Global Specialization and the Exchange Rate Elasticity of Exports

Hoang Le Thu Huong[1)]

1. Introduction

Getting more deeply integrated and interdependent is a prominent feature of the world economy nowadays. Trade in intermediate goods constitutes a large share of world trade and appears to have increased significantly in recent years. Research about the relationship between trade and exchange rate has always been an important question. With the growth of the global value chain, it is necessary to examine how it affects the relationship between exchange rate and trade.

There are two main issues in the research about the relationship between exchange rates and international trade: first, the impacts of exchange rate volatility on international trade flows; second, the impacts of currency misalignments on international trade flows. In this paper, we focus on the second issue, i.e. the relationship between the level of exchange rates and trade, and investigate how the global integration affects the exchange rate elasticity of exports.

There are two sides when considering about global production chain: intermediate goods trade and value-added trade. About value-added trade, in previous studies, Koopman et al. (2010) defined how much foreign and domestic value-added is included in a country's export. They suggested and calculated a global value chain (GVC) participation and GVC position index. Johnson and Noguera (2012) proposed value-added export ratio. Ahmed et al. (2015) examined how the formation of global value chains has effected the relationship between the real effective exchange rate and exports. They use a panel framework with the value-added trade data which is provided by the OECD-WTO database, and only focus on manufacturing exports. However, the OECD-WTO input-output table is discontinuous so the value-added trade data is not continuous from 1995 to 2011. To deal with this problem, they use five-year average time series instead of annual time series in their panel regressions. The GVC integration they used was developed by Koopman et al. (2010). They find that as countries are more integrated in global production process, a currency depreciation only improves competitiveness of a fraction of the value of final good exports. They find that global value chain participation reduces the real effective exchange rate elasticity of manufacturing exports by 22 percent on average.

The effects of exchange rates on trades in the context of global supply chains are also addressed in several

1) Faculty of Japanese, Foreign Trade University. Email: huonghltjp@ftu.edu.vn

recent studies. For instance, The IMF Spillover Report on China (IMF, 2011) finds that an RMB appreciation may hurt intermediate goods producers in emerging Asia, because it lowers output in China and then lowers Chinese demand for intermediate goods. Arunachalaramanan and Golait (2011) find that an appreciation of the Chinese RMB against the India Rupee would not improve the bilateral trade balance from the Indian perspective. This is because it would raise the cost of intermediate products from China, which are very important for domestic production in India, in the short-run. On the other hand, previous studies propose that when markets have no distortions, an exchange rate misalignment, such as the undervaluation of the currency, has no long-run effect on trade flows or on real economic activity because it does not change relative prices, but the short-run can be different.

In this paper, we consider the intermediate goods trade, not the value-added trade. We investigate how much imported intermediate goods a country uses and how much intermediate goods a country exports to the world. We thus analyze the relationship between participation in the global production chain through intermediate goods trade and the effect of the level of exchange rates on exports. Our objective is to find out how global integration affects the exchange rates elasticity of exports. Eichengreen and Gupta (2012) find that the effect of the real exchange rate is stronger for export of services than export of merchandises. They said it could be that services use fewer imported imports than merchandises. In this paper, we estimate whether fewer imported imports make the exchange rate effect on exports larger. However, different from other studies on intermediate goods trade, we use international input-output table to track the sources of intermediate goods. Such research will capture the exact integration of countries in the global supply chain rather than considering only direct imported intermediate goods. This will be explained in more detail in the next section.

We find that if a country's export depend more on imported intermediate goods, and if the domestic production ratio is lower, it will reduce the exchange rates elasticity of exports. This is consistent with Amiti et al. (2014) who use Belgian annual firm-level data in their analysis and find that the impact of a depreciation on export volumes is lower for exporters with higher import shares.

The remainder of this paper is organized as follows. Section 2 provides the data set and the empirical methodology. Section 3 contains the main empirical findings of the paper. Section 4 concludes this study.

2. Methodology

In this section, we first decompose the global supply chain integration to find the total domestic intermediates a country produces by itself and the total foreign intermediate goods that a country imports from other countries in order to produce their goods and services for export. Then, we estimate how the global integration affects the exchange rates elasticity of exports.

2. 1 Data

Our panel includes 40 countries and covers the period 1995-2011. We use the Input-output table provided from World Input Output Database (WIOD). WIOD provides the continuous data, and especially in their input-output table, the rest of the world is considered as an endogenous country. This allows us to calculate a more exact integration of global production chain, through both intermediate goods trade and value-added trade.

Real effective exchange rate (REER) data is taken from Bank for International Settlements (BIS). We use the broad index because it covers more countries. The yearly REER is calculated from monthly data. The real exchange rate (RER) we use in this paper is the inverse of the BIS's REER. An increase of RER means a depreciation of the currency and vice versa.

Real gross domestic production (RGDP) is taken from World Development Indicators (WDI) and national statistics office for the case of Taiwan. We include lagged real GDP in the regression as commonly used in the literature.

In order to calculate annual real export time series, we transform nominal exports in terms of USD to local currency using the nominal exchange rates, and then deflate by Consumer Price Index (CPI) of each country. Nominal exchange rate of the local currency vis-à-vis USD is taken from Penn World Table, and the CPI is taken from International Monetary Fund (IMF) and national statistics office (for Taiwan).

2. 2 Model

The advantage of using the international input-output table is that we can track the source of intermediates to understand the specialization in the global production network. We explain how we decompose the formation of the global supply chain below.

To make it simple, we can consider the international input-output table as a single country's table. Let $\mathbf{x}$ be the N × 1 vector of total output, $\mathbf{f}$ be the N × 1 vector of final demand, $\mathbf{Z}$ be the N × N matrix of intermediates, $\mathbf{A}$ be the N × N input coefficient matrix (intermediate coefficient matrix), $\mathbf{i}$ is the N × 1 unity vector. $\mathbf{A}$ is represented as follows:

$$\mathbf{A} = \mathbf{Z}\hat{\mathbf{x}}^{-1},$$

where a hat over a vector denotes a diagonal matrix with the elements of the vector along the main diagonal. The total output is equal to sum of intermediates and final demand. So we have:

$$\mathbf{x} = \mathbf{Zi} + \mathbf{f} = \mathbf{Ax} + \mathbf{f}.$$

Solving the above equation, we can derive the below equation:

$$\mathbf{x} = (\mathbf{I} - \mathbf{A})^{-1}\mathbf{f},$$

which shows that by knowing the final demand, one can calculate the total output of an economic system. Let $\mathbf{L} = (\mathbf{I} - \mathbf{A})^{-1}$, the inverse matrix or the Leontief matrix[2)]. Now we can represent total output as follows:

$$\mathbf{x} = \mathbf{Lf} \qquad \cdots\cdots (1)$$

On the other hand, the matrix of intermediates is represented as follows:

$$\mathbf{Zi} = \mathbf{Ax} \qquad \cdots\cdots (2)$$

Insert (1) into (2), we have:

$$\mathbf{Zi} = \mathbf{ALf} \qquad \cdots\cdots (3)$$

2) For more detail, see Miller & Blair (2009), page 20.

Table 1 An example of international input-output table of 3 countries with 2 sectors

		Intermediate						Final demand			Total output
		Country 1		Country 2		Country 3		Co. 1	Co. 2	Co. 3	
		Se. 1	Se. 2	Se. 1	Se. 2	Se. 1	Se. 2				
Co. 1	Se. 1	z_{11}^{11}	z_{12}^{11}	z_{11}^{12}	z_{12}^{12}	z_{11}^{13}	z_{12}^{13}	f_1^{11}	f_1^{12}	f_1^{13}	x_1^1
	Se. 2	z_{21}^{11}	z_{22}^{11}	z_{21}^{12}	z_{22}^{12}	z_{21}^{13}	z_{22}^{13}	f_2^{11}	f_2^{12}	f_2^{13}	x_2^1
Co. 2	Se. 1	z_{11}^{21}	z_{12}^{21}	z_{11}^{22}	z_{12}^{22}	z_{11}^{23}	z_{12}^{23}	f_1^{21}	f_1^{22}	f_1^{23}	x_1^2
	Se. 2	z_{21}^{21}	z_{22}^{21}	z_{21}^{22}	z_{22}^{22}	z_{21}^{23}	z_{22}^{23}	f_2^{21}	f_2^{22}	f_2^{23}	x_2^2
Co. 3	Se. 1	z_{11}^{31}	z_{12}^{31}	z_{11}^{32}	z_{12}^{32}	z_{11}^{33}	z_{12}^{33}	f_1^{31}	f_1^{32}	f_1^{33}	x_1^3
	Se. 2	z_{21}^{31}	z_{22}^{31}	z_{21}^{32}	z_{22}^{32}	z_{21}^{33}	z_{22}^{33}	f_2^{31}	f_2^{32}	f_2^{33}	x_2^3
Value-added		v_1^1	v_2^1	v_1^2	v_2^2	v_1^3	v_2^3				
Total input		x_1^1	x_2^1	x_1^2	x_2^2	x_1^3	x_2^3				

Let $\mathbf{D} = \mathbf{AL}$ then we can rewrite the above equation as follows:

$$\mathbf{Zi} = \mathbf{Df} \qquad \cdots\cdots (4)$$

Using this equation, we can track the sources of intermediates when given the final demand vector. In this paper, we use this equation (4) to decompose how much domestic and imported intermediates that a country needs to use to produce its exports.

For instance, let's consider an international input-output table of three countries (Table 1) and track the source of intermediates used to produce goods for exports of country 1. Let $\mathbf{f}^{12}$, $\mathbf{f}^{13}$ be the final demand exports from country 1 to country 2 and 3, respectively; and $\mathbf{e}^1 = \mathbf{f}^{12} + \mathbf{f}^{13}$ is the final demand exports vector of country 1. The total intermediates used to produce $\mathbf{e}^1$ are decomposed as follows:

$$\mathbf{De}^1 = \begin{bmatrix} \mathbf{D}^{11} & \mathbf{D}^{12} & \mathbf{D}^{13} \\ \mathbf{D}^{21} & \mathbf{D}^{22} & \mathbf{D}^{23} \\ \mathbf{D}^{31} & \mathbf{D}^{32} & \mathbf{D}^{33} \end{bmatrix} \begin{bmatrix} \mathbf{f}^{12} + \mathbf{f}^{13} \\ \mathbf{0} \\ \mathbf{0} \end{bmatrix} = \begin{bmatrix} \mathbf{D}^{11}\mathbf{f}^{12} + \mathbf{D}^{11}\mathbf{f}^{13} \\ \mathbf{D}^{21}\mathbf{f}^{12} + \mathbf{D}^{21}\mathbf{f}^{13} \\ \mathbf{D}^{31}\mathbf{f}^{12} + \mathbf{D}^{31}\mathbf{f}^{13} \end{bmatrix}$$

$$\mathbf{i}'\mathbf{De}^1 = \mathbf{u}'(\mathbf{D}^{11}\mathbf{f}^{12} + \mathbf{D}^{11}\mathbf{f}^{13}) + \mathbf{u}'(\mathbf{D}^{21}\mathbf{f}^{12} + \mathbf{D}^{21}\mathbf{f}^{13}) + \mathbf{u}'(\mathbf{D}^{31}\mathbf{f}^{12} + \mathbf{D}^{31}\mathbf{f}^{13})$$

Where $\mathbf{u}$ is the $M \times 1$ unity vector with M number of sectors (in this sample N=3M due to there are 3 countries). The first term in the second line defines the intermediates that country 1 supplies to produce goods for export of itself, the second and the third term represent respectively the intermediates that countries 2 and 3 supply to produce goods for export of country 1. The first term divided by the total intermediates is considered as the ratio of domestic intermediates. The sum of the second and the third term divided by the total intermediates is considered as the import intensive ratio

To illustrate in the simplest way, we will use an aggregate term throughout the rest of this section.

The ratio of domestic intermediates to total intermediates used for producing exports of one country can be defined as follows:

$$dpr = \frac{\mathbf{u}'\mathbf{D}^{\mathbf{ii}}\mathbf{e}^{\mathbf{i}}}{\mathbf{i}'\mathbf{D}\mathbf{e}^{\mathbf{i}}}$$

The ratio of imported intermediates to total intermediates used for producing exports of one country is defined as follows:

$$mr = 1 - dpr = 1 - \frac{\mathbf{u}'\mathbf{D}^{\mathbf{ii}}\mathbf{e}^{\mathbf{i}}}{\mathbf{i}'\mathbf{D}\mathbf{e}^{\mathbf{i}}}$$

The *dpr* (domestic production ratio) shows that in production[3)], how much one country really produces for itself. On the opposite side, the *mr* (import intensive ratio) shows how much one country relies on foreign intermediates for producing its exports. In this paper, the sum of *dpr* and *mr* is equal to 1. Thus, the bigger the *dpr*, the smaller the *mr*, and vice versa.

Next, consider the next equation:

$$\sum_{\mathbf{j}=2,3}\mathbf{D}\mathbf{e}^{\mathbf{j}} = \begin{bmatrix} \mathbf{D}^{11} & \mathbf{D}^{12} & \mathbf{D}^{13} \\ \mathbf{D}^{21} & \mathbf{D}^{22} & \mathbf{D}^{23} \\ \mathbf{D}^{31} & \mathbf{D}^{32} & \mathbf{D}^{33} \end{bmatrix} \begin{bmatrix} \mathbf{0} \\ \mathbf{f}^{21} + \mathbf{f}^{23} \\ \mathbf{f}^{31} + \mathbf{f}^{32} \end{bmatrix} = \begin{bmatrix} \mathbf{D}^{12}\mathbf{f}^{21} + \mathbf{D}^{12}\mathbf{f}^{23} + \mathbf{D}^{13}\mathbf{f}^{31} + \mathbf{D}^{13}\mathbf{f}^{32} \\ \mathbf{D}^{22}\mathbf{f}^{21} + \mathbf{D}^{22}\mathbf{f}^{23} + \mathbf{D}^{23}\mathbf{f}^{31} + \mathbf{D}^{23}\mathbf{f}^{32} \\ \mathbf{D}^{32}\mathbf{f}^{21} + \mathbf{D}^{32}\mathbf{f}^{23} + \mathbf{D}^{33}\mathbf{f}^{31} + \mathbf{D}^{33}\mathbf{f}^{32} \end{bmatrix}$$

$$\begin{aligned}\sum_{\mathbf{j}=2,3}\mathbf{i}'\mathbf{D}\mathbf{e}^{\mathbf{j}} = {} & \mathbf{u}'(\mathbf{D}^{12}\mathbf{f}^{21} + \mathbf{D}^{12}\mathbf{f}^{23} + \mathbf{D}^{13}\mathbf{f}^{31} + \mathbf{D}^{13}\mathbf{f}^{32}) + \mathbf{u}'(\mathbf{D}^{22}\mathbf{f}^{21} + \mathbf{D}^{22}\mathbf{f}^{23} + \mathbf{D}^{23}\mathbf{f}^{31} + \mathbf{D}^{23}\mathbf{f}^{32}) \\ & + \mathbf{u}'(\mathbf{D}^{32}\mathbf{f}^{21} + \mathbf{D}^{32}\mathbf{f}^{23} + \mathbf{D}^{33}\mathbf{f}^{31} + \mathbf{D}^{33}\mathbf{f}^{32})\end{aligned}$$

The first term of the second line represents the exported intermediates of country 1 that is used to produce country 2 and 3's exports. The first term divided by the total intermediates (used for producing exports of country 2 and 3) is considered as the contribution ratio of country 1 for producing exports of the rest of the world.

The ratio of exported intermediates of one country to total intermediates used to produce exports of other countries is defined as follows:

$$mer_i = \frac{\sum_{\mathbf{j}\neq\mathbf{i}}\mathbf{u}'\mathbf{D}^{\mathbf{ij}}\mathbf{e}^{\mathbf{j}}}{\sum_{\mathbf{j}\neq\mathbf{i}}\mathbf{i}'\mathbf{D}\mathbf{e}^{\mathbf{j}}}.$$

The set of the two variables, *mr* and *mer*, represents the participation level of one country in the global production chain.

A depreciation of the exchange rate makes the exports more competitive and this will help increase exports, but at the same time it makes the imports more expensive. We expect that a higher import intensive

3) In this paper we pay attention to the intermediates used only for producing exports. Hereafter it may not be mentioned but all the ratios must be put in situation of producing exports.

Table 2 Summary statistics

Variable	No. Obs.	Mean	Std. Dev.	Max	Min
Growth rate of real exports	640	0.047391	0.180304	2.00765	-2.30479
RER, percent change	640	-0.00936	0.070907	0.748412	-0.38412
Dpr	680	0.516373	0.161118	0.903369	0.200059
Mer	680	0.009298	0.013923	0.084973	4.19E-05
Import intensive ratio (*mr*)	680	0.483627	0.161118	0.799941	0.096631
Log of real GDP (*lrgdp*)	680	26.5679	1.742629	30.35232	22.41281

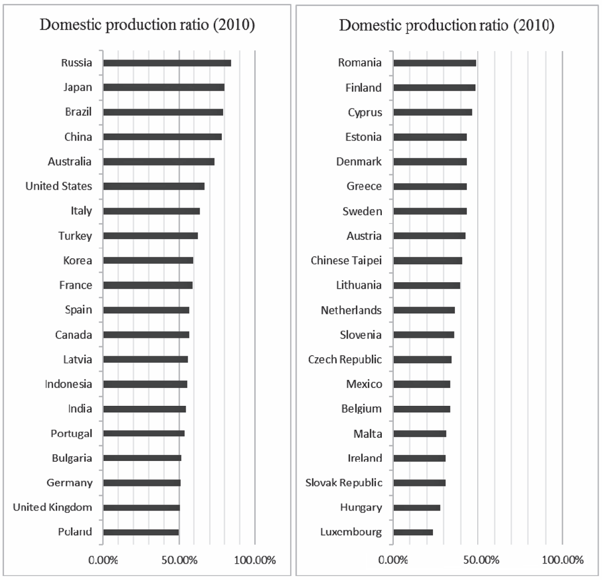

Figure 1 Domestic production ratio (2010)

ratio will lower the exchange rate elasticity of exports.

The model we use to estimate the elasticity in this paper is as follows:

$$\Delta E_{jt} = \alpha + \beta \Delta RER_{jt} + \theta(\Delta RER_{jt} * T_{jt}) + \gamma GDP_{j,t-1} + \delta_t + \delta_j + \varepsilon_{jt}$$

Where j denotes country, t denotes year, ΔE denotes real export growth rate and ΔRER denotes real exchange rate change, GDP denotes real gross domestic production and T denotes variables that represent formation of global production chain. The country fixed effects δ_j capture the country specific growth rates, and year fixed effects δ_t capture common macro shocks that may affect the country's exports. ε_{jt} denotes the Gaussian disturbances with zero mean. We estimate the regressions with standard errors clustered at countries.

3. Empirical Results

Table 2 contains descriptive statistics for the variables used in the econometric analysis. After

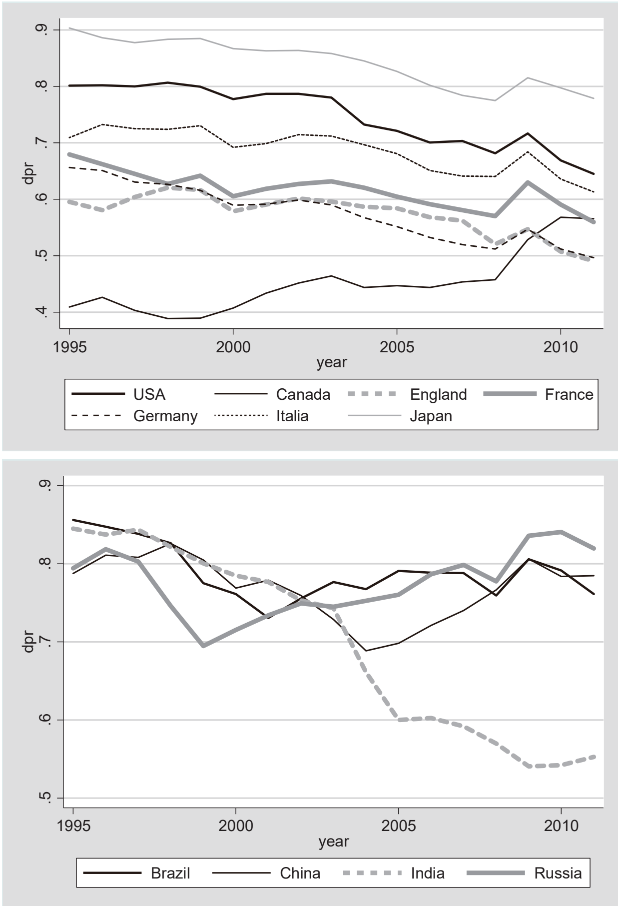

Figure 2 Domestic production ratio over time

decomposing the formation of global production chain, we calculate *mr*, *dpr* and *mer* and report information about these variables in this table. Average domestic production ratio of all countries over the 1995−2011 period is approximately 51.64%, the highest is 90.34% and the lowest is 20.01%. It also means that the average import intensive ratio is around 48.36%, which shows that all countries are deeply interdependent with the world economy.

Figure 1 shows the domestic production ratios of all countries in 2010. We can see that the big economies such as Russia, Japan, Brazil, China, Australia, USA and Italia have high domestic production ratios, which means low import intensive ratios and therefore do not depend much on imported intermediates. On the other hand, countries that have the lowest domestic production ratios, or depend much on imported intermediates, are small and majority belong to the EU such as Luxembourg, Hungary, Slovak Republic, Ireland or Malta.

Figure 2 shows the change of domestic production ratio over period 1995−2011 of some countries. Six of the large economies: USA, Japan, Germany, England, France and Italia seem to have lower domestic production ratio over time. Only Canada has domestic production ratio increase over time. While in BRIC,

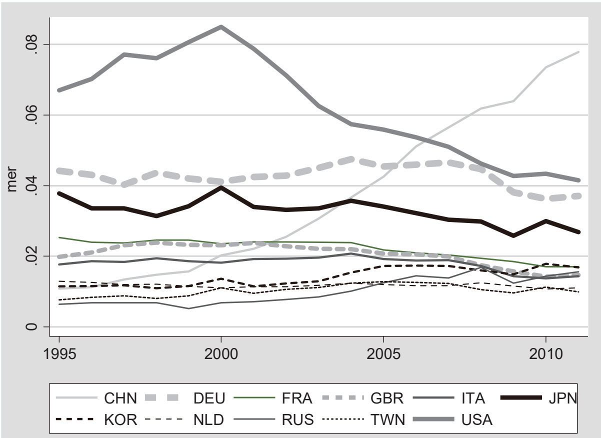

Figure 3 Ratio of exported intermediates of one country to total intermediates used to produce exports of other countries (top highest ratios)

Table 3 Correlation matrix

	ΔE	ΔRER	dpr	mer	mr	lrgdp
ΔE	1					
ΔRER	0.1325***	1				
dpr	-0.0505	0.0111	1			
mer	-0.0247	0.0683*	0.5018***	1		
mr	0.0505	-0.0111	-1.000***	-0.5018***	1	
lrgdp	-0.0784**	0.1016*	0.6906***	0.7010***	-0.6906***	1

Note: ***, ** and * indicate that the coefficient is significantly different from zero at 1, 5 and 10 percent level of significance, respectively.

India is the only country that has domestic production ratio decreased sharply over time.

Figure 3 represents top countries that have the highest ratios of exported intermediates to total intermediates used to produce exports of other countries. It shows a clear rapid increase of China's role in the global production chain. China overtakes USA and becomes the country that supplies intermediates the most to other countries. The next three biggest countries are USA, Germany and Japan.

Table 3 shows the correlation coefficients matrix between the variables. The correlation coefficient between real export growth rate and real exchange rate change is positive and significant. It means that we can expect a positive exchange rate elasticity of exports.

Table 4 shows the results of the main regressions. Column (2) of table 4 shows that countries with higher import intensive ratios present lower exchange rate elasticity of exports. The exchange rate elasticity of exports is the measurement of how responsive exports are to a change in exchange rates. In other words, it shows how much export will increase if the exchange rate increases by 1% (i.e. depreciation). The average import intensive ratio of 48.36% reduces the exchange rate elasticity of exports from 1.17 (column 1) to 0.55 (column

Table 4 The real exchange rate change and real export growth

Variables	(1) ΔE	(2) ΔE	(3) ΔE	(4) ΔE
ΔRER	0.55355***	1.17385***	0.50986***	1.22717***
	(0.10841)	(0.18489)	(0.15084)	(0.24510)
ΔRER*mr		-1.51191***		-1.59301***
		(0.43240)		(0.43134)
ΔRER*mer			6.37270	-2.92327
			(6.84597)	(7.51276)
Lagged GDP	-0.10502	-0.10800	-0.10024	-0.11035
	(0.09053)	(0.08972)	(0.09482)	(0.09249)
Constant	2.81127	2.89115	2.68478	2.95346
	(2.36687)	(2.34463)	(2.48010)	(2.41763)
Time fixed effects	Y	Y	Y	y
Country fixed effects	Y	Y	Y	y
Observations	640	640	640	640
R-squared	0.21046	0.21789	0.21109	0.21800
Number of countries	40	40	40	40

Note: Cluster at country level and robust standard error is shown in parentheses.
***, ** and * indicate that the coefficient is significant at 1, 5 and 10 percent level of significance respectively.

2). Therefore, on average, import intensive ratio reduces exchange rate elasticity of exports by approximately 52.84%.

Turning to the other variables of participation in the global production chain, we find that *mer* (ratio of exported intermediates of one country to total intermediates used to produce exports of other countries) does not have an impact on the exchange rate elasticity (see column 3 and 4 of table 4). Participating in other countries' exports more or less does not change the responsiveness of exports to real exchange rate changes.

4. Conclusion

This paper provides a method to track the sources of intermediates used in producing exports. We use the international input-output table to decompose the formation of global production chain. Thenceforth, we estimate how participating in the global production chain affects the exchange rate elasticity of exports. We find that the import intensive ratio reduces the elasticity of real exports to the real exchange rate by 52.84 percent. This shows that countries that have high import intensive ratios may not benefit much when using devaluation to achieve economic policy. Besides, we cannot find evidence to show that participating in other countries' exports affects the elasticity of real exports to the real exchange rate. Because we can decompose to get the sources of intermediates that detail in sector level and between two countries, there is still room for research about the relationship between exchange rates and exports at a sector level or bilateral trade.

References

Ahmed, Swarnali, Appendino, Maximiliano Andres, and Michele Ruta (2015). "Global Value Chains and the Exchange Rate Elasticity of Exports", IMF Working Paper, WP/15/252.

Amiti, Mary, Oleg Itskhoki and Jozef Konings (2014). "Importers, Exporters, and Exchange RateDisconnect", American Economic Review, 104(7): 1942–1978.

Aruchalaramanan, S. and R. Golait (2011). "The Implications of a Renminbi Appreciation on Indian Trade", RBI Working papers series 2/2011, Reserve Bank of India.

Auboin, Marc and Michele Ruta (2013). "The Relationship between Exchange Rates and International Trade: A Literature Review", World Trade Review, 12(3), 577–605.

Bems, R. and R. C. Johnson (2012). "Value-Added Exchange Rates", NBER Working Paper 18498, National Bureau of Economic Research, Cambridge, MA.

Eichengreen, Barry and Poonam Rupta (2013). "The Real Exchange Rate and Export Growth: Are Services Different?", Policy Research Working Paper Series 6629, The World Bank.

IMF (2011). "People's Republic of China: Spillover Report for the 2011 Article IV Consultation and Selected Issues", Country Report No. 11/193, International Monetary Fund, Washington, DC.

Johnson, Robert C. and Guillermo Noguera (2012). "Accounting for Intermediates: Production Sharing and Trade in Value-added," Journal of International Economics, Elsevier, Vol. 86(2), pages 224–236.

Koopman, Robert, William Powers, Zhi Wang, Shang-Jin Wei (2010). "Give Credit Where Credit Is Due: Tracing Value-added in Global Production Chains," NBER Working Papers 16426, National Bureau of Economic Research, Inc.

Miller, Ronald E. and Blair, Peter D. (2009). "Input-Output Analysis: Foundations and Extensions", Cambridge, Cambridge University Press.

Data Sources

Total exports (goods and services)	World Input-Output Database
Real effective exchange rate (REER)	Bank for International Settlements
Real GDP	World Development Indicator, National sources
Consumer Price Indices	International Monetary Fund, National sources
Exchange rate (local currency/USD)	Penn World Table

List of countries

Australia, Austria, Belgium, Bulgaria, Brazil, Canada, China, Cyprus, Czech Republic, Germany, Denmark, Spain, Estonia, Finland, France, United Kingdom, Greece, Hungary, Indonesia, India, Ireland, Italy, Japan, Korea, Lithuania, Luxembourg, Latvia, Mexico, Malta, Netherlands, Poland, Portugal, Romania, Russia, Slovak Republic, Slovenia, Sweden, Turkey, Chinese Taipei, United States.

［ホアン　レ　トゥー　フォン　横浜国立大学大学院国際社会科学府博士課程修了，ハノイ貿易大学日本語学部准教授］