

# Import Exchange Rate Pass-Through and Credit Constraints: Evidence From China

Presenter: Lingfei Lu

Supervisor: Prof. Yao Amber Li

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Department of Economics

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## Roadmap

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# Introduction

- Exchange rate shock is a key factor affecting international trade price fluctuations.
- Exchange rate pass-through (ERPT) is defined as the elasticity of local price changes to exchange rate fluctuations.
  - A *complete* ERPT means only the prices in destination currency change with exchange rates; while an *incomplete* ERPT means the prices in producer currency also change.
- Exchange rate pass-through measures how exchange rate risk is shared between buyers and sellers of trade.

# Introduction

- Using detailed Chinese customs transaction records, we separate ERPT into the export and the import side.
  - The higher the export ERPT, the more volatile the sale price of Chinese exporters in destination market.
  - The higher the import ERPT, the more unstable the cost of imported material or intermediate goods of Chinese importers.
- In this project, we will study China's exchange rate pass-through using import-side micro-level evidence.

# Key Questions

Our questions:

- 1 What is the difference between China's import-side exchange rate pass-through (ERPT) and its export-side counterpart?
- 2 How do credit constraints of importers affect import ERPT?
- 3 What are the channels through which credit constraints affect import ERPT? What factors would enhance or mitigate this effect?

## Key Findings

We find:

1. The average import exchange rate pass-through level in China is significantly less complete than the export one.
2. Tighter financial constraints will increase both import and export ERPT to be more complete.
3. Importers with a wider sourcing base (who import a certain product from more sources) have a less complete ERPT and are less affected by credit constraints.

# Literature Review: Incomplete Exchange Rate Pass-through

- We first contribute to a wide literature on exchange rate disconnect, particularly on the lack of price sensitivity to exchange rate shocks. [Obstfeld and Rogoff, 2000], [Campa and Goldberg, 2005]
- Two milestone papers link the exchange rate-price elasticity or pass-through to disaggregated firm-level characteristics.
  - [Berman et al., 2012] (BMM) provide micro-level evidence of firm heterogeneity in response to real exchange rate shocks.
  - [Amiti et al., 2014] (AIK) find that firms with higher import intensity and larger market share have lower ERPT.

# Literature Review: Incomplete Exchange Rate Pass-through

- Three major channels leading to incomplete export exchange rate pass-through in the literature:
  1. Local currency pricing (LCP): short-run nominal price rigidities in the destination currency. [[Engel, 2002](#)], [[Gopinath and Rigobon, 2008](#)]
  2. Pricing-to-market (PTM): firms with variable markups optimally set different prices depending on destination market conditions. [[Atkeson and Burstein, 2008](#)], [[Berman et al., 2012](#)], [[Manova and Zhang, 2012](#)], [[Gopinath et al., 2010](#)], [[Gopinath and Itskhoki, 2010](#)]
  3. Marginal production cost: home currency appreciation will decrease marginal costs due to cheaper imported inputs, partially offsetting export price changes. [[Amiti et al., 2014](#)], [[Chatterjee et al., 2013](#)]



# Literature Review: Incomplete Exchange Rate Pass-through

- Recent literature reveals more firm-level evidence on heterogeneous pass-through.
  - [Chen and Juvenal, 2016] find more pricing-to-market and a smaller response of export volumes for higher quality goods.
  - [Li et al., 2015] (LMX) find that the domestic price response of Chinese exporters to exchange rate changes is very weak.
  - [Garetto, 2016] and [Auer and Schoenle, 2016] argues that firm-level ERPT is a U-shaped function of firm-level productivity and market share; and new entrants under incomplete information, have lower passthrough rates than those under complete information.
  - [Devereux et al., 2017] find that ERPT invoicing depend on the market share of both importers (negative) and exporters (U-shaped).

# Literature Review: Credit Constraints and Trade

- Another important strand of literature discusses the effects of firms' credit constraints on international trade.
  - [[Kroszner et al., 2007](#)] first classify firms by industries with different degrees of external financial dependence to study banking crisis.
  - [[Manova, 2013](#)] argues that financial market imperfections affect trade because only those firms with sufficient liquidity to finance the additional expenditures can participate in trade.
  - [[Chaney, 2016](#)] defines financially constrained firms as those that lack both sufficient pledgeable assets and sufficient productivity to generate sufficient liquidity on their own.
  - [[Feenstra et al., 2015](#)], [[Manova et al., 2015](#)], and [[Fan et al., 2015a](#)] discuss how credit constraints affect Chinese exporters, through incomplete information, multinational links, and quality, respectively.

# Literature Review: Credit Constraints and Trade

- For the relationship between credit constraints and exchange rate pass-through, [[Strasser, 2013](#)] shows that financially constrained firms tend to pass more exchange rate shocks to prices.
  - Borrowing constraints force firms to keep pricing-to-market (PTM) to a minimum as they do not have enough margin to adjust markups.
- Our project will improve two recent articles discussing credit constraints and ERPT with evidence from China, [[Dai et al., 2021](#)] and [[Xu and Guo, 2021](#)], who verify that more financially constrained exporters are more sensitive to exchange rate changes.

# Data: Customs Transaction Records

- The first dataset is the transaction level records from the General Administration of Customs of China (GACC) during 2000-2011.
- This dataset provides information on all Chinese trade transactions including import and export values, quantities, units, product names and codes, source and destination countries, and type of enterprises.
- The categories of products are coded by the Harmonized Coding and Description System (HS) from World Customs Organization (WCO).
- We drop unwanted observations referring to [\[Li et al., 2015\]](#):
  - products with inconsistent missing information of unit or quantity
  - special product categories such as arms (HS2=93), antiques (HS2=97), and special categories (HS2=98 and 99)
  - transactions existing for only one year without any change over time.

## Data: Firm-level Information

- The second dataset is Chinese Industrial Enterprises (CIE) database from the National Bureau of Statistics of China (NBSC).
- This dataset covers all state-owned enterprises and above-scale firms with annual sales of more than 5 million RMB from 1999 to 2007.
- The data provide details about firms' identification code, ownership, industry type, and about 80 other variables in the balance sheet including the number of employees, total wage payments, the value of fixed assets, sales income, total operation inputs, etc.
- To merge it with customs records, we match the identification codes based on the contact information of firms as in [Fan et al., 2015b].

## Data: Summary Statistics

- The summary statistics of the whole customs records, the firm information dataset, and the final matched sample are shown in the panels A, B, and C below, respectively:

Table 3.1. Summary Statistics for Main Samples

	#observations	Mean	Median	Std. dev	P10	P90
<b>Panel A: Customs records</b>						
Export Value (USD)	18,581,221	424868	21692	1.04E+07	888	423436
Export Price (RMB)	18,581,221	22007.45	30.10417	2229173	4.564519	556.4724
Annual Export Price Change	11,400,795	0.025908	0.005982	0.665267	-0.50011	0.5709025
Import Value (USD)	14,172,315	439283	7721	1.98E+07	214	292720
Import Price (RMB)	14,172,315	49519.78	111.0406	1411944	5.159389	10247.12
Annual Import Price Change	8,580,234	0.023625	-0.00207	1.017117	-0.8523061	0.9388119
<b>Panel B: Firm information</b>						
Sales Income (thousand RMB)	1,745,511	78826.33	17630	714350.5	5318	111319
Employment	1,745,511	262.9454	108	964.6382	30	500
Fixed Asset (thousand RMB)	1,745,511	27437.2	4043	312024.8	573	36968
Operation Input (thousand RMB)	1,745,511	61682.99	13971	562923.1	4035	168810
Current wage payable (thousand RMB)	1,745,511	3730.157	1121	28699.16	266	6300
<b>Panel C: Matched sample</b>						
Export Value (USD)	3,168,876	880187.2	33693	4.66E+07	1376	712735
Export Price (RMB)	3,168,876	18326.68	28.31701	1893237	4.995613	398.6719
Annual Export Price Change	1,829,966	0.023539	0.006083	0.682097	-0.48284	0.550056
Import Value (USD)	3,280,928	1120261	11139	2.36E+07	266	529584
Import Price (RMB)	3,280,928	29955.95	76.56041	525990.1	4.966081	5614.432
Annual Import Price Change	1,827,983	-0.08694	-0.00105	1.34694	-1.20575	1.013989

# Data: Exchange Rates and Macro Variables

- Nominal exchange rates and price level of household consumption are from Penn World Table (PWT) 10.0 [Feenstra et al., 2015].
- The bilateral nominal exchange rate is defined as the number of home currency units that can purchase a unit of foreign currency.
- The CPI-based real exchange rate ( $RER_{ct}$ ) is defined as:

$$RER_{ct} = NER_{ct} \cdot \frac{CPI_{ct}}{CPI_{CHN,t}}.$$

- An increase in  $RER_{ct}$  means a real depreciation of the Chinese RMB against the foreign country's  $c$  currency.
- In addition, we use the real GDP of the destination countries from PWT 10.0, computed with national-accounts growth,  $RGDP_{ct}$ .

## Data: Exchange Rates Fluctuations

- We saw substantial variations in RMB exchange rate fluctuations against major trading partners of China during 1999-2011.

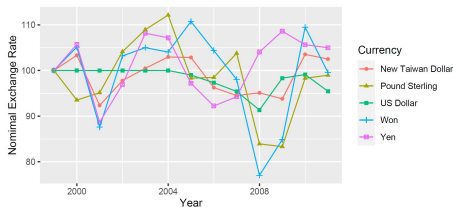


Figure 3.1. Nominal exchange rates of China's major trading partners (1999-2011)

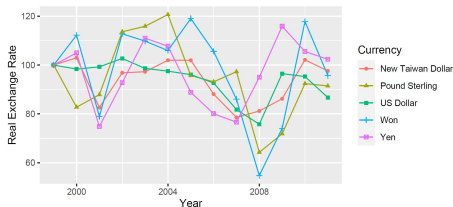


Figure 3.2. Real exchange rates of China's major trading partners (1999-2011)

- The real exchange rate against the US dollar did not change a lot in 2000-2004 due to the nominal pegging scheme. In 2005, the peg was lifted to appreciation due to the evolution of exchange policy.



## Baseline Estimation Equation

- The first step goal is to estimate exchange rate pass-through as the elasticity of unit values changes to exchange rate changes.

$$\Delta \ln P_{ijct}^D = \alpha + \beta^D \Delta \ln RER_{ct} + \gamma \Delta \ln RGDP_{ct} + \xi_{ijc} + \tau_t + \varepsilon_{ijct} \quad (1)$$

where  $P_{ijct}$  is the price of the product  $i$  bought (sold) by firm  $j$  from country  $c$  in year  $t$ .  $D \in \{\text{Import, Export}\}$  denotes the trade direction.  $\xi_{ijc}$  denotes the firm-product-country level fixed effects.  $\tau_t$ , the year dummies, control for common macro-shocks across firms.

- To deal with possible non-stationarity, we use the first difference of the logarithms for prices  $\Delta \ln P_{ijct}^D$ , real exchange rates  $\Delta \ln RER_{ct}$  and real GDP  $\Delta \ln RGDP_{ct}$  to represent their annual rates of change.

## Unit Value as Price

- The customs records contain trade values (by US dollars) and quantities for each HS6 product  $i$ , each firm  $j$ , from (or to) each country  $c$ , in each year  $t$ ,  $V_{ijct}$ , and  $Q_{ijct}$ .
- The real prices for export and import  $P_{ijct}^{Import}$  and  $P_{ijct}^{Export}$  are computed as unit values, both denominated by the Chinese RMB:

$$P_{ijct}^D = \frac{V_{ijct}^D \cdot NER_{US,t}}{Q_{ijct}^D}$$

- Because product categories are highly subdivided, we believe that the unit value is an ideal proxy for the transaction price.

# Baseline Estimation Coefficients

- The coefficient  $\beta^{D=Import}$  measures the completeness of import exchange rate pass-through, i.e. a higher  $\beta$  means Chinese importers face more volatile import RMB prices during exchange rate shocks.
- However,  $\beta^{D=Export}$  means the "incompleteness" of the export pass-through because a higher  $\beta$  means Chinese exporters pass less exchange rate change to the destination market while having more volatile domestic currency prices.

## Estimations with Credit Constraints

- We study the credit constraint effects on exchange rate pass-through by including an interaction term of sectors' financial vulnerability:

$$\Delta \ln P_{ijct}^D = \alpha + \beta_1^D \Delta \ln RER_{ct} + \beta_2^D \Delta \ln RER_{ct} \cdot FV_j + \gamma \Delta \ln RGDP_{ct} + \xi_{ijc} + \tau_t + \varepsilon_{ijct} \quad (2)$$

where  $FV_j$  is the financial vulnerability of the sector to which the firm  $j$  belongs.

- The interaction coefficient  $\beta_2$  represents the effect of industry-level credit constraints on exchange rate pass-through.
- The overall import ERPT for firm  $j$  is given by  $\beta_1^D + \beta_2^{Import} FV_j$  and the overall export ERPT is  $\beta_1^D + \beta_2^{Export} FV_j$ .

# Measures of Credit Constraints

- Following [Manova et al., 2015] and [Fan et al., 2015a], we use sector-level financial vulnerability measures to proxy for credit needs (demand for outside capital) and the ability to resist financial risks.
  - External Finance Dependence ( $ExtFin_j$ )**: the share of capital expenditures not financed by operational cash flows.
  - Asset Tangibility ( $Tang_j$ )**: the share of the net value of tangible assets that firms can pledge as collateral to raise external finance, in its total book value.
  - Inventory-to-sales Ratio ( $Invnt_j$ )**: measure of the production cycle duration and the necessary working capital to maintain inventories and meet demand.
- We also construct the **first principal component  $FPC_j$**  of external finance dependence and asset tangibility as an aggregate measure.

## Measures of Credit Constraints

- Alternatively, we also compute measures of credit needs based on Chinese firm-level information, with an additional of R&D intensity.
- Below are the summary statistics of US and Chinese measures of credit constraints.

Table 4.1. Summary Statistics for Credit Constrains Measures

	#observations	Mean	Median	Std. dev	P10	P90
<b>Panel A: US Measures</b>						
FPC <sub><i>j</i></sub>	1,745,511	-7.12e-09	-0.2706642	1	-1.071394	1.072687
ExtFin <sub><i>j</i></sub>	1,745,511	-.0036698	-0.05	0.3112002	-0.25	0.28
Tang <sub><i>j</i></sub>	1,745,511	0.3106788	0.32	0.0944181	0.1866667	0.43
Invent <sub><i>j</i></sub>	1,745,511	0.1594069	0.1633333	0.0292352	0.115	0.1933333
	#observations	Mean	Median	Std. dev	P10	P90
<b>Panel B: Chinese Measures</b>						
ExtFin <sub><i>j</i></sub>	1,745,511	-0.6479498	-0.47	0.6746751	-1.32	-0.1
Tang <sub><i>j</i></sub>	1,745,511	0.3332769	0.3268749	0.0648019	0.2390799	0.4317028
Invent <sub><i>j</i></sub>	1,745,511	0.1102537	0.1030875	0.0274747	0.0778921	0.1348336
R&D <sub><i>j</i></sub>	1,745,511	0.0168278	0.012111	0.0142106	0.0053125	0.0281532

\* This table shows the summary statistics of credit constraints measures. Panel A describes the measures calculated using US data while panel B shows the alternative Chinese version. All variables are unitless, the numerical size only means relative rank.

## Additional Firm-level Factors

To answer the third question, we introduce a vector  $\mathbb{Z}_{jt}$  (or its lagged form  $\mathbb{Z}_{jt-1}$ ) to include additional factors which may affect ERPT.

1. **Sourcing Diversity**: defined as the number of source countries from which an importer  $j$  imports a certain HS6 product type  $i$ .
2. **Markup**: estimated by the GMM method following [De Loecker and Warzynski, 2012] and [Brooks et al., 2021].
3. **Market Share**: defined as a firm's value share in the import market, within a given HS6 product category.

$$S_{ijct}^D \equiv \frac{v_{ijct}^D}{\sum_{j' \in J_{ict}} v_{ij'ct}^D}$$

## Estimations with Additional Factors

- Estimation equations with additional factors  $\mathbb{Z}_{jt-1}$ :

$$\Delta \ln P_{ijct}^D = \alpha + [\beta_1^D + \beta_2^D \cdot FV_j + \beta_3^D \cdot \mathbb{Z}_{jt-1}^{D'}] \Delta \ln RER_{ct} + \gamma \Delta \ln RGDP_{ct} + \mathbb{Z}_{jt}^{D'} \eta + \xi_{ijc} + \tau_t + \varepsilon_{ijct}. \quad (3)$$

$$\Delta \ln P_{ijct}^D = \alpha + [\beta_1^D + \beta_2^D \cdot FV_j + \beta_3^D \cdot \mathbb{Z}_{jt-1}^{D'} + \beta_4^D \cdot FV_j \cdot \mathbb{Z}_{jt-1}^{D'}] \Delta \ln RER_{ct} + \gamma \Delta \ln RGDP_{ct} + \mathbb{Z}_{jt}^{D'} \eta + \xi_{ijc} + \tau_t + \varepsilon_{ijct}. \quad (4)$$

- When using market share and its square term as additional factors:

$$\Delta \ln P_{ijct}^D = \alpha + [\beta_1^D + \beta_2^D \cdot FV_j + \beta_3^D \cdot S_{ijct}^D + \beta_4^D \cdot S_{ijct}^{D^2}] \Delta \ln RER_{ct} + \gamma \Delta \ln RGDP_{ct} + \eta S_{ijct}^D + \xi_{ijc} + \tau_t + \varepsilon_{ijct}. \quad (5)$$



## Results: Import Pass-through vs Export Pass-through

- The results for import exchange rate pass-through versus export exchange rate pass-through are shown below using different samples.

Table 5.1. Baseline Estimations of Exchange Rate Pass-Through

	(1)	(2)	(3)	(4)
Panel A	Import			
	Whole	Matched	Top 50	Top 20
$\Delta \ln RER_{ct}$	0.179*** (0.003)	0.357*** (0.015)	0.354*** (0.015)	0.344*** (0.016)
$\Delta \ln RGDR_{ct}$	-0.133*** (0.026)	0.263*** (0.090)	0.282*** (0.091)	0.333*** (0.097)
Year FE	Yes	Yes	Yes	Yes
Firm-product-country FE	Yes	Yes	Yes	Yes
Observations	8409682	1792020	1781948	1684798
Panel B	Export			
	Whole	Matched	Top 50	Top 20
$\Delta \ln RER_{ct}$	0.050*** (0.002)	0.031*** (0.005)	0.039*** (0.006)	0.065*** (0.009)
$\Delta \ln RGDR_{ct}$	-0.102*** (0.010)	-0.083** (0.037)	-0.118*** (0.042)	-0.082 (0.056)
Year FE	Yes	Yes	Yes	Yes
Firm-product-country FE	Yes	Yes	Yes	Yes
Observations	11173463	1793974	1611410	1251147

## Results: Import Pass-through vs Export Pass-through

### Key Finding 1

- The average import exchange rate pass-through level in China is significantly less complete than the export one.
- For Chinese firms, when RMB depreciates against the currencies of major trading partners, export prices denominated in RMB will not rise significantly, but their import costs will rise sharply;
- On the contrary, when the real exchange rate of RMB appreciates, export prices in RMB will decrease only to a limited extent, and their import costs will increase dramatically drop.

## Results: Effects of Credit Constraints

- Panel A presents differences in import exchange rate pass-through caused by industry-level credit demand heterogeneity as equation 2.

Table 5.2. Effects of Credit Constraints on Exchange Rate Pass-Through

	(1)	(2)	(3)	(4)
Panel A	Import			
	FPC	External Finance	Tangibility	Inventory
$\Delta \ln RER_{ct}$	0.123*** (0.016)	0.218*** (0.016)	1.175*** (0.033)	-0.739*** (0.069)
$\Delta \ln RGDR_{ct}$	0.314*** (0.090)	0.323*** (0.090)	0.283*** (0.090)	0.273*** (0.090)
$\Delta \ln RER_{ct} * FPC_j$	0.379*** (0.010)			
$\Delta \ln RER_{ct} * ExtFin_j$		1.159*** (0.029)		
$\Delta \ln RER_{ct} * Tang_j$			-3.305*** (0.117)	
$\Delta \ln RER_{ct} * Invent_j$				6.305*** (0.389)
Year FE	Yes	Yes	Yes	Yes
Firm-product-country FE	Yes	Yes	Yes	Yes
Observations	1792020	1792020	1792020	1792020

## Results: Effects of Credit Constraints

- Panel B presents comparable results for effects of credit constraints on export exchange rate pass-through.

Panel B	Export			
	FPC	External Finance	Tangibility	Inventory
$\Delta \ln RER_{ct}$	0.039*** (0.006)	0.034*** (0.005)	-0.030** (0.015)	0.102*** (0.030)
$\Delta \ln RGDR_{ct}$	-0.084** (0.037)	-0.083** (0.037)	-0.084** (0.037)	-0.083** (0.037)
$\Delta \ln RER_{ct} * FPC_j$	-0.019*** (0.004)			
$\Delta \ln RER_{ct} * ExtFin_j$		-0.045*** (0.013)		
$\Delta \ln RER_{ct} * Tang_j$			0.230*** (0.053)	
$\Delta \ln RER_{ct} * Invent_j$				-0.412** (0.171)
Year FE	Yes	Yes	Yes	Yes
Firm-product-country FE	Yes	Yes	Yes	Yes
Observations	1793974	1793974	1793974	1793974



# Results: Sourcing Diversity and Credit Constraints

Table 5.3. Import Sources and Effects of Credit Constraints on Import Exchange Rate Pass-Through

	(1)	(2)	(3)	(4)
Panel A				
	#Sources	#Sources+ FPC	#Sources+ External Finance	#Sources+ Tangibility
$\Delta \ln RER_{ct}$	0.433*** (0.017)	0.177*** (0.019)	0.274*** (0.018)	1.386*** (0.040)
$\Delta \ln RGDR_{ct}$	0.250*** (0.090)	0.292*** (0.090)	0.297*** (0.090)	0.267*** (0.090)
#Source <sub>ijt</sub>	-0.021*** (0.002)	-0.016*** (0.003)	-0.016*** (0.003)	-0.050*** (0.006)
$\Delta \ln RER_{ct} * FPC_j * \#Source_{ijt}$		-0.014*** (0.002)		
$\Delta \ln RER_{ct} * FPC_j$		0.443*** (0.012)		
$\Delta \ln RER_{ct} * ExtFin_j * \#Source_{ijt}$			-0.054*** (0.006)	
$\Delta \ln RER_{ct} * ExtFin_j$			1.410*** (0.037)	
$\Delta \ln RER_{ct} * Tang_j * \#Source_{ijt}$				0.104*** (0.026)
$\Delta \ln RER_{ct} * Tang_j$				-3.790*** (0.148)
Year FE	Yes	Yes	Yes	Yes
Firm-product-country FE	Yes	Yes	Yes	Yes
Observations	1792020	1792020	1792020	1792020

## Results: Sourcing Diversity and Credit Constraints

### Key Finding 3

- Importers with a wider sourcing base (who import a certain product from more sources) have a less complete ERPT and are less affected by credit constraints.
- 
- If a firm can import the same product from more sources, it has more flexibility to escape the unfavorable exchange rate risk.
  - A more diverse importer can either switch from one source to another to reduce costs (trade diversion effect), or make a more credible threat to negotiate a more stable price.

## Discussion on Firm Heterogeneity in Markup

- [Berman et al., 2012] and [Li et al., 2015] suggest that different markup levels lead to heterogeneous responses to exchange rate shocks. We verify this by including markup in equation 3 and 4.

Table A.2. Heterogeneous Markup and Effects of Credit Constraints on Export Exchange Rate Pass-through

	(1)	(2)	(3)	(4)
Panel B				
	Markup	Markup+ FPC	Markup+ External Finance	Markup+ Tangibility
$\Delta \ln RER_{ct}$	-0.046** (0.021)	-0.042** (0.021)	-0.048** (0.021)	-0.112*** (0.027)
$\Delta \ln RGDP_{ct}$	-0.074* (0.043)	-0.076* (0.043)	-0.075* (0.043)	-0.076* (0.043)
$\Delta \ln RER_{ct} * Markup_{jt-1}$	0.061*** (0.016)	0.066*** (0.016)	0.067*** (0.016)	0.063*** (0.016)
$\Delta \ln RER_{ct} * FPC_j$		-0.023*** (0.005)		
$\Delta \ln RER_{ct} * ExtFin_j$			-0.061*** (0.016)	
$\Delta \ln RER_{ct} * Tang_j$				0.243*** (0.062)
$Markup_{jt-1}$	-0.005* (0.003)	-0.005 (0.003)	-0.004 (0.003)	-0.005* (0.003)
Year FE	Yes	Yes	Yes	Yes
Firm-product-country FE	Yes	Yes	Yes	Yes
Observations	1411116	1411116	1411116	1411116



## Discussion on Firm Heterogeneity in Markup

- Does this logic also work for import exchange rate pass-through?

Table 6.1. Heterogeneous Markup and Effects of Credit Constraints on Import Exchange Rate Pass-through

	(1)	(2)	(3)	(4)
Panel A	Markup	Markup+ FPC	Markup+ External Finance	Markup+ Tangibility
$\Delta \ln RER_{ct}$	0.459*** (0.045)	0.310*** (0.045)	0.431*** (0.045)	1.419*** (0.058)
$\Delta \ln RGDP_{ct}$	0.329*** (0.106)	0.376*** (0.106)	0.389*** (0.106)	0.343*** (0.106)
$\Delta \ln RER_{ct} * Markup_{jt-1}$	-0.073** (0.030)	-0.157*** (0.030)	-0.163*** (0.031)	-0.112*** (0.030)
$\Delta \ln RER_{ct} * FPC_j$		0.414*** (0.011)		
$\Delta \ln RER_{ct} * ExtFin_j$			1.232*** (0.034)	
$\Delta \ln RER_{ct} * Tang_j$				-3.692*** (0.139)
$Markup_{jt-1}$	0.013** (0.006)	0.009 (0.006)	0.007 (0.006)	0.012** (0.006)
Year FE	Yes	Yes	Yes	Yes
Firm-product-country FE	Yes	Yes	Yes	Yes
Observations	1411106	1411106	1411106	1411106

- Importers with higher markup also have less complete ERPT!

## Discussion on Firm Heterogeneity in Market Share

- We provide the regression results of equation 5 with the market share and its square term as additional factors.

Table 6.2. Market Share and Effects of Credit Constraints on Import Exchange Rate Pass-through

	(1)	(2)	(3)	(4)	(5)
Panel A	MS	MS <sup>2</sup>	Import FPC	External Finance	Tangibility
$\Delta \ln RER_{ct}$	0.392*** (0.016)	0.381*** (0.016)	0.119*** (0.018)	0.220*** (0.017)	1.175*** (0.033)
$\Delta \ln RGDP_{ct}$	0.247*** (0.090)	0.251*** (0.090)	0.314*** (0.090)	0.321*** (0.090)	0.280*** (0.090)
$\Delta \ln RGDP_{ct} * MS_{ijct}$	-0.305*** (0.042)	0.155 (0.156)	0.677*** (0.156)	0.556*** (0.156)	0.546*** (0.156)
$\Delta \ln RGDP_{ct} * MS_{ijct}^2$		-0.531*** (0.173)	-0.941*** (0.173)	-0.837*** (0.173)	-0.846*** (0.173)
$\Delta \ln RER_{ct} * FPC_j$			0.379*** (0.010)		
$\Delta \ln RER_{ct} * ExtFin_j$				1.156*** (0.029)	
$\Delta \ln RER_{ct} * Tang_j$					-3.290*** (0.118)
MS	-0.012 (0.012)	-0.009 (0.012)	-0.002 (0.012)	-0.004 (0.012)	-0.003 (0.012)
Year FE	Yes	Yes	Yes	Yes	Yes
Firm-product-country FE	Yes	Yes	Yes	Yes	Yes
Observations	1792020	1792020	1792020	1792020	1792020

## Discussion on Firm Heterogeneity in Market Share

- To test whether there is U-shape relationship between markup and ERPT, we perform group regressions by market share quartile.

Table 6.3. Estimations of Exchange Rate Pass-Through by Market Share Quartile

	(1)	(2)	(3)	(4)
Panel A	Import			
	1st	2nd	3rd	4th
$\Delta \ln RER_{ct}$	0.222*** (0.056)	0.378*** (0.042)	0.404*** (0.032)	0.242*** (0.020)
$\Delta \ln RGDP_{ct}$	-0.371 (0.324)	0.444* (0.241)	0.314* (0.179)	-0.054 (0.129)
Year FE	Yes	Yes	Yes	Yes
Firm-product-country FE	Yes	Yes	Yes	Yes
Observations	372447	450728	492016	476829
Panel B	Export			
	1st	2nd	3rd	4th
$\Delta \ln RER_{ct}$	0.101*** (0.023)	0.096*** (0.014)	0.032*** (0.010)	0.007 (0.008)
$\Delta \ln RGDP_{ct}$	-0.099 (0.188)	0.082 (0.104)	-0.062 (0.070)	-0.054 (0.052)
Year FE	Yes	Yes	Yes	Yes
Firm-product-country FE	Yes	Yes	Yes	Yes
Observations	367524	464827	508742	452881

# Discussion on Future Research

How can we further decipher the mechanisms that affect exchange rate pass-through?

## 1. Import-export Linkage

- "Pressure-reducing valve": when a firm has the ability to pass more exchange rate fluctuations to destination prices, it has more room to absorb price fluctuations of imported inputs.
- Advantages in some firm characteristics may bring greater bargaining power on both the import the export side and thus cause lower export and import price pass-through as in [[Amiti et al., 2014](#)].

## 2. Time Trend of China's Exchange Rate Pass-through

- How do the (import and export) exchange rate pass-through levels of China evolve over time?
- Is this trend of exchange rate pass-through affected by loosening credit constraints and/or industry switching?

## Alternative Measures of Credit Constraints

- Robustness check test 1: we use alternative credit constraint measures constructed from Chinese data.

Table 7.1. Alternative Estimations with Chinese Measures of Credit Constraints

	(1)	(2)	(3)	(4)
Panel A				
	External Finance	Import Tangibility	Inventory	R&D Intensity
$\Delta \ln RER_{ct}$	0.502*** (0.018)	2.032*** (0.053)	-0.752*** (0.043)	0.043** (0.019)
$\Delta \ln RGDP_{ct}$	0.249*** (0.090)	0.240*** (0.090)	0.333*** (0.090)	0.304*** (0.090)
$\Delta \ln RER_{ct} * ExtFin_j$	0.223*** (0.014)			
$\Delta \ln RER_{ct} * Tang_j$		-5.776*** (0.176)		
$\Delta \ln RER_{ct} * Invent_j$			9.797*** (0.352)	
$\Delta \ln RER_{ct} * R\&D_j$				16.398*** (0.573)
Year FE	Yes	Yes	Yes	Yes
Firm-product-country FE	Yes	Yes	Yes	Yes
Observations	1792020	1792020	1792020	1792020

# Alternative Measures of Credit Constraints

Panel B	Export			
	External Finance	Tangibility	Inventory	R&D Intensity
$\Delta \ln RER_{ct}$	0.016** (0.007)	-0.135*** (0.023)	0.086*** (0.019)	0.043*** (0.007)
$\Delta \ln RGDP_{ct}$	-0.081** (0.037)	-0.082** (0.037)	-0.081** (0.037)	-0.082** (0.037)
$\Delta \ln RER_{ct} * ExtFin_j$	-0.021*** (0.007)			
$\Delta \ln RER_{ct} * Tang_j$		0.557*** (0.074)		
$\Delta \ln RER_{ct} * Invent_j$			-0.504*** (0.165)	
$\Delta \ln RER_{ct} * R\&D_j$				-0.627*** (0.243)
Year FE	Yes	Yes	Yes	Yes
Firm-product-country FE	Yes	Yes	Yes	Yes
Observations	1793974	1793974	1793974	1793974

## Alternative Subsample: Two-way traders

- Robustness check test 2: we use alternative sub-samples with only two-way traders who import and export at the same time.

Table 7.2. Alternative Estimations with Two-way Traders

	(1)	(2)	(3)	(4)
Panel A	Baseline	Import (Two-way traders)		
		FPC	External Finance	Tangibility
$\Delta \ln RER_{ct}$	0.394*** (0.015)	0.136*** (0.016)	0.231*** (0.015)	1.158*** (0.031)
$\Delta \ln RGDP_{ct}$	0.406*** (0.086)	0.459*** (0.086)	0.469*** (0.086)	0.427*** (0.086)
$\Delta \ln RER_{ct} * FPC_j$		0.388*** (0.009)		
$\Delta \ln RER_{ct} * ExtFin_j$			1.246*** (0.028)	
$\Delta \ln RER_{ct} * Tang_j$				-3.138*** (0.112)
Year FE		Yes	Yes	Yes
Firm-product-country FE		Yes	Yes	Yes
Observations	1712289	1712289	1712289	1712289

## Alternative Subsample: Two-way traders

Panel B	Export (Two-way traders)			
	Baseline	FPC	External Finance	Tangibility
$\Delta \ln RER_{ct}$	0.040*** (0.006)	0.051*** (0.006)	0.044*** (0.006)	-0.034** (0.016)
$\Delta \ln RGDP_{ct}$	-0.144*** (0.041)	-0.145*** (0.041)	-0.144*** (0.041)	-0.147*** (0.041)
$\Delta \ln RER_{ct} * FPC_j$		-0.022*** (0.005)		
$\Delta \ln RER_{ct} * ExtFin_j$			-0.048*** (0.015)	
$\Delta \ln RER_{ct} * Tang_j$				0.284*** (0.059)
Year FE		Yes	Yes	Yes
Firm-product-country FE		Yes	Yes	Yes
Observations	1415415	1415415	1415415	1415415



# Conclusion

- In this paper, we provide evidence at a disaggregated level for the incomplete import exchange rate pass-through in China and reveal how importers' financial constraints affect the pass-through.
- We find that:
  1. the average import exchange rate pass-through in China is around 35-40%, far below the 95% level for export pass-through;
  2. both import and export exchange rate pass-through are more complete for firms in industries with tighter credit constraints;
  3. import source diversity can effectively reduce import price pass-through and offset the effects of credit constraints
- In the future, we need to explore the underlying mechanism by which credit constraints affect exchange rate pass-through and the implications on the evolving trend of exchange rate pass-through.

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