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Exchange rate effects on Korea–U.S. bilateral trade: A new look

Jungho Baek*

Department of Economics, School of Management, University of Alaska Fairbanks, United States

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ABSTRACT

This study examines the effect of exchange rate fluctuations on Korea's trade with the U.S. by taking the roles of exchange rate volatility and third country effects into account. An autoregressive distributed lag (ARDL) approach to cointegration is applied to estimate bilateral exports and imports of disaggregating 10 industries between Korea and the U.S. We find that Korea's major export industries are highly responsive to the bilateral exchange rate, volatility and third country effects in both the long- and short-run, whereas Korea's imports are mostly insensitive to changes in those three factors. It is also found that income in both countries plays an important role in influencing the bilateral trade flows in both the long- and short-run.

1. Introduction

A large body of empirical studies has examined the relationship between Korea's trade and its exchange rate (Korean won) (e.g., Arize, 1994; Jung, 1996; Hsing and Savvides, 1996; Wilson, 2001; Bahmani-Oskooee and Ratha, 2004; Chang, 2005, 2009; Kim, 2009; Baek, 2012, 2013). For example, Hsing and Savvides (1996) `and Chang (2009) analyze the effects of changes in real exchange rates on Korea's trade balance. The former finds that real depreciation of the Korean won has little impact on Korea's trade balance, while the latter shows that exchange rate is indeed an important determinant affecting Korea's trade. More recently, Baek (2012) examines the dynamic effects of exchange rate changes on changes in exports and imports between Korea and the U.S.; he concludes that Korean exports are relatively sensitive to exchange rate changes, but Korean imports are not.

Although previous studies have undoubtedly advanced our understanding of exchange rate impacts on Korea's trade flows, they have some serious shortcomings. An important point frequently overlooked in the literature is that, since studies mostly employ either *aggregate* trade data between Korea and the rest of the world or bilateral *total* trade between Korea and its trading partners in tackling the issue, the results of previous studies are likely to suffer from what is known as 'aggregation bias problem'; that is, within one aggregate trade flow a number of significant exchange rate impacts could be offset by a number of insignificant effects and vice versa (Baek, 2012).

Another shortcoming of previous studies evaluating the effect of exchange rates on Korea's trade is that *little* attention has been paid to exchange rate volatility (uncertainty) and third country exchange rate effects (referred to here as third country effects). A considerable number of theoretical and empirical studies have shown that exchange rate volatility has either favorable or adverse effects on the volumes of exports and imports, depending on the risk-taking position of economic agents (e.g., Sercu and Uppal, 2000; Doganlar, 2002; Baak et al., 2007). For example, since risk-averse traders

* Tel.: +907 474 2754; fax: +907 474 5219.
E-mail address: jbaek3@alaska.edu

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Table 1
Source: Korea International Trade Association (KITA).

Country	Exports		Imports		Total	
	Value (million $)	Share (%)	Value (million $)	Share (%)	Value (million $)	Share (%)
China	134,323	24.5	80,785	15.5	215,108	20.2
Japan	38,796	7.1	64,363	12.4	103,159	9.7
U.S.A	58,525	10.7	43,341	8.3	101,866	9.5
Saudi Arabia	9,112	1.7	39,707	7.6	48,819	4.6
Hong Kong	32,606	6.0	13,402	2.6	46,008	4.3
Singapore	22,888	4.2	9,676	1.9	32,564	3.1
Australia	9,250	1.7	22,988	4.4	32,238	3.0
Indonesia	13,955	2.5	15,676	3.0	29,631	2.8
Taiwan	14,815	2.7	14,012	2.7	28,827	2.7
Germany	7,510	1.4	17,645	3.4	25,155	2.4
Russia	11,097	2.0	11,354	2.2	22,451	2.1
Sub-total	352,877	64.4	332,949	64.1	685,826	64.2
Total	547,870	100.0	519,584	100.0	1,067,454	100.0

Source: Korea's export and imports, 2012.

generally try to avoid any risk associated with exchange rate fluctuations and hence losses, exchange rate volatility may have a negative effect on the trade volume. In addition, in his seminal work on the exchange rate risk, Cushman (1986) points out that 'third country effects' could play a role in influencing the pattern of bilateral trade flows. He notes: "While increased dollar-pound risk would be expected to reduce U.S. exports to the United Kingdom (UK), increased dollar-mark risk might increase the U.S. to UK flow as U.S. exporters substitute British for German markets. Increased pound-mark risk could also increase the U.S. to UK flow as British importers make the same switch." A number of studies have since attempted to incorporate third country effects in their models and have largely found significant third country effects (e.g., Baak, 2008; Bahmani-Oskooee and Xu, 2012; Bahmani-Oskooee et al., 2013). Accordingly, studies excluding exchange rate volatility and third country effects in their models are likely to be misspecified (known as the omitted variable bias), thereby raising questions about the validity of the results.

The main new contribution of this study is, therefore, to use disaggregated trade data at the level of individual industries between Korea and the U.S., and to examine the effect of exchange rate fluctuations on the bilateral trade by taking the roles of exchange rate volatility and third country effects into account. An autogressive distributed lag (ARDL) bounds testing approach to cointegration is used as the estimation method. It should be emphasized here that Korea has maintained a strong trade relationship with the U.S. since the beginning of its economic development in the early 1960s. From 1965 through 2000, for example, the U.S. has been the largest trading partner of Korea, accounting for 20–40% of Korea's total trade. Since China and Japan became the top two trade partners of Korea in the mid-2000s, the U.S. has been the third-largest trading partner for Korea; in 2012, exports and imports totaled $58 billion and $43 billion, respectively (Table 1). Given the significance of the bilateral trade between the two countries, it is important to clearly understand the exchange rate impacts through improved and up-to-date analysis. It is hoped that our appropriately constructed analysis will lead to more robust empirical findings and contribute to the trade literature on Korea.

The remainder of this paper is organized as follows. The next section describes the empirical model associated with the ARDL bounds testing approach as well as the dataset used for the analysis. The following section discusses the empirical results. Finally, the last section makes some concluding remarks.

2. The models and the data

2.1. Export and import demand Models

It should be emphasized at the onset that the recent empirical studies (e.g., Baek, 2012, 2013; Bahmani-Oskooee et al., 2013) show that in addition to the use of bilateral disaggregated trade data, trade models analyzing exports and imports separately allows us not only to avoid the aggregation bias but also to clearly identify what variables are affecting exports or imports and by how much. To examine the driving forces behind Korea–U.S. bilateral trade properly, therefore, we use the bilateral export and import demand models developed by Bahmani-Oskooee et al. (2013) as follows:

$$\ln X_{it} = a_0 + a_1 \ln Y_t^{US} + a_2 \ln ER_t + a_3 \ln VL_t + a_4 \ln VL_t^{JP} + \varepsilon_t \quad (1)$$

$$\ln M_{it} = b_0 + b_1 \ln Y_t^{KR} + b_2 \ln ER_t + b_3 \ln VL_t + b_4 \ln VL_t^{JP} + \mu_t \quad (2)$$