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# Exchange rate volatility and the United States exports: evidence from Canada and Japan

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This paper investigates the influence of exchange rate volatility on the real exports of the United States to Canada and Japan during the current flexible exchange rate period (1974–1998). The Johansen multivariate cointegration method and the constrained error correction (general-to-specific) method are applied to study the relationship between real exports and its determinants (including exchange rate volatility). Conditional variance from the GARCH(1,1) model is applied as exchange rate volatility. Both nominal and real exchange rates are employed in the empirical study. Results indicate a significant effect of the exchange rate volatility on real exports. These exchange rate volatility effects are mostly negative. *J. Japanese Int. Economies* **19** (1) (2005) 51–71. School of Management, University of Bradford, Emm Lane, Bradford BD9 4JL, UK.
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## 1. Introduction

One of the major concerns since the introduction of the flexible exchange rate has been whether the increase in exchange rate variability (uncertainty) has affected the international trade flow. Higher exchange rate volatility leads to higher cost for risk-averse traders and to less foreign trade (Arize et al., 2000). In other words, greater exchange risk increases the riskiness of trade profits, leading risk-averse traders to reduce trade. Thus, a theoretical

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framework seems to indicate a negative relationship between international trade flow and exchange rate variability.[1] Some studies such as Coes (1981), Cushman (1983), Akhtar and Spence Hilton (1984), Thursby and Thursby (1987), Kenen and Rodrik (1986), Maskus (1986), De Grauwe (1988), Chowdhury (1993), Arize (1995, 1998) and Arize et al. (2000) do provide evidence that exchange rate variability does reduce international trade flow. According to Arize (1998), knowledge of the degree to which exchange rate volatility affects trade is important for the design of both exchange rate and trade policies. For example, if exchange rate volatility leads to a reduction in exports, trade adjustment programmes that emphasized export expansion could be unsuccessful if exchange rate is volatile. In addition, the intended effect of a trade liberalization policy may be doomed by a variable exchange rate and could precipitate a balance-of-payment crisis (Arize, 1998 and Arize et al., 2000). The purpose of this paper is to investigate the effects of the exchange rate variability (volatility) on United States exports to Canada and Japan during the current flexible exchange rate period.

Some previous studies have also reported indicating no or very little significant effect of the exchange rate variability on international trade. Bailey et al. (1987) claim that earlier studies conducted during the 1970s fail to find a significant effect of the exchange rate variability on international trade simply due to the lack of enough flexible exchange rate period data.[2] Bailey et al. (1986, 1987) fail to find any significant effect of the exchange rate variability on the trade flow of seven OECD countries. A similar result is also provided by Gotur (1985), Aschheim et al. (1987), Koray and Lastrapes (1989), and Gagnon (1993). An empirical investigation by the IMF (1984) covering exports from the seven large industrial countries produces only two cases where the effect is significant and negative. Asseery and Peel (1991), Franke (1991), Giovannini (1988), Sercu and Vanhulle (1992) and Dellas and Zillberfarb (1993) have shown that exchange rate variability imposes a positive effect on international trade. These studies consider international trade as an option held by firms. Like any other option, the value of trade may rise with volatility. De Grauwe (1988) shows the relationship between exchange rate volatility and trade flows is analytically indeterminate. As indicated by Arize (1995) and Arize et al. (2000), conflicting results imply the effect of exchange rate variability on international trade is uncertain and requires more empirical and theoretical research.

As stated above, this paper empirically investigates the relationship between exchange rate variability (volatility) and the United States export to Canada and Japan. In this paper the exchange rate variability is measured using the univariate GARCH model. The paper also applies the multivariate cointegration method and constrained error correction models to study the stated relationship. Furthermore, monthly data is applied as compared to the popular quarterly data or annual data, and a relatively longer period is covered than most other papers.[3] McKenzie (1999) emphasized a few key points in future research in this field. First, the need for care in specifying the technique by which exchange rate

[1] According to Klaassen (2002), this perception that greater exchange rate risk reduces trade has helped motivate monetary unification in Europe and is also related to currency market intervention by central banks.

[2] See Bailey et al. (1986, 1987) for citations of these earlier studies.

[3] Koray and Lastrapes (1989) also use monthly data in their paper, and Chowdhury (1993), Arize (1995) and Arize et al. (2000) apply the Johansen multivariate method of cointegration.

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