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Efficiency tests of foreign exchange markets for four Asian Countries

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ABSTRACT

This paper uses the traditional variance ratio test of Lo and MacKinlay (1988, 1989), the non-parametric-based variance ratio test of Wright (2000) and the multiple-variance ratio test of Chow and Denning (1993), to re-examine the validity of the weak form efficient market hypothesis for foreign exchange markets in four floating-rate markets in neighboring Asian economies (Japan, South Korea, Taiwan and the Philippines). The results show that the random walk patterns of the exchange rate return series cannot be rejected, with the one exception of Taiwan, where inefficiency is shown to be most prominent. We therefore conclude that the foreign exchange markets of Japan, South Korea and the Philippines are weak form efficient, while the foreign exchange market of Taiwan is inefficient.

1. Introduction

There is an abundance of prior studies in which the behavior of asset prices has been examined. One method of testing for weak form market efficiency has been to determine whether the behavior of asset prices follows a random walk pattern; with the random walk hypothesis contending that consecutive price changes in an efficient market are irregular. However, if the series of asset prices exhibit mean reversion, then the prices are regarded as being serially correlated, and it is therefore feasible to forecast their behavior in the long run. Belaire-Franch and Opong (2002) noted that if asset returns could be modeled, this would suggest that stock returns may also be predicted. Clearly,

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such information would be extremely valuable to investors, academics and regulators; consequently, an understanding of the behavior of asset prices and how empirically accurate, within the markets, the random walk hypothesis may be, are of considerable importance to a number of interrelated groups.[1]

A substantial number of academic studies have emerged over recent years in which advanced modeling techniques have been used to examine the behavior of financial markets (Liu and He, 1991; Lee and Ike, 1999; Wright, 2000; Belaire-Franch and Opong, 2005). Although, in the majority of these studies, the results have shown that financial markets are inefficient (with their price series usually exhibiting mean reversion), the findings on the weak form efficient market hypothesis generally remain inconclusive. Furthermore, only in a very few studies, of which we are aware, has there been any investigation of the efficiency of foreign exchange markets in Asian economies, particularly those with floating exchange rate systems.[2] Within those studies where an investigation of market efficiency has been undertaken on emerging markets, the focus has generally been on the stock market (Darrat and Zong, 2000; Cheung and Coutts, 2001; Poshakwale, 2002; Worthington and Higgs, 2003; Lima and Tabak, 2004; Ainul and Mohammed, 2005; Füss, 2005; Hoque et al., 2007; Al-Khazali et al., 2007). In addition, some studies of exchange rate efficiency in the Australasian region are also debated recently. A general list of prior studies is presented in Table 1. The controversial and mixed results in the literature have referred to alternative testing methods, different data periods, and dissimilar frequencies of data (for example, Olekalns and Wilkins, 1998; Henry and Olekalns, 2002; Jeon and Seo, 2003; Oh et al., 2007; Sohel Azad, 2009). Thus, determining which financial market is more efficient is of importance when markets seem to exhibit the same efficiency or inefficiency levels under various tests. The purpose of this paper is therefore to contribute to this important topic by examining the behavior of four countries in Asia with floating exchange rates.

A floating exchange rate, or a flexible exchange rate, is a type of exchange rate regime within which a currency's value is allowed to fluctuate according to the foreign exchange market. Within such systems, it would be unusual for the central bank to frequently intervene to stabilize the currency. Consequently, in a country with a floating exchange rate system, the foreign exchange market should be efficient; that is, the foreign exchange rate series will exhibit a random walk pattern. What we aim to determine here, however, is what the situation is in reality.

We examine this question with regard to four Asian economies, Japan, South Korea, Taiwan and the Philippines, with the foreign exchange markets in these countries providing us, for a number of reasons, with an excellent opportunity to study efficiency. First of all, their exchange rates are free floating, as defined and published by the International Monetary Fund (IMF). In particular, the foreign exchange markets are of exceptional importance to economic policy within these economies since they are all oriented towards export trade.[3] In addition, Chen et al. (2006) point out that the movements of exchange rates have major impacts on foreign direct investments. Specifically, after the Asian currency crisis, the impacts of capital flows, economic or uneconomic factors and exchange rate stabilization (Krongkaew, 1999; Ariff and Abubakar, 1999; Kunimune, 1999) on foreign exchange markets attract more mass population's attention. Even more, the nearby currency crisis in Argentinean show that the exchange rate regime plays a significant role in economics (Alvarez-Plata and Schrooten, 2006). We can see, therefore, above results show that an efficient foreign exchange market is important.

Secondly, with the exception of Japan, the greatest economic system of the four economies examined, the uncertainty stemming from non-economic impact on the foreign exchange markets (such as general elections, strikes, and so on) is also significant for these countries. Accordingly, their exchange

[1] An efficient market generates prices that can fully reflect all available information (Fama, 1991); accordingly, asset returns are purely non-predictable and no investors can earn abnormal profits by exploiting past available information. The implication is therefore that prices traded in such a market will be serially uncorrelated.

[2] Karfakis and Parikh (1994) examine the market efficiency hypothesis for five major exchange rates of the Australian dollar. Masih and Masih (1995) aim to examine Canadian floating dollar and six other major European currencies, in testing the market efficiency hypothesis (MEH) use cointegration techniques.

[3] Although Japan possesses the highest foreign exchange reserves in the world, the ratios for South Korea, Taiwan and the Philippines are also between 60% and 104% (the (exports + imports)/GNP ratios are available upon request); which clearly indicates that the three Asian developing countries are also heavily dependent on the foreign exchange market.