The purchasing power parity of Southeast Asian currencies: A time-varying coefficient approach ☆

Bong-Han Kim [a,*], Hong-Kee Kim [b], Keun-Yeob Oh [c]

[a] Department of International Economics, Kongju National University, Republic of Korea
[b] Department of Economics, Hannam University, Republic of Korea
[c] Department of Economics and Trade, Chungnam National University, Republic of Korea

ARTICLE INFO

ABSTRACT

The economies of Southeast Asia have undergone several structural changes, including the Asian currency crisis, during the post-Bretton Woods era. We use a time-varying coefficient cointegration model to test for purchasing power parity (PPP) of Southeast Asian currencies and to track changes in purchasing power relationships over time. The main empirical findings are as follows. First, the stability of the relationship between exchange rates and price differentials is strongly rejected. Second, a major structural change occurs at the outbreak of the Asian currency crisis in 1997. Third, when the cointegration vector is allowed to vary with time, we find evidence of a cointegration relationship for four countries in terms of the US dollar and for four countries in terms of the Japanese yen. Therefore, it seems unlikely that Southeast Asian currencies form a "yen bloc."

1. Introduction

Purchasing power parity (PPP) is achieved when a common basket of goods and services, denoted in a common currency, costs the same in all countries. The existence of PPP rests on the assumption of perfect inter-country goods arbitrage. We may expect PPP to hold only in the long run, because, in the short run, market frictions, such as transaction costs, taxation, trade restrictions, and differences in price indices across countries, tend to interfere. Numerous studies have tested for PPP by testing either whether real exchange rates are stationary (e.g., Huizinga, 1987; Lothian and Taylor, 1996; Meese and Rogoff, 1998) or whether nominal exchange rates are cointegrated with price differentials (e.g., Enders, 1988; MacDonald, 1993; Fisher and Park, 1991).

The concept of PPP has a special meaning for Southeast Asia, because the ideal of PPP could be employed as a useful tool with which to select a common currency for a future currency union among Southeast Asian countries. Most relevant studies have considered the US dollar, the Japanese yen, or the Euro as potential candidates for the common currency (e.g., Karras, 2005; Kwan, 2001; McKinnon, 2001; Williamson, 1999). The degree of conformity to PPP can be a useful criterion for evaluating the relationship between these candidates and the currencies of Southeast Asian countries.

Although several previous empirical studies have tested for the PPP of these currencies in terms of the US dollar and the Japanese yen, their results were mixed. Results concerning PPP depend on the econometric methodologies, the length of time covered by the data, the choice of a numeraire currency, the coverage of fixed exchange rate periods, and other factors.[1] Different econometric tools have yielded conflicting test results. The augmented Dickey–Fuller (ADF) unit root test usually rejects PPP, while panel unit root tests tend to support it (e.g., by Azali et al., 2001). Some studies, such as that by Azali et al. (2001), provide evidence supporting PPP for Southeast Asian currencies after using the Im-Pesaran-Shin (hereafter, IPS) panel unit root test and panel cointegration test of Pedroni (1995). As Chang (2002) pointed out, however, commonly used panel unit root tests, such as the IPS, which assumes cross-sectional independence, are likely to yield biased results when applied to panel data with cross-sectional dependency.[2]

In this paper, therefore, we follow an alternative approach. In testing for the PPP of Southeast Asian exchange rates using long-term data, we presume the existence of some structural breaks and regime

---

[1] See Sarno and Taylor (2002) for a review of this literature.
[2] Chang and Song (2005) developed a nonlinear IV panel unit root test that allows not only for cross-sectional dependencies of innovation, but also for the presence of cointegration across cross-section levels. They applied nonlinear IV tests to panels of real exchange rates and found no evidence of PPP. This result contrasts sharply with those of previous studies.
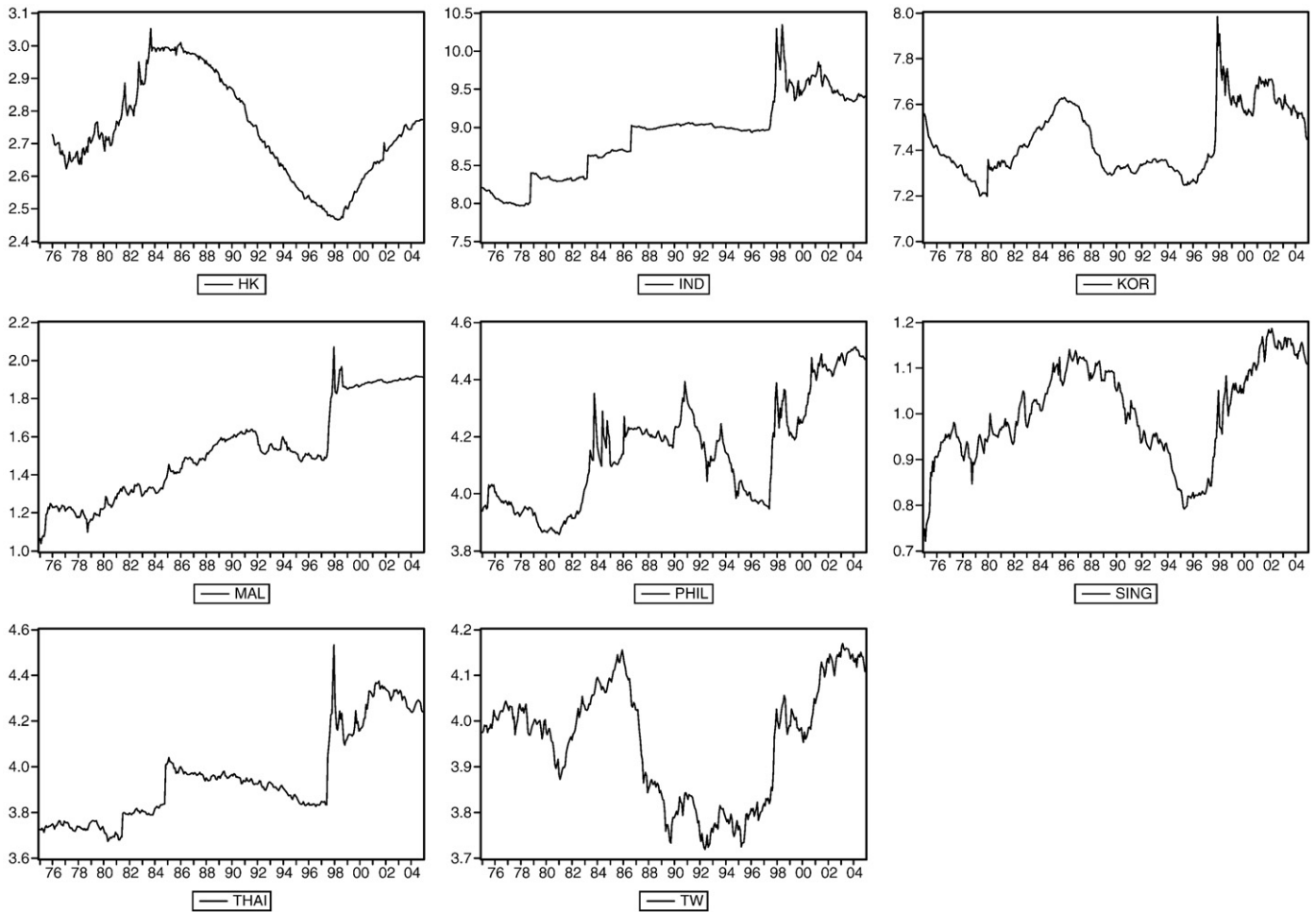
Fig. 1. Real exchange rates in terms of the US dollar.

shifts. For Southeast Asian economies, it is reasonable to assume that several structural changes should have taken place due to rapid economic growth, policy regime shifts, and changes in the international economic environment. Recently, the East Asian crisis of 1997–1998 had a substantial impact on both foreign exchange markets and PPP within the regions.

In this paper, we accomplish two primary tasks. First, we test for the PPP of these currencies by allowing the relationship between the exchange rates and price differentials to vary over time. In this way, we can consider whether regime shifts indeed took place in Southeast Asian economies during the post-Bretton Woods era. Second, we track the changes in this relationship over time. If we characterize the exact pattern of variation that exists in the relationship between consumer prices and foreign exchange rates, our results will be very helpful for making decisions about long-run exchange rate polices.

To test the stability of the PPP relationship, we apply two tests: Park's (1990) variable addition approach and Hansen's (1992) Lagrange multiplier (LM)-type tests. We also test the null hypothesis of cointegration with time-varying coefficients against that of no cointegration using Park's variable addition test.

We estimate the time-varying coefficients in two different ways. First, we use a time-varying coefficient cointegration regression (hereafter, TVC) developed by Park and Hahn (1999). Second, we conduct a maximum likelihood estimation (MLE) using the Kalman filter algorithm. We then compare the estimates obtained using these methods.

Section 2 briefly surveys the literature on real exchange rates and PPP hypothesis tests for Southeast Asian currencies. Section 3 introduces two time-varying coefficient approaches. In Section 4, we report the findings of our empirical analysis and compare our findings with those reported in the previous studies. Finally, Section 5 provides a brief summary and conclusion.

2. Literature on PPP for Southeast Asian currencies

Most empirical studies based on a conventional ADF test have failed to reject the unit root hypothesis for Asian real exchange rates. Therefore, the most recent studies have employed more sophisticated econometric methodologies, such as panel unit root tests, unit root tests with structural breaks, and nonlinear unit root tests (e.g., by Azali et al., 2001; Liew et al., 2004; Breitung and Candelon, 2005).

Traditional unit root tests have low power because they ignore the possibility that some structural breaks are present. For example, Zurbruegga and Allsoppb (2004) explored the impact of the East Asian crisis on PPP within the region using the cointegration tests of Inoue (1999) and Johansen et al. (2000) and allowing one-time structural breaks. Their findings generally support the hypothesis of PPP in the context of the Asian crisis. This evidence would ordinarily be a significant indicator of the robustness of PPP to structural shifts, in the sense that the sample period spanned the duration of the Asian crisis. However, their paper focused on the one-time shock of the Asian crisis and ignored any other possible structural breaks that may have been experienced by Southeast Asian economies. They also did not provide useful information about the way that price differentials vary with nominal exchange rates.