An Exchange Rate Pass-through into Import Prices in China, Revisited

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- 1 Introduction
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1 Introduction

- processing trade accounts a big share in Chinese trade （*Risheng Mao et al.*, 2017）
- the quality of export products changes a lot in recent year（Brandt et.al., 2012； Bingzhan Shi， 2014； Miaojie YU and Rui Zhang， 2016）
- the behavior variation of different enterprise ownership's is big（Xuefeng Qian et al.， 2013）

1 Introduction

- What's the degree of Exchange Rate Pass-through into Import Prices in China?
- how to better control the effect of quality change?
- what's the role of processing trade and enterprise ownership?

2 literature review

- Exchange Rate Pass-through: Macro or Micro

- Exchange Rate Pass-through:Heterogeneous and asymmetric

2 literature review

- Imported intermediate products：Amiti et al.，2014；Xunyong Xiang et al.，2016; Jian Han et al.，2017; Camila Casas, 2020
- Quality：Yaqi Wang et al.，2015；Chen and Juvenal,2016; Yaqi Wang and Miaojie Yu，2017
- Productivity：Berman et al.(2012)，Ma et al.,2015，Xunyong Xiang et al.，2016
- Ownership: Halpern and Koren(2007)
- Economy: Mayer and Melitz(2014)

2 literature review

Quality measure method

- 1) unit price method
- 2) specific product characteristics method
- 3) demand information regression inference method (Gervais ,2011,Khandelwal et al. ,2013)

2 literature review

- methods in measurement of quality are varied
- no consensus on Imported intermediate products
- more concern on export part

3 Model Setting and data processing

- import function:

$$p_{i,c,l,t} = \alpha_0 + \alpha_1 fx_{c,t} + \alpha_2 X_{i,c,l,t} + i + c + l + t + \varepsilon_0$$

- i:HS-8products; c: corresponding export economy;
- l:province; t:year

3 Model Setting and data processing

- import function:

$$p_{i,c,l,t} = \alpha_0 + \alpha_1 fx_{c,t} + \alpha_2 X_{i,c,l,t} + i + c + l + t + \varepsilon_0$$

- Explained variable: $p_{i,c,l,t}$ the unit value in RMB of i products imported from economy c in year t by l province of China
- Explanatory variable: $fx_{c,t}$ the bilateral exchange rate of economy c and China, in Indirect Quotation; then $dfx_{c,t} > 0$ means RMB appreciation

3 Model Setting and data processing

- import function:

$$p_{i,c,l,t} = \alpha_0 + \alpha_1 fx_{c,t} + \alpha_2 X_{i,c,l,t} + i + c + l + t + \varepsilon_0$$

- Control Variables: $CPI_{c,t}$; $L.p_{i,c,l,t}$; $HHI_{i,c,l,t} = 10000 \sum_{i=1}^{i} \sum_{t=1}^{t} \left(value_{i,c,l,t} / value_{c,t} \right)^2$;

- $ownershare_{i,c,l,t} = value_{i,c,l,t,o} / value_{i,c,l,t}$; $shipmentshare_{i,c,l,t} = value_{i,c,l,t,s} / value_{i,c,l,t}$

Table 1 Variables and Data Sources

	Variable	Definition	Data resource
Explained variable	Import price ($dp_{i,c,l,t}$)	unit value in RMB of i products imported from economy c in year t by l province of China in differential form	China Customs and UN comm-trade
Explanatory variable	Exchange rate ($dfx_{c,t}$)	differential form of nominal bilateral exchange rate of economy c and China, in Indirect Quotation	IFS
Control variable	Production cost($dcpi_{c,t}$)	CPI index of economy c	IFS
	market concentration (HHI)	square sum of market share	Self calculation
	Ownership(set 1)	Including four variables: State share,Private share,Foreign share,Collective share	Self calculation
	Trade type(set 2)	Including two variables: Ordinary share, Processing share	Self calculation

3 data processing

- （1）deleting Special Category products,including HS93、HS97、HS98、HS99；keeping differentiated products classificatified by Rauch;
- （2）deleting the missing sample
- （3）keeping the data if $\left|dp_{i,c,l,t}\right| < 300\%$
- （4）keep only if a product substains more than five periods

4 Empirical test result

- 4.1 basic regression result
- 4.2 Robust Test
- 4.3 Hysteresis Test
- 4.4 Asymmetric Test

4 Empirical test result

table 3 Exchange Rate Pass-through to Import Price: Annual data of 2003 to 2015

VARIABLES	(1) dprice	(2) dprice	(3) dprice	(4) dprice	(5) dprice	(6) dprice
dfx	**-0.118*** **	**-0.117*** **	**-0.099*** **	**-0.115*** **	**-0.099*** **	**-0.099*** **
	(0.006)	**(0.006)**	**(0.006)**	**(0.006)**	**(0.006)**	**(0.006)**
dcpi	-0.025	-0.058*	-0.128***		-0.120***	-0.118***
	(0.029)	(0.030)	(0.033)		(0.033)	(0.033)
L.dprice				-0.307***		
				(0.001)		
State share					0.090***	
					(0.016)	
Private share					0.035**	
					(0.016)	
Foreign share					0.077***	
					(0.016)	
Collective share					0.049***	
					(0.017)	
Ordinary share						0.006**
						(0.003)
Processing share						-0.051***
						(0.004)
Fixed effect	Individual+year	Individual+year+ province	Individual*provin ce *year	Individual*provin ce *year	Individual*provin ce *year	Individual*provin ce *year
Observations	2,003,047	2,003,047	2,003,047	1,864,826	2,003,047	2,003,047
R-squared	0.008	0.008	0.237	0.310	0.237	0.237

4 Empirical test result

Table 4 Exchange Rate Pass-through to Import Price: Monthly data of 2015 to 2017

VARIABLES	(1) dprice	(2) dprice	(3) dprice	(4) dprice
dfx	**-0.148*** **	**-0.148*** **	**-0.115*** **	**-0.115*** **
	(0.024)	**(0.024)**	**(0.029)**	**(0.028)**
L.dprice	-0.419***	-0.419***	-0.419***	-0.413***
	(0.000)	(0.000)	(0.001)	(0.001)
Ordinary share				0.011***
				(0.002)
Processing share				-0.024***
				(0.002)
Fixed effect	Individual+year	Individual+year+province	Individual*province*year	Individual*province*year
Constant	-0.030***	-0.030***	-0.004***	0.013***
	(0.002)	(0.003)	(0.000)	(0.004)
Observations	3,482,592	3,482,592	3,482,592	3,482,592
R-squared	0.177	0.177	0.378	0.378

Table 5 Hysteresis Test of Import Exchange Rate Pass-through

	Annual data				Monthly data	
	(1)	(2)	(3)	(4)	(5)	(6)
VARIABLES	dprice	dprice	dprice	dprice	dprice	dprice
dfx	**-0.129*** **	**-0.122*** **	**-0.121*** **	**-0.123*** **	**-0.048**	**-0.043**
	(0.006)	**(0.007)**	**(0.007)**	**(0.007)**	**(0.033)**	**(0.033)**
L.dfx	**-0.069*** **	**-0.057*** **	**-0.057*** **	**-0.057*** **	**-0.218*** **	**-0.212*** **
	(0.006)	(0.007)	(0.007)	(0.007)	**(0.033)**	**(0.033)**
L2.dfx	0.004	-0.000	0.000	-0.000	**-0.159*** **	**-0.152*** **
	(0.006)	(0.006)	(0.006)	(0.006)	**(0.033)**	**(0.033)**
L3.dfx					**0.019**	**0.023**
					(0.033)	**(0.033)**
L4.dfx					**-0.052***	**-0.049**
					(0.032)	**(0.032)**
L.dprice	-0.320***	-0.324***	-0.324***	-0.325***	-0.446***	-0.446***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Control variable	No	No	Set 1	Set 2	No	Set 2
Fixed effect	Individual+year +province	Individual*provi nce *year	Individual*provi nce *year	Individual*provi nce *year	Individual*provi nce *year	Individual*provi nce *year
Observations	1,594,412	1,594,412	1,594,412	1,594,412	2,572,764	2,572,764
R-squared	0.112	0.323	0.323	0.323	0.409	0.409

Table 6 Asymmetric Test of Import Exchange Rate Pass-through

	Annual data				Monthly data	
	(1)	(2)	(3)	(4)	(5)	(6)
VARIABLES	dprice	dprice	dprice	dprice	dprice	dprice
dfx	-0.019**	-0.014	-0.014	-0.012	-0.069	-0.115**
	(0.009)	(0.009)	(0.009)	(0.009)	(0.055)	(0.052)
Appreciation dummy *dfx	**-0.160*** **	**-0.158*** **	**-0.159*** **	**-0.160*** **	**-0.140***	**-0.122***
	(0.014)	**(0.014)**	**(0.014)**	**(0.014)**	**(0.074)**	**(0.070)**
L.dprice	-0.303***	-0.307***	-0.307***	-0.308***	-0.419***	-0.419***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.000)
Control variable	No	No	Set 1	Set 2	No	Set 2
Fixed effect	Individual+year+ province	Individual*provin ce *year	Individual*provin ce *year	Individual*provin ce *year	Individual*provin ce *year	Individual*provin ce *year
Observations	1,864,826	1,864,826	1,864,826	1,864,826	3,482,592	3,482,592
R-squared	0.104	0.310	0.310	0.310	0.378	0.377

4 Empirical test result

- the degree of exchange rate pass-through of import is about 11%
- 2-year lag-effect rises the degree up to about 28%
- Asymmetric: appreciation of RMB is higher
- Heterogeneous: state-owned enterprise and processing trade is lower
- exchange rate pass-through of Korea and taiwan is higher than other economies

5 Heterogeneity Investigation

- 5.1 Ownership Heterogeneity
- 5.2 Trade Type Heterogeneity
- 5.3 Economy Heterogeneity
- 5.4 Product Heterogeneity

Table 7 Ownership and Trade-type Heterogeneity of Import Exchange Rate Pass-through

			Annual data			Monthly data
	(1)	(2)	(3)	(4)	(5)	(6)
VARIABLES	dprice	dprice	dprice	dprice	dprice	dprice
dfx	-0.127***	-0.128***	-0.071***	-0.115***	-0.126***	-0.119***
	(0.007)	(0.007)	(0.011)	(0.006)	(0.007)	(0.033)
State share* dfx	**0.078*** **					
	(0.020)					
Private share* dfx		**0.057*** **				
		(0.017)				
Foreign share* dfx			**-0.071*** **			
			(0.014)			
Collective share* dfx				-0.033		
				(0.079)		
Processing share* dfx					**0.032** **	**0.042**
					(0.015)	**(0.058)**
L.dprice	-0.307***	-0.307***	-0.307***	-0.307***		-0.419***
	(0.001)	(0.001)	(0.001)	(0.001)		(0.000)
dcpi					-0.213***	
					(0.048)	
Fixed effect	Individual*provin ce *year	Individual*provin ce *year	Individual*provin ce *year	Individual*provin ce *year	Individual*provin ce *year	Individual*province *year
Observations	1,864,826	1,864,826	1,864,826	1,864,826	2,003,047	3,482,592
R-squared	0.310	0.310	0.310	0.310	0.310	0.378

Table 8 Economy Heterogeneity of Import Exchange Rate Pass-through

	Annual data				Monthly data	
	(1)	(2)	(3)	(4)	(5)	(6)
VARIABLES	dprice	dprice	dprice	dprice	dprice	dprice
dfx	-0.110***	-0.100***	-0.099***	-0.101***	-0.115***	-0.109***
	(0.006)	(0.006)	(0.006)	(0.006)	(0.030)	(0.030)
Economy dummy*dfx	**-0.232*** **	**-0.218*** **	**-0.219*** **	**-0.218*** **	**-0.010**	**-0.015**
	(0.021)	**(0.024)**	**(0.024)**	**(0.024)**	**(0.090)**	**(0.090)**
L.dprice	-0.303***	-0.307***	-0.308***	-0.308***	-0.419***	-0.419***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Control variable	No	No	Set1	Set 2	No	Set 2
Fixed effect	Individual+province +year	Individual*province *year	Individual*province *year	Individual*province *year	Individual*province *year	Individual*province *year
Observations	1,864,826	1,864,826	1,864,826	1,864,826	3,482,592	3,482,592
R-squared	0.103	0.310	0.310	0.310	0.378	0.378

Table 9 Product Heterogeneity of Exchange Rate Pass-through

	Annual data			Monthly data	
	(1)	(2)	(3)	(4)	(5)
VARIABLES	dprice	dprice	dprice	dprice	dprice
dfx	-0.125***	-0.115***	-0.117***	-0.119***	-0.114***
	(0.006)	(0.006)	(0.006)	(0.029)	(0.029)
Entry product*dfx	**-0.010**	**0.000**	**-0.004**	**-0.366**	**-0.362**
	(0.025)	**(0.031)**	**(0.031)**	**(0.291)**	**(0.291)**
Quit product*dfx	**0.060*** **	**0.053** **	**0.054** **	**0.061**	**0.059**
	(0.023)	**(0.025)**	**(0.025)**	**(0.117)**	**(0.117)**
Non-consist product*dfx	**0.060*** **	**0.056*** **	**0.058*** **	**-0.109**	**-0.110**
	(0.014)	**(0.016)**	**(0.016)**	**(0.315)**	**(0.315)**
L.dprice	-0.290***	-0.294***	-0.294***	-0.413***	-0.413***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Control variable	No	No	Set 1+2	No	Set 2
Fixed effect	Individual+province +year	Individual*province *year	Individual*province *year	Individual*province *year	Individual*province *year
Observations	2,357,978	2,357,978	2,357,978	3,739,920	3,739,920
R-squared	0.095	0.292	0.292	0.375	0.375

6 Conclusion

- For different type of trade mode, the exchange rate pass-through degree of processing trade is significantly lower than that of non processing trade.

- For different enterprise ownership, the exchange rate pass through degree of state owned enterprises is slightly lower than that of non state owned enterprises, the difference is about 8%.

- For different economies, the exchange rate pass through degree of South Korea and Taiwan is higher than that of other economies about 22%

- ***Thanks for listening!***