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Southeast Asian monetary integration: New evidences from fractional cointegration of real exchange rates☆

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ABSTRACT

This paper examines generalized purchasing power parity theory (G-PPP) among the ASEAN-5 countries. Implementing both the rank analysis and the regression-based analysis of the cointegrating system's, we identify several weak fractional cointegration relationships. Accordingly, cointegrating errors of real exchange rates (RERs) are highly persistent but mean-reverting. Our findings contrast with all previous studies that restrict their investigations to the traditional $I(1)/I(0)$ cointegration. Since RERs are tied through a long memory process, empirical models of G-PPP theory that ignore such a feature should be misspecified. Finally, our results support further monetary integration among different sub-groups of the ASEAN-5 countries as they share long-run comovements.

1. Introduction

This empirical paper examines the long-run relationship among the RERs of the five most advanced members of the ASEAN countries.[2] Our aim is to investigate whether the ASEAN-5 has operated as an Optimum Currency Area (OCA) over the period 1975–2011. Prior research on cointegration among RERs has focused on the traditional $I(1)/I(0)$ cointegrating relationships. In the former case,

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[2] The ASEAN-5 consists of founder members namely Singapore, Thailand, the Philippines, Indonesia, Malaysia.

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there is no equilibrium relationship and related studies conclude against the existence of an OCA (Wilson and Choy, 2007; Sun and Simons, 2011), while in the latter case, all RERs share the same kind of real disturbances, thus strengthening the case of a currency union (Ogawa and Kawasaki, 2008; Mishra and Sharma, 2010). However, classical cointegration models used in these studies imply short memory residuals as the equilibrium errors are restricted to be $I(0)$. In this paper we argue that such conflicting evidences may be resolved in a fractionally cointegrated framework.

Considering the above limitation, we depart from the traditional framework by supposing the presence of long memory in the cointegrating residuals. The rationale for considering RERs as a fractional cointegration process has its counterparts in the literature. The recent floating exchange rate period has been characterized in many countries by significant and persistent misalignment of RER. This perception has spurred a renewed interest in the study of exchange rate behavior while, at the same time, long memory models as well as their applications have become popular among researchers. Initially, Booth et al. (1982) apply a classical rescaled range analysis to examine three major daily spot exchange rates, namely the British pound, French franc and Deutsche mark. These authors find evidences of positive long-term persistence during the flexible exchange rate period (1973–1979) but negative long-term persistence during the fixed exchange rate period (1965–1971). Later, Cheung (1993), also find convincing evidences of long-term persistence in five major weekly nominal exchange rates during the managed floating regime, using the Geweke–Porter–Hudak test. Baum et al. (1999) estimate an ARFIMA model to test for the existence of long memory in international inflation rates (CPI- and WPI-based inflation rates) for a number of industrial and developing countries, over the post-Bretton Woods (1971–1995) period. The authors demonstrate that long memory is a common feature for the inflation rates of the countries studied.

More recent papers have shown that RERs are subject to persistent shocks, taking them away from their fundamental value over unexpected timescales. In other words, mean reversion occurs but deviations from equilibrium are long-lived (see, among others, Gil-Alana, 2000; Caporale and Gil-Alana, 2004; Dufrénot et al., 2008). The presence of long-memory in currency movements led researchers to investigate fractional cointegration techniques for modeling long-run relationship among exchange rates. For instance, Baillie and Bollerslev (1994) argue that long-run relationship among a set of seven exchange rates may well be tied together through a long memory $I(d)$-type process. Cheung and Lai (1993) analyses Purchasing Power Parity (PPP)[3] and find evidence that relative prices are characterized by a fractionally cointegrated process.

In view of the preceding remarks, this paper seeks to test G-PPP hypothesis introduced by Enders and Hurn (1994) by means of a robust estimation methodology of fractional cointegration. We envisage in this study both dollar-based and yen-based RERs for the ASEAN-5 countries,[4] using monthly data over the period 1975–2011 ($n = 444$).

The main results of the paper are the following: (1) We find different sub-groups of the ASEAN-5 countries sharing with each other a long-run relationship. (2) All of the cointegration relationships are weak in the sense that RERs deviate persistently from the long run equilibrium. As expected, these two results imply important limitations for a monetary union involving all the ASEAN-5 countries. (3) All significant cointegration relationships exhibit a positive long run coefficient, thus implying symmetric adjustments to macroeconomic disturbances. (4) Both the yen and the US dollar are important when considering a step-by-step approach toward the coordination of monetary policy. (5) There are some evidences to assert that the ASEAN-5 countries became more integrated after 1997–98 since the equilibrium errors respond more rapidly to shocks, indicating less persistent deviations toward the common equilibrium in the post-crisis period.

[3] PPP theory is a structural model of RER determination supposing that two currencies in equilibrium lead to the same purchasing power in both countries.

[4] Indeed, the US is one of the most important export markets for final outputs produced inside the region through vertical integration of production chains, while the Japanese economy accounts for a large proportion of trade among Southeast Asian countries.