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International Review of Economics and Finance 16 (2007) 237–254

IREF International
Review of
Economics
& Finance

www.elsevier.com/locate/iref

Exchange rates, exchange risk, and Asian export revenue

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Received 19 May 2004; received in revised form 20 October 2004; accepted 12 December 2004

Available online 2 March 2005

Abstract

While depreciation may raise export revenue, associated exchange risk could offset any positive effect. The present paper investigates this net effect for eight Asian countries using a bivariate GARCH-M model that simultaneously estimates time varying risk. The fundamental result is that export markets react differently to exchange rates and associated risk. High degrees of risk apparently stimulate efforts to avoid its impact. Exchange risk has a dominating negative impact for the appreciating Japanese yen. Depreciation has no impact in Malaysia and Singapore, and exchange risk has a negative effect in Singapore. For the other five countries, depreciation stimulates export revenue but risk leads to a negative net effect in Taiwan.

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JEL classification: F14; F31

Keywords: Depreciation; Exchange risk; Exports; Bivariate GARCH-M

1. Introduction

Depreciation lowers the foreign currency price of exports and should increase export quantity. Export revenue in domestic currency, however, may not rise and can fall. Perfectly inelastic foreign import demand would imply no increase in export revenue. If there is high import content in export production,

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depreciation could result in higher price of exports. With appreciation, exporters might price to market and lower their domestic currency price to maintain market share. Exporters may also actively hedge in option markets to avoid exchange rate effects.

Theory is ambiguous and the empirical evidence on exchange rates and export revenue is mixed. [Junz and Rhomberg \(1973\)](#) and [Wilson and Takacs \(1979\)](#) find that devaluation increases export revenue for developed countries with fixed exchange rates, and [Bahmani-Oskooee and Kara \(2003\)](#) find similar results with flexible rates. In contrast, [Abeysinghe and Yeok \(1998\)](#), [Athukorala \(1991\)](#), [Athukorala and Menon \(1994\)](#), and [Wilson and Tat \(2001\)](#) find that appreciation does not lower export revenue in some Asian countries.

Even if there were a positive effect of depreciation on export revenue, associated exchange risk might discourage exporters and mitigate the positive effect. Exchange risk has become an issue since the collapse of fixed exchange rates in the early 1970s but there is no consensus regarding its impact on export revenue. Exchange risk could theoretically lower export revenue due to profit risk as developed by [Ethier \(1973\)](#). [De Grauwe \(1988\)](#) suggests, however, that exporters might increase volume to offset revenue loss. On the other side of the transactions, importers may seek other sources when facing exchange risk. [Broll and Eckwert \(1999\)](#) note the return on an option to export should increase along with risk. Exchange risk could also alter the currency inventory practices of exporters and importers.

Reviewing the empirical literature, negative risk effects are found by [Pozo \(1992\)](#) for UK exports to the US; [Chowdhury \(1993\)](#) and [Arize \(1995, 1996, 1997\)](#) for US, European, and G7 exports; [Weliwita, Ekanayake, and Tsujii \(1999\)](#) for Sri Lanka's exports to six developed countries; and [Arize, Malindretos, and Kasibhatla \(2003\)](#) and [Arize, Osang, and Slottje \(2000\)](#) for LDC exports using a moving sample standard deviation model. In contrast, positive risk effects are found by [Asseery and Peel \(1991\)](#) for multilateral exports except for the UK; [Kroner and Lastrapes \(1993\)](#) for France, Germany, and Japan but negative effects for the UK and US; and [McKenzie and Brooks \(1997\)](#) for Germany and the US. [Klaassen \(2004\)](#) finds no risk effects for bilateral US exports to the other G7 countries.

Such contrary results motivate the present paper, the first to examine the net effect of depreciation and exchange risk simultaneously in a bivariate GARCH-M model. Monthly data covers the period 1979–2002 in Japan and seven developing Asian countries: Indonesia, Korea, Malaysia, Philippines, Singapore, Taiwan, and Thailand. Exports in these countries are found to respond differently to depreciation and risk.

2. Time varying variances

The present bivariate GARCH-M model differs from previous analysis in three ways. [Bahmani-Oskooee and Kara \(2003\)](#) and [Wilson and Tat \(2001\)](#) use cointegration techniques to examine the effect of depreciation on exports and the trade balance but [Arize et al. \(2003\)](#) show this technique overestimates the effect of depreciation when there is a negative risk effect. The present paper simultaneously estimates the effects of depreciation and risk.

Second, moving standard deviations of the exchange rate maintain the hypothesis of homoskedasticity while serving as a proxy for heteroskedastic risk in [Arize et al. \(2000, 2003\)](#), and [Chowdhury \(1993\)](#). The present approach makes no such assumptions, improving upon models examining the relationship

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