EXCHANGE RATE VOLATILITY AND TRADE: A LITERATURE SURVEY

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Abstract

This paper reviews the literature dealing with the effects of exchange rate volatility on trade. The overall evidence is best characterized as mixed as the results are sensitive to the choices of sample period, model specification, proxies for exchange rate volatility and countries considered (developed vs developing). Numerous empirical studies have been conducted to investigate whether trade is influenced by exchange rate volatility. It is widely believed that increased exchange rate volatility inhibits the growth of foreign trade.

Key words: Exchange rate volatility, Trade flows,
JEL Classification: F31, F10.

I. Introduction

Since the adoption of a floating exchange-rate regime in 1973, the effects of exchange-rate volatility on the volume of international trade have been the subjects of both theoretical and empirical investigations. Exchange rate volatility is defined as the risk associated with unexpected movements in the exchange rate. Economic fundamentals such as the inflation rate, interest rate and the balance of payments, which have become more volatile in the 1980s and early 1990s, by themselves, are sources of exchange rate volatility. More recently, increase cross-border flows that have been facilitated by the trend towards liberalization of the capital account, the advancement in technology, and currency speculation have also caused exchange rate to fluctuate (Hook and Boon 2000). The high degree of volatility and uncertainty of exchange rate movements since the beginning of the generalized floating in 1973 have led policy makers and researchers to investigate the nature and extent of the impact of such movements on the volume of trade. Since the

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breakdown of the Bretton Woods system of fixed exchange rates, both real and nominal exchange rates have fluctuated widely.

Given these contradictory theoretical predictions, empirical researchers have examined the effect of both real and nominal exchange rate volatility on the volume of international trade. The overall evidence is best characterized as mixed as the results are sensitive to the choices of sample period, model specification, proxies for exchange rate volatility, and countries considered (developed vs developing). As Cote's (1994) survey of the empirical literature concludes, "Despite the widespread view that an increase in volatility will reduce the level of trade, this review reveals that the effects of volatility are ambiguous."

The rest of the paper is organized as follows: Section II describes the theory. Section III reports the literature survey, and the last section is the conclusion.

2. Theory

The volatility of exchange rates is the source of exchange rates risk and has certain implications on the volume of international trade, consequently on the balance of payments. Theoretical analyses of the relationship between higher exchange-rate volatility and international trade transactions have been conducted by Hooper and Kohlhagen (1978) and some other economists. The argument is as follows: Higher exchange-rate volatility leads to higher cost for risk-averse traders and to less foreign trade. This is because the exchange *rate* is agreed on at the time of the trade contract, but payment is not made until the future delivery actually takes place. If changes in exchange rates become unpredictable, this creates uncertainty about the profits to be made and, hence, reduces the benefits of international trade. Exchange-rate risk for the all country is generally not hedged because forward markets are not accessible to all traders. Even if hedging in the forward markets were possible, there are limitations and costs. For example, the size of the contracts is generally large, the maturity is relatively short, and it is difficult to plan the magnitude and timing of all international transactions to take

advantage of the forward markets. On the other hand, recent theoretical developments suggest that there are situations in which the volatility of exchange rates could be expected to have either negative or positive effects on trade volume. De Grauwe (1988) stressed that the dominance of income effects over substitution effects can lead to a positive relationship between trade and exchange-rate volatility. This is because, if exporters are sufficiently risk averse, an increase in exchange-rate volatility raises the expected marginal utility of export revenue and therefore induces them to increase exports. De Grauwe suggested that the effects of exchange-rate uncertainty on exports should depend on the degree of risk aversion. Recently, theoretical models of hysteresis in international trade have shown that increased uncertainty from high volatility in exchange rates can also influence foreign trade, in particular if significant sunk costs are involved in international transactions. It is difficult, however, to identify how trade will be affected.

3. Lıterature Survey

A detailed literature survey on the effects of exchange rate volatility on trade has been outlined in this section (see Table 1). Several theoretical studies such as Ethier (1973); Clark (1973); Baron (1976); Cushman (1986); Peree and Steinherr (1989) have shown that an increase in exchange rate volatility will have adverse effects on the volume of international trade. Other theoretical studies have demonstrated that increased volatility can have ambiguous or positive effects on trade volume: for instance, Viaene and de Vries (1992), Franke (1991) and Sercu and Vanhulle (1992). Numerous empirical studies have been conducted to investigate whether trade is influenced by exchange rate volatility[1]. It is widely believed that increased exchange rate volatility inhibits the growth of foreign trade. Negative effects of exchange rate uncertainty on trade flows are reported by many authors. They have all found that exchange-rate risk depresses trade flows. However, studies by Hooper and Kohlhagen (1978), Gotur (1985), Bailey et al. (1986, 1987),

[1] Surveys of the literature can be found in Cote (1994), McKenzie (1999), IMF (1984) and Clark, Tamirisa, and Wei (2004).

McKenzie (1998), Aristotelous (2001), Bailey and Tavlas (1988), Bahmani et al. (1993), and Gagnon (1993), among others, do not find any significant relationship between exchange-rate volatility and trade. On the other hand, McKenzie and Brooks (1997), Klein (1990), Franke (1991), Giovannini (1988), Brada and Mendez (1988), Asseery and Peel (1991), Kasman and Kasman (2005), Sercu and Vanhulle (1992), Doyle (2001) and Bredin et al. (2003) have found positive effects of exchange rate volatility on trade.

Table 1 Exchange Rate Volatility and Trade: Literature Survey

Study	**Sample Period**	**Nominal or real exchange rate used**	**Countries and Estimation technique used**	**Main Result**
Akhtar and Hilton (1984)	1974-81Q	Nominal	OLS	Negative effect
Gotur (1985)	1974-82Q	Nominal	OLS	Little to no effect
Bailey, Tavlas and Ulan (1986)	1973-84Q	Nominal	OLS	Not significant, mixed effects
Bailey, Tavlas and Ulan (1987)	1962-85Q	Nomianal &Real	OLS	Little to no effect
Bailey and Tavlas (1988)	1975-86Q	Nominal	OLS	Not significant
Belenger et al. (1988)	1976-87Q	---	IVE	Significant and negative in 2 sectors
Brada and Mendez (1988)	1973-77A	Real	Cross section	Positive effect
De Grauwe and Verfaille (1988)	1975-85A	Real	Cross section	Level of trade significantly

				stronger within EMS than outside EMS
Koray and Lastpares (1989)	1961-85M	Real	VAR	Weak negative relationship
Mann (1989)	1977-87Q	Real	OLS	Few significant results
Peree and Steinherr (1989)	1960-85A	Nominal	OLS	Negative effect
Caballero and Corbo (1989)	--	Real	OLS and IVE	Significant and negative effect
Lastrapes and Koray (1990)	1975-87Q	Real	VAR	Weak relationship
Medhora (1990)	1976-82A	Nominal	OLS	Not significant and positive effect
Asseery and Peel (1991)	1972-87Q	Real	OLS - ECM	Significant and positive except for UK
Bini – Smaghi (1991)	1976-84Q	Nominal	OLS	Significant and negative effect
Feenstra and Kendall (1991)	1975-88Q	---	GARCH	Negative effect
Akhtar and Hilton (1991)	1974-81Q	Nominal	OLS	Not significant, mixed effect
Kumar and	1974-	Nominal	OLS	Not

Dhawan (1991)	85Q	& Real		significant and negative effect
Belenger et al. (1992)	1975-87Q	Nominal	IVE, GIVE	Significant and negative effect
Kumar (1992)	1962-87A	Real	Standard deviation	Mixed results
Savvides (1992)	*1973-86A*	*Real*	*Cross section*	Negative effect
Gagnon(1993)	Q	Real	Simulation analysis	Not significant
Frankel and Wei (1993)	1980-90A	Nominal & Real	OLS and IVE	Small and negative in 1980, positive in 1990
Kroner and Lastpares(1993)	1973-90M	Nominal	GARCH-M	Significant, varied signs and magnitudes
Chowdhury(1993)	1973-90Q	Real	VAR	Significant negative effect
Caporale and Dorodian (1994)	1974-92M	Real	Joint estimation	Significant negative effect
McKenzie and Brooks (1997)	1973-92M	Nominal	OLS	Positive effect
McKenzie (1998)	1969-95Q		ARCH	Generally positive effect
Daly (1998)	1978-92Q	Real	---	Mixed results

				(overall likely have a positive correlation)
Hook and Boon (2000)	1985-97Q	Both	VAR	Negative effect on export
Aristotelous (2001)	1989-99A	Real	Gravitiy model	No effect on export
Doganlar (2002)	1980-96Q	Real	EG Cointegration	Negative effect on export
Vergil (2002)	1990-2000Q	Real	Standard deviation	Negative effect on export
Das (2003)	1980-2001Q	Both	ADF, ECM, Cointegration	Significant negative effect on export
Baak (2004)	1980-2002A	Real	OLS	Significant negative effect on export
Tenreyro (2004)	1970-97A	Nominal	Gravity model	Insignificant and no effect on trade
Clark, Tamirisa, and Wei (2004)	1975-2000A	Both	Gravity model	Negative and significant effect
Kasman & Kasman (2005)	1982-2001Q	Real	Cointegration, ECM	Significant positive effect on export
Arize et al. (2005)	1973-	Real	Cointegration,	Significant

	2004Q		ECM	negative effect on export
Hwang and Lee (2005)	1990-2000M	Real	GARCH-M	Positive effect on import and insignificant effect on export
Lee and Saucier (2005)	1986-2003Q	Nominal	ARCH-GARCH	Negative effect on trade

Note: A annual, Q quarterly and M monthly.

4. Interpretation of contradictory results

Some authors consider that the exchange rate volatility is not one of the causes of foreign trade problems but it is mainly a consequence of domestic restrictions to growth, foreign trade disequilibrium and transitory problems derived from interest rates differentials and other factors. In this regard Guisan(2005) analyses the evolution of exchange rates indexes and relative prices in OECD countries. This author performs an analysis between each country and the United States, comparing exchange rates (ER) and purchasing power parities (PPP), and the main conclusion are as follows:

1) The most general cause of change in current ER are the inflation differentials between each country and the United States, and those differences usually do not have important effects on foreign trade if ER evolve accordingly to PPP. Regarding the causes of prices differentials this author considers that inflation is not a cause of economic stagnation but that usually the reverse relationship holds: economic stagnation implies that demand pressure on supply is translated to prices and not to real production with inflationary effects. The monetary policies addressesed to avoid inflation, without complementary policies addressed to avoid stagnation, are useless

because they only disguise the sympton but they do not act on the causes and they do not lead to a healthy economic development.

2) There is a general trend of exchange rates to converge with PPP although monetary markets conditions and other factors may produce important and transitory deviations from this trend. Deviation of exchange rates from PPP usually do not have a great impact on real Exports, due to the flexibility of exports prices to adapt to the international prices, but the capacity to import is affected because in case of undervalued ER (current ER higher than PPP) it will happen that a constant real value of Exports will have a similar value in local currency but a lower value in dollars.

3) When the imports capacity diminishes the initial problem of stagnation in economic development will usually worsen, because Imports are an important factor of production as it is shown in Guisan(2006) and other studies. There are differences among countries regarding the effects of stagnation of diminution of real Imports, depending on the production sector where those inputs are used as intermediate consumption or raw materials. Thus the effects may affect more to non industrial sectors, more to industry, or have an even effect in both kinds of production sectors. When foreign trade restrictions affect industry, there will be a further negative effect in real Exports, because Exports depend not only on foreign demand but also on domestic supply as seen in Guisan and Cancelo(2004) and other studies.

5. Conclusion

This paper provides an extensive survey of the literature on exchange rate volatility and trade, examining both the theory that underlies the work in this area and the results of empirical studies published since 1978. Results of the different studies are difficult to compare since the sample period, model specification, countries and the measure of risk vary widely. In several cases, long-run measures are used that may be a better proxy for trend changes in the exchange rate than volatility. Overall, a larger number of studies appear to

favour the conventional assumption that exchange rate volatility depresses the level of trade.

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