Effects of Exchange Rate Fluctuations and Financial Development on International Trade: Recent Experience

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Abstract

Many studies have investigated whether or not exchange rate fluctuations have negative effects on international trade both in theoretical and empirical terms. This article examines the relationship between international trade and exchange rate fluctuations in developed and developing countries and the empirical relationship between international trade and financial development in developed countries. The results show that exchange rate fluctuations can have negative effects on international trade in developing countries and that financial development has positive effects on international trade in developed countries.

Key words: Exchange Rate, Financial Development, Fluctuation, International Trade, Volatility

INTRODUCTION

Many studies have investigated whether or not exchange rate fluctuations (volatility) have negative or positive effects on international trade in both theoretical and empirical terms since the beginning of the floating exchange rate system in the 1970s. One purpose of this article is to address this problem empirically.

The impact of exchange rate fluctuations on international trade is still controversial because there is no consensus on whether the impact is negative or positive as shown in the results of previous studies. However, most studies have indicated that there is a negative relationship between international trade and exchange rate fluctuations. Arize et al. (2000), Saucer and Bohara (2001), Grier and Smallwood (2007), Baum and Caglayan (2009) and Caglayan and Di (2010) noted heterogeneous negative effects on countries. However, the relationship is still not conclusive, and there is much controversy around this issue both in theoretical and empirical terms.

On the other hand, few studies have focused on financial development. Only Caglayan et al. (2013) examined this issue directly. Of course, there are some related studies. IMF (2009) showed that the lack of a developed financial system increases transaction costs as a trade barrier. In general, financial development or depth, namely banking and financial services, seem to be strongly related to the development of international trade. However, this problem has not been discussed in spite of its importance.

This study examines empirically the effects of exchange rate fluctuations and financial development on international trade. For the relationship between exchange rate fluctuation and international trade, the empirical analyses are not limited to developed countries; however, because of a lack of data, only developed countries are examined for the relationship between financial development and international trade. A dynamic panel model is employed to investigate this problem empirically.

This article is structured as follows. Section 2 reviews the existing studies. Section 3 introduces the model for empirical examination. Section 4 shows the results of empirical analyses and analyzes them. Finally this article ends with a brief summary.

EXISTING STUDIES

Since the introduction of the floating exchange rate system during the 1970s, many studies have been presented to show the relationship between exchange rate fluctuations and international trade. Since then, the introduction of a common currency in Europe has promoted this dispute. Most studies have provided evidence that the increase of exchange rate volatility dampens international trade as expected. Ethier (1973), Cushman (1983, 1986), Kenen and Rodrik (1986), Thursday and Thursday (1987), Peree and Steinherr (1989), and Caporale and Doroodian (1994), Arize (1998), and Coric and Pugh (2010) showed increased exchange rate fluctuations impact negative effects on international trade, especially exports. Recently, Serenis (2013) indicated that an adverse relationship can be found between exports and volatility for South American countries, Bahmani-Oskooee and Satawatananon (2013), and Jiranyakul (2013) showed a negative impact of exchange rate uncertainty on Thailand's imports. Verheyen (2012) also showed that exchange rate volatility causes a negative influence on international trade between the United States and the Euro zone.

On the other hand, some studies have demonstrated a positive relationship between exchange rate fluctuation and international trade. Hooper and Kohlhagen (1978) investigated the effects of exchange rate volatility on imports of five industrialized countries and found that exchange rate fluctuation measured by the standard error of the nominal exchange rate positively impacts imports. De Grauwe (1988) found a positive relationship between exchange rate fluctuation and international trade when the income effect has a substitution effect. Klein (1990), Franke (1991) and Sercu and Vanhulle (1992), Kroner and Lastrapes (1993), Baum et al. (2004), and Baum and Caglayan (2010) showed that exchange rate volatility has a positive impact on international trade in some cases. Naseem and Hamizah (2009) showed empirically that exchange rate volatility did not affect imports in Malaysia before 1997 financial crisis. As the financial transaction expands, hedging of exchange rate risks has become more and more common. In developed countries, to hedge/cover risks in international trade becomes more easily understood and predictable than in the past. Many kinds of forwards/futures transactions have appeared on financial markets. Also, exchange rates can be more predictable. As such movements spread, exchange rate volatility does not strongly dampen international trade. In particular, the impact of exchange rate volatility on international trade has not been much discussed relative to developed countries where many kinds of sophisticated financial services can be useful. However, the relationship between exchange rate fluctuations should be noted as there is some possibility that financial crisis of 2008 may occur again so that analyses of the relationship become increasingly important in developing and newly industrialized countries, not only in the academic world but also in the business world.

There is no consensus regarding the relationship between exchange rate volatility and international trade. Miles (1979), De Grauwe (1988), Koray and Lastrapes (1989), Gagnon (1993), Viaene and de Vries (1992), and Barkoulas et al. (2002) showed the ambiguous effects of exchange rate uncertainty.

Also, few studies have focused on developing and newly industrialized economies. Doroodian (1999) found that exchange rate volatility has a negative impact on international trade in India, Malaysia, and South Korea. Siregar

and Rajan (2004) found no correlation between exchange rate uncertainty and imports in Indonesia. The distinction between developing and developed countries seems to be sometimes very important as previously noted.

Other studies have focused on other topics in addition to the distinction between developing and developed countries. Erdem et al. (2010) examined the relationship between imports and exports and found that the negative impact of exchange rate fluctuation on international trade was stronger on imports than exports. Alam (2012) found a negative impact of real exchange rate volatility on imports in Pakistan for the long run. Adewuyi and Akpokodje (2013) showed that exchange rate uncertainty has more significant negative effects in the non-CFA group than in the CFA group. Musilla and Al-Zyoud (2012) found a negative relationship between exchange rate fluctuations and international trade. Mensah et al. (2013) showed that exchange rate volatility affects employment growth in the manufacturing sector in Ghana. Nazlioglu (2013) found that the impact of exchange rate volatility on exports in Turkey is different across industries. Bahmani-Oskooee and Harvey (2013) found that the majority of industries are not significantly affected by volatility.

Chipilli (2013) showed that a stable exchange rate is important to sustain the growth of trade as persistence in exchange rate volatility may influence the reallocation of resources to the nontradable sector. Rabanal and Tuesta (2013) showed that the distinction between tradable and nontradable goods is key to the understanding of real exchange rate fluctuations. Studies that focus on industries and tradable/nontradable good seem to have appeared recently.

However, the effect of the development of the financial system on exchange rate volatility has not been discussed despite the fact that financial development has become increasingly important in international trade. Along with new financial instruments such as financial derivatives, financial development provides greater risk management and insurance services. Kletzer and Bardhan (1987), Demirgüç-Kunt and Maksimovic (1998), Rajan and Zingales (1998), Braun and Larrain (2004), Svaleryd and Vanbulle (2005), and Demir and Dahi (2011) showed that industries are increasingly dependent on external finance for growth. Jayaratne and Strahan (1996) found that state experience increased rates of economic growth after the removal of intrastate branch restrictions. Caballero and Krishnamurthy (2004) showed that underdeveloped financial markets cause currency mismatch problems and worsen the negative effects of exchange rates. Aghion et al. (2009) showed that exchange rate uncertainty can increase the negative effects of credit constraints on fixed investments. However, this aspect has not been taken into account in promoting international trade despite of its importance. There is room for further research.

The impact of exchange rate fluctuation on international trade is still and should be the center of attention in international economics as globalization has been ongoing not only developed economies but also in developing economics. However, the influence of this exchange rate uncertainty on international trade is neither theoretically nor empirically conclusive. In particular, the difference between developed and developing countries has not been discussed fully and the results are not conclusive. This study also focuses on this issue.

METHOD OF EMPIRICAL ANALYSIS

To examine the effects of exchange rate uncertainty and financial development on international trade, panel data are used to conduct a dynamic panel model. The dynamic panel model equation in this study has one lagged

dependent variable to allow for the modeling of a partial adjustment mechanism. The estimated equation is as shown in (1) and (2).

$$\text{TRADE}_{ij,t} = a + b\text{TRADE}_{ij,t-1} + c\text{VOLATILITY} + d\text{MARKET} + \varepsilon \qquad (1)$$

$$\text{TRADE}_{ij,t} = a + b\text{TRADE}_{ij,t-1} + c\text{VOLATILITY} + \varepsilon \qquad (2)$$

where TRADE denotes the log difference of real exports per capita from country i to j at time t. VOLATILITY means monthly variations in real exchange rates against the U.S. dollar for up to a year. MARKET means financial development. This figures is from IMD banking and financial services. The score is from 0 (low) to 10 (high).

In equation (1), this study uses the *IMD World Competition Yearbook* to proxy the degree to which people are able to understand each situation. The *Yearbook* compiles indicators from many fields. The indicators are computed based on interviews with senior business leaders in many countries. The listed countries are Argentina, Australia, Austria, Belgium, Brazil, Canada, China, Chile, Columbia, Croatia, Czech, Denmark, Estonia, Finland, France, Germany, Greece, Hong Kong, Hungary, Iceland, India, Indonesia, Ireland, Israel, Italy, Japan, Kazakhstan, Korea, Jordan, Lithuania, Luxembourg, Malaysia, Mexico, Netherlands, New Zealand, Norway, Peru, Philippines, Poland, Portugal, Qatar, Romania, Russia, Singapore, Slovak, Slovenia, South Africa, Spain, Sweden, Switzerland, Thailand, Turkey, Ukraine, United Kingdom, United States, and Venezuela; the selection of these countries was based on data availability. They are all OECD countries. This study defines these countries as developed countries, so the distinction between developed and developing countries is not performed.

For equation (2), the omission of the dependent variable, MARKET, enables a distinction between developed and developing countries. All of the available data from IFS (International Financial Statistics from IMF) were used for estimation. The developing countries are Afghanistan, Albania, Algeria, American Samoa, Angola, Argentina, Armenia, Azerbaijan, Bangladesh, Belarus, Belize, Benin, Bhutan, Bolivia (Plurinational State of), Bosnia and Herzegovina, Botswana, Brazil, Bulgaria, Burkina Faso, Burundi, Cambodia, Cameroon, Cape Verde, Central African Republic, Chad, Colombia, Comoros, Congo, Democ. Republic of the, Congo, Rep., Costa Rica, Côte d'Ivoire, Cuba, Djibouti, Dominica, Dominican Republic, Ecuador, Egypt, El Salvador, Eritrea, Ethiopia, Fiji, Gabon, Gambia, The, Georgia, Ghana, Grenada, Guatemala, Guinea, Guinea-Bissau, Guyana, Haiti, Honduras, Iran, Islamic Rep. of, Iraq, Jamaica, Jordan, Kazakhstan, Kenya, Kiribati, Korea, Democractic Republic of Kosovo, Kyrgyz Republic, Lao People's Democratic Republic, Latvia, Lebanon, Lesotho Liberia, Libya, Lithuania, Macedonia, the F.Y.R. of Madagascar, Malawi, Maldives, Mali, Marshall Islands, Mauritania, Mauritius, Micronesia, Fed. States of, Moldova, Mongolia, Montenegro, Morocco, Mozambique, Myanmar, Namibia , Nepal, Nicaragua, Niger, Nigeria, Pakistan, Palau, Panama, Papua New Guinea, Paraguay, Peru, Romania, Rwanda, Samoa, Sao Tome and Principe, Senegal, Serbia, Seychelles, Sierra Leone, Solomon Islands, Somalia, South Africa, South Sudan, Sri Lanka, St. Kitts and Nevis, St. Lucia, St. Vincent and the Grenadines, Sudan, Suriname, Swaziland, Syrian Arab Republic, Tajikistan, Tanzania, United Republic of, Timor-Leste, Togo, Tonga, Tunisia, Turkmenistan, Tuvalu, Uganda, Ukraine, Uruguay, Uzbekistan, Vanuatu, Bolivarian Republic of Venezuela, Vietnam, Yemen, Zambia, and Zimbabwe.

The method for the empirical analysis is OLS and robust estimation. Robust estimation performs an initial OLS

regression, calculates Cook's distance, eliminates gross outliers for which Cook's distance exceeds 1, and then performs interactions based on Huber weights. The sample period is from 2009 to 2011. The data are yearly. Average data are used for estimation.

EMPIRICAL RESULTS

The results for equation (1) are shown in Table 1.

Table 1. Effect of Exchange Rate Fluctuations and Financial Development on International Trade

Method	OLS	Robust Estimation
C	31.541	33.821
	(0.987)	(0.952)
TRADEt-1	-0.874	-0.865
	(0.000)	(0.000)
VOLATILITYt	-0.012	-0.011
	(0.135)	(0.143)
MARTETt	0.034	0.035
	(0.006)	(0.006)
Durbin-Watson	1.621	1.600
Probability (F-statistic)	0.000	0.000
Adj.R2	0.591	0.589

Note. Figures in parentheses are *p*-values.

The results are inconclusive. Exchange rate volatility does not significantly influence the volume of international trade. On the other hand, financial market development promotes international trade. Mature financial markets and services are necessary to promote international trade.

Moreover, the empirical results of equation (2) are shown in Table 2. The empirical estimations are divided into developed and developing countries.

Table 2. Effect of Exchange Rate Fluctuations on International Trade

Countries	Developed Countries		Developing Countries	
Method	OLS	Robust Estimation	OLS	Robust Estimation
C	30.105	30.018	35.627	35.323
	(0.958)	(0.932)	(0.105)	(0.101)
TRADEt-1	-0.892	-0.890	-0.840	-0.842
	(0.000)	(0.000)	(0.000)	(0.000)
VOLATILITYt	0.009	0.008	-0.017	-0.016
	(0.186)	(0.183)	(0.000)	(0.000)
Durbin-Watson	1.990	1.985	2.001	2.000
Probability (F-statistic)	0.000	0.000	0.001	0.000
Adj.R2	0.636	0.632	0.625	0.627

Note. Figures in parentheses are *p*-values.

It is interesting to note that exchange volatility negatively influences international trade in developing countries. As the volatility exchange rate increases, it dampens international trade.

The empirical results for equations (1) and (2) show that financial development is important for and can be useful to promote international trade. In developing countries, exchange rate volatility dampens international trade. To avoid this relationship, financial development can be effective. Exchange rate volatility cannot be avoided easily in many small, developing countries. However, the establishment of a stable and sound financial system can be attained in some cases without consideration of other countries. Financial development can be one of the effective ways to cause international trade increase. Financial development also may contribute to economic growth.

On the other hand, exchange rate volatility does not significantly decrease international trade (the coefficient is negative as expected). The reason would be that as financial market development has been attained, many hedging or covering instruments have been developed to combat exchange rate volatility. However, the 2008 global financial crisis hit and damaged many developed countries. Financial development in many fields is important not only for developing countries but also in developed countries.

CONCLUSIONS

This study empirically examined the relationship between international trade and exchange rate fluctuations and the relationship between international trade and financial development in developed countries. The results show that exchange rate fluctuations do not necessarily have negative effects on international trade in developing countries; however, this relationship was not found in developed countries. On the other hand, financial development has positive effects on international trade. In developing countries, financial development could be an effective way to promote international trade and economic growth. The establishment of a stable and sound financial system should be a priority as exchange rate volatility cannot be avoided in some cases.

However, time span and sample period influence the results. Because of data availability, the facts could not be considered without some limitations; however, it is also very difficult to take this into account as specific issues should be considered for each country or district.

Recently, Saito and Pietra (2013) showed that excess volatility of exchange rates has no clear-cut effect on welfare. This study's results should be expanded to include the welfare of the economies and growth. Further research is needed.

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