.715	0.737
Adj-R2-within		0.0069	0.0101	0.00569
B. Interest Rate				
TPU	0.0180*** (-0.0011)	-0.0370*** (-0.0005)	-0.0315*** (-0.0007)	-0.0434*** (-0.0007)
R-squared	0.145	0.825	0.745	0.834
Adj-R2-within		0.0245	0.011	0.0375
Observations	3,318,497	2,989,362	1,027,573	1,961,789
C. Term (Months)				
TPU	0.2387*** (-0.0038)	-0.0022 (-0.0023)	0.0734*** (-0.0036)	-0.0531*** (-0.0031)
R-squared	0.044	0.722	0.688	0.729
Adj-R2-within		0.00488	0.00014	0.00718
Observations	2,542,640	2,273,814	837,156	1.436.658
Bank Controls	YES	YES	YES	YES
Firm-Bank FE	No	YES	YES	YES

Note: Robust standard errors in parentheses. *** $p < 0.01$, ** $p < 0.05$, $p < 0.10$.

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Heterogeneous bank responses to trade uncertainty

To better identify effects of trade policy uncertainty on domestic credit supply, we exploit our datasets and construct bank-specific channel variables.

- 1 Using bank balance sheet data:
 - specialization in **credit** (loan to assets ratio)
 - specialization in **foreign currency** (eg. FX liabilities to total liabilities)
- 2 Using customs data and credit registry:
 - specialization in trade firms, **existing loans to trade firms**

$$X_{b(f)} = \frac{\text{outstanding loans to trade firms (excluding firm } f)}{\text{total outstanding loans}}$$

Within the category of trade firms:

Exporters only, Importers only, or GVC firms (a firm that both exports and imports during the sample period).

- 3 **Foreign parent**, and foreign parent home country location using dummy variables

Testing for effect of trade uncertainty on bank credit supply

$$C_{fbt} = \alpha_0 + \beta_1 U_{t-l} + \beta_2 X_{b,t-1-k} U_{t-l} + \lambda X_{b,t-1-k} + \zeta Z_{b,t-1-k} + \mu_{fb} + \delta_{st} + \varepsilon_{fbt} \quad (1)$$

- C_{fbt} is the credit supply variable: i) log of the amount of new credit granted by a bank b to a firm f in period t , the maturity in months, and the interest rate spread over the risk-free rate on those new loans;
- U_{t-l} is the trade uncertainty measure at time $t - l$.
- $X_{b,t-1-k}$ is the bank-level variable of interest capturing the channel through which trade tensions may affect credit supply.
- $Z_{b,t-1-k}$ is the set of bank controls: size (log of assets), liquidity (liq. assets/total assets), balance sheet quality (NPL ratio), and capitalisation (CAR).
- μ_{fb} is a control for time-invariant characteristics of the firm-bank relationship and δ_{st} is sector-time fixed effects, helping to control for loan demand effects
- Standard errors are clustered at the firm-bank level (and robust to cross-sectional dependence, heteroskedasticity and autocorrelation)

Hypothesis:

higher trade uncertainty tightens bank credit supply

From equation (1):

$$\left. \frac{\partial C_{fbt}}{\partial U_{t-l}} \right|_{X_{b,t-1-k}=\bar{X}_b} = \beta_1 + \beta_2 \bar{X}_b < 0 \quad (2)$$

When faced with higher uncertainty **banks** with

- *ex ante* higher proportion of **loans to overall assets** or **outstanding credit with trade firms**, may tighten credit supply because of existing loans deteriorating and/or higher perceived credit risk in the future
- *ex ante* higher proportion of **foreign currency intermediation**, may curtail credit because of increased FX volatility or higher perceived FX risks in the future
- a **foreign parent**, may transmit uncertainty shocks to local subsidiaries

Alternatively, we may observe that **banks "loosen" supply aligning with international specialization** (in credit to trade firms, or FX)

We estimated the model for each channel variable, and for each credit supply dependent variable (loan amount, spread, and maturity).

Evidence of an increase in new loans for banks with higher existing credit to trade firms (driven by Exporters, GVCs)

	(1)	(2)	(3)	(4)	(5)
	Loan to assets	Bank's exposure to Trade firms	Bank's exposure to Import firms	Bank's exposure to Export firms	Bank's exposure to Global Value Chain firms
A. New loans					
Bank variable	0.0056*** (0.0006)	-0.0184*** (0.0006)	-0.0083*** (0.0007)	-0.0452*** (0.0018)	-0.0272*** (0.0010)
Bank variable X TPU	-0.0000 (0.0000)	0.0001*** (0.0000)	-0.0000 (0.0000)	0.0047*** (0.0001)	0.0008*** (0.0001)
Firm-Bank FE	YES	YES	YES	YES	YES
Sector-Time FE	YES	YES	YES	YES	YES
Observations	2,986,956	2,986,945	2,986,945	2,986,945	2,986,945
R-squared	0.761	0.761	0.761	0.761	0.761
F stat. p-value	0.000	0.000	0.000	0.000	0.000
TPU dydx at 50p	-0.0008 (0.0007)	0.0053*** (0.0012)	-0.0004 (0.0009)	0.0173*** (0.0004)	0.0074*** (0.0007)

Table 4, more results in the paper:

- evidence that these banks also widen spreads and *lengthen* maturities
- banks with higher loan to assets respond through spreads (narrower) and loan terms (shorter)

Banks with higher FX intermediation increase new loans

	(6)	(7)	(8)	(9)	(10)
	FX liabilities	FX assets	Foreign parent	NAFTA, Non-NAFTA	US, Non-NAFTA
A. New loans					
Bank variable	0.0023*** (0.0006)	0.0017*** (0.0006)			
TPU X Bank variable	0.0002*** (0.0000)	0.0003*** (0.0000)	0.0086*** (0.0004)	-0.0080*** (0.0005) 0.0133*** (0.0004)	-0.0084*** (0.0005) 0.0133*** (0.0004)
Firm-Bank FE	YES	YES	YES	YES	YES
Sector-Time FE	YES	YES	YES	YES	YES
Observations	2,986,956	2,986,956	2,986,956	2,980,408	2,980,408
R-squared	0.761	0.761	0.761	0.761	0.761
F stat. p-value	0.000	0.000	0.000	0.000	0.000
R2-within	0.000462	0.000528	0.000539	0.00149	0.00149
Adj-R2-within	0.000460	0.000525	0.000536	0.00148	0.00148
TPU dydx at 50p	0.0063*** (0.0004)	0.0077*** (0.0004)			

Table 5, more results in the paper:

- evidence these banks also widen spreads and *shorten* maturities
- banks with foreign parents also respond similarly, but differentially depending on parent's home country: NAFTA (US,Canada) less new lending

Innovation in TPU measurement...proxy variable using trade tweets and the USD/MXN exchange rate

A regression that uses raw news-based TPU measures might capture not only the effects of trade policy uncertainty, but also the effect of other contemporaneous macroeconomic factors.

To check this, we estimate a structural VAR (SVAR) for Mexico identified with an external instrument built from unexpected USD/MXN exchange rate movements around trade-related tweets, following the proxy-SVAR approach of Mertens and Ravn (2013) and Stock and Watson (2018).

- collect tweets from the U.S. administration about trade policy with Mexico
- construct surprise series: exchange rate impact of the tweets in a tight window around the trade tweet event
- use the surprise series as an external instrument in a structural VAR, following Gertler and Karadi (2015), and Känzig (2021)
- recover the TPU structural shock series

Estimating the marginal effects of TPU using our TPU shock series: i) strengthens our evidence that banks respond...

	(1)	(2)	(3)	(4)	(5)
	Loan to assets	Bank's exposure to Trade firms	Bank's exposure to Import firms	Bank's exposure to Export firms	Bank's exposure to Global Value Chain firms
A. New loans					
Bank variable	0.0055*** (0.0006)	-0.0185*** (0.0006)	-0.0099*** (0.0007)	-0.0198*** (0.0016)	-0.0215*** (0.0009)
Bank variable X TPU	-0.0001*** (0.0000)	0.0026*** (0.0000)	0.0024*** (0.0000)	0.0200*** (0.0003)	0.0027*** (0.0002)
Firm-Bank FE	YES	YES	YES	YES	YES
Sector-Time FE	YES	YES	YES	YES	YES
Observations	2,986,956	2,986,945	2,986,945	2,986,945	2,986,945
R-squared	0.761	0.761	0.761	0.761	0.761
F stat. p-value	0.000	0.000	0.000	0.000	0.000
TPU dydx at 50p	-0.0076*** (0.0021)	0.1452*** (0.0025)	0.1021*** (0.0020)	0.0736*** (0.0010)	0.0243*** (0.0018)

– comparing estimated average marginal effects, from the raw TPU (Tbl 4) to the TPU shock series (Tbl 7), only notable difference was for banks with higher existing credit with Exporting firms: the raw TPU shows a shortening of maturities, while with the shock series, the response becomes statistically insignificant

...and ii) banks adjust along each credit variable: loan issuance, spreads and maturity.

	(6)	(7)	(8)	(9)	(10)
	FX liabilities	FX assets	Foreign parent	NAFTA, Non-NAFTA	US, Non-NAFTA
A. New loans					
Bank variable	0.0034*** (0.0005)	0.0033*** (0.0006)			
TPU X Bank variable	0.0020*** (0.0000)	0.0023*** (0.0000)	0.0670*** (0.0010)	0.0520*** (0.0015)	0.0503*** (0.0015)
				0.0705*** (0.0011)	0.0705*** (0.0011)
Firm-Bank FE	YES	YES	YES	YES	YES
Sector-Time FE	YES	YES	YES	YES	YES
Observations	2,986,956	2,986,956	2,986,956	2,980,408	2,980,408
R-squared	0.761	0.761	0.761	0.761	0.761
F stat. p-value	0.000	0.000	0.000	0.000	0.000
R2-within	0.00104	0.00117	0.00178	0.00184	0.00184
Adj-R2-within	0.00103	0.00117	0.00178	0.00185	0.00185
TPU dydx at 50p	0.0508*** (0.0011)	0.0558*** (0.0011)			

- comparing results from raw TPU (Tbl 5) to TPU shock series (Tbl 8), notably using the raw TPU series, foreign parent banks from NAFTA (US,Canada) decreased loan issuance, but with our TPU shock series, they show an increase in new loans, although still by less than non-NAFTA banks.

Conclusion: banks respond to TPU by adjusting credit conditions, however not strictly tightening or loosening

- ① The estimated marginal effects of **trade policy uncertainty** on banks' provision of **domestic credit** are statistically significant whether using the TPU-Banxico index, or our TPU shock series.
- ② Bank responses to TPU are modulated by bank channel variables
 - higher loans to assets ratio: fewer loans, lower spreads, shorter maturities
 - higher existing credit to trade firms: more loans, however interest rate and maturities responses varied depending on whether to GVCs, Exporters or Importers
 - existing credit with Importers and Exporters, higher TPU caused wider spreads and longer maturities, while for GVCs narrower spreads and shorter maturities
 - higher FX intermediation: more loans, higher spreads, shorter maturities
- ③ foreign parent status influences credit supply in the host jurisdiction, with differentiated responses depending on the home country proximity to the source of TPU, in the case of Mexico, NAFTA (US,Canada) versus non-NAFTA

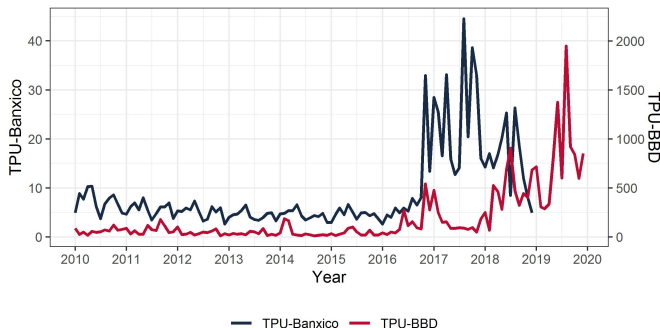
References, and extra slides

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Existing text-based Trade Policy Uncertainty measures 2010-2020

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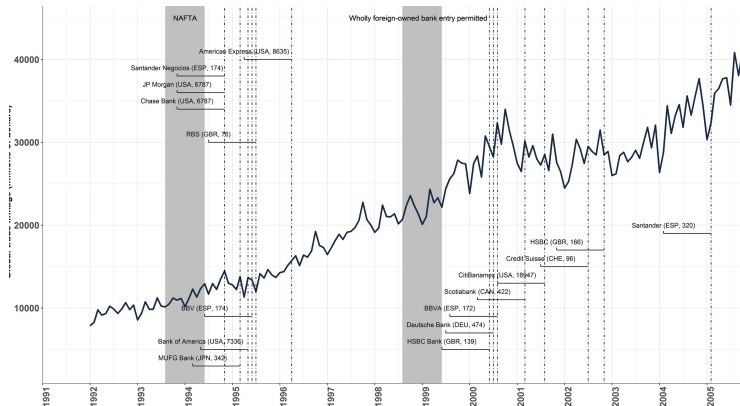
Figure: Trade policy uncertainty measures



Note: The TPU-Banxico measure is a text-based trade policy uncertainty index constructed by Banco de México using word searches for phrases and words associated with NAFTA, trade policy, and uncertainty in the Mexican and U.S. press. TPU-BBD is the trade policy component of the US uncertainty index from Baker et al. (2016).

Foreign bank entry into Mexico 1991-2015

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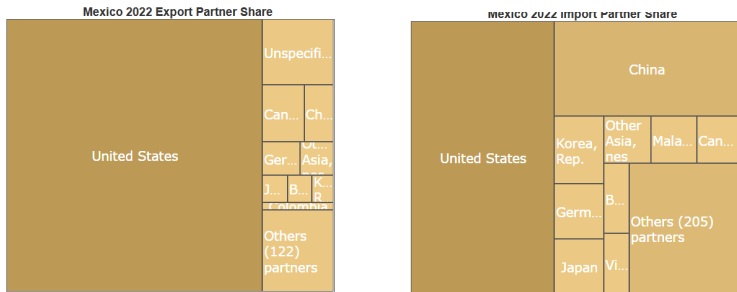
Note: The first wave of bank entry occurred after NAFTA, the second wave after regulatory changes that allowed for wholly foreign-owned subsidiaries.

Source: Source: Banco de México and CNBV.

Mexican export destinations and sectors

[Return](#)

Figure: Mexico's trade structure (2022, partner share)

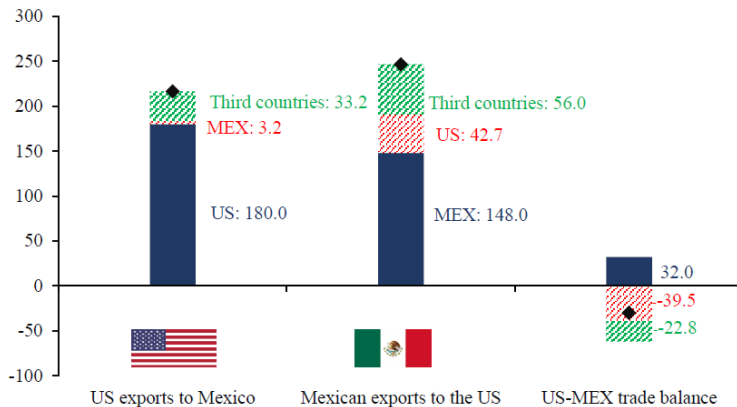


Note: The US accounts for 78% of exports and 44% of imports. Around 60% of Mexican merchandise exports come from the Manufacturing goods sector; some 30% from the Automotive industry and 10% from the Oil sector.

Source: WITS, U.N. Comtrade Database, data for 2022.

Mexico-US trade integration [Return](#)

Figure: Bilateral manufacturing trade decomposition (2014, USD billion)



Note: Black diamonds represent level of gross manufacturing exports or trade balance. Blue bars represent domestic content, shaded bars represent foreign content of exports.

Source: From ?, those authors' own estimates using data from the World Input-Output Database and the US Trade Department.

Summary statistics – Bank data [Return](#)

Bank variable	Mean	Std. Dev.	Median	90th pctl.
Assets (MXN mn.)	161,966.3	345,655.3	28,254.3	546,888.4
Assets (USD mn.)	10,336.6	21,700.0	1,730.3	37,139.2
Liquid assets to total assets (%)	33.5	22.6	31.7	66.7
NPL ratio (%)	3.6	6.0	2.2	8.7
CAR (%)	38.4	88.8	16.6	59.0
Loan to assets (%)	43.6	28.7	47.5	81.9
FC liabilities to total liabilities (%)	14.2	16.7	8.7	37.8
Bank's exposure to:				
Trade firms (%)	52.0	20.4	53.5	76.3
Import firms (%)	38.6	18.6	38.4	59.1
Export firms (%)	3.3	5.3	2.6	6.9
Global value chain firms (%)	10.1	9.8	8.2	17.4

Source: Banco de México and CNBV. Data sample: 2010M1 – 2018M12.

Note: Bank's exposure to trade/import/export/global value chain firms calculated for Mexico as a percentage of bank's corporate credit.

Summary statistics – New loans [Return](#)

Firm group	Loan characteristics	Mean	Std. Dev.	Median	90th pctile.
All firms	Amount (millions of MXN)	5.9	67.6	0.3	6.0
	Amount (millions of USD)	0.4	4.2	0.0	0.4
	Term (months)	24.0	3,918.1	24.0	50.0
	Interest Rate (%)	15.8	10.0	14.0	25.1
Non-trading firms	Amount (millions of MXN)	3.3	51.9	0.2	2.9
	Amount (millions of USD)	0.2	3.2	0.0	0.2
	Term (months)	25.8	4,813.2	35.0	51.0
	Interest Rate (%)	17.3	10.7	15.2	26.3
Trading firms	Amount (millions of MXN)	11.4	92.5	1.0	15.1
	Amount (millions of USD)	0.7	5.7	0.1	1.0
	Term (months)	20.7	733.2	12.0	48.0
	Interest Rate (%)	12.4	7.1	11.8	20.0

Source: Banco de México and CNBV. Data sample: 2010M1 – 2018M12.

Note: Statistics for the loan term are calculated omitting credit lines because they have an indefinite term. Overall they represent 9.3% of new credit volume. A term of zero months indicates loans with maturity of less than 30 days. Term and interest rates are weighted averages of new loans granted by a given bank to a given firm during period t .

Split between non-trade and trade firms in the loan data

Trade firms = those that **either import or export** during our sample period.

	Share of new credits				Share of outstanding credits			
	Number of loans		Loan amount		Number of loans		Loan amount	
	No imports	Imports	No imports	Imports	No imports	Imports	No imports	Imports
No exports	84.88	11.8	38.56	46.1	89.41	8.4	50.08	38.0
Exports	1.1	2.2	3.7	11.7	0.8	1.4	3.3	8.6

- Most loans go to non-trade firms.
- Trade firms receive around 15% of the volume and 60% of the value of new loans in Mexico during our sample period.
- Non-trade firms account for 90% of outstanding loans, and about 50% of their value during our sample period.