Economic Modelling 34 (2013) 52–58

Contents lists available at ScienceDirect

Economic Modelling

journal homepage: www.elsevier.com/locate/ecmod

Stationarity of Asian real exchange rates: An empirical application of multiple testing to nonstationary panels with a structural break

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ARTICLE INFO

JEL classification:
F31
O53
C12
C33

Keywords:
Purchasing Power Parity
East Asia
Stationarity
Panel unit root test
Multiple testing

ABSTRACT

This paper investigates the stationarity of the real exchange rates of the currencies for ten Asian countries against the US dollar during the pre-Lehman period. This paper explicitly investigates the presence of a structural break that occurred at unknown dates across countries and which may have been caused by the Asian financial crisis in 1997–1998. To identify which of the ten countries hold real exchange rate stationarity, that is, long-run Purchasing Power Parity, the resampling-based multiple testing proposed by Romano and Wolf (2005) is employed while dealing with possible cross-sectional correlation among the countries and avoiding the over-rejection of the null hypothesis or the multiplicity problem. Moreover, the paper examines the small-sample property of the multiple testing when there is a structural break in cross-sectionally dependent panels. Finally, the empirical results show that the stationarity hypothesis of the real exchange rate is significantly supported in some Asian countries.

1. Introduction

Since the Asian financial crisis in 1997–1998, East Asian countries have been facing arduous problems related to managing their exchange rate policies, one of which is selecting an exchange rate regime. Before the crisis, most East Asian countries adopted the de facto dollar-peg regime. This regime contributed to their economic growth through increases in exports and capital inflows because the appreciation of the Japanese Yen against the US dollar after 1985 led to the depreciation of their respective currencies. However, after 1995, the appreciation of the US dollar worsened the terms of trade and caused rapid and massive capital outflows, which are believed to be some of the main causes of the Asian currency crisis. During the most difficult period of this financial crisis, the majority of the East Asian countries switched their exchange rate regimes from a dollar-peg to a floating regime. After this crisis period, various exchange rate regimes have been officially implemented in East Asia. However, interestingly, many studies such as Ogawa (2002) and McKinnon and Schnabl (2004) have empirically found an increase in co-movement with the US dollar again. Some studies, such as Narayan (2010), have empirically confirmed Purchasing Power Parity (PPP), that is, real stability vis-à-vis the US dollar, within East Asian countries.

As indicated by Sarno and Taylor (2002), the empirical evidence from the unit root literature on the PPP hypothesis is inconclusive. However, it is widely accepted that the failure to reject the unit root hypothesis of real exchange rates does not necessarily imply the acceptance of this null hypothesis because this could be caused by the lack of power of the tests. Thus, a number of existing papers sought to determine a technique to increase the power of the tests by using extended time-series or panel data.[1] As a result, Taylor (2009) has emphasized that the recent empirical findings generally provide strong and robust support for the long-run PPP regardless of the type of exchange rates and sample periods.

Fig. 1 shows fluctuations in the ten Asian real exchange rate series. As shown in this figure, there seem to be apparent discontinuities in these series, which were mainly affected by the Asian financial crisis. Moreover, this crisis heterogeneously shocked these Asian countries following different paths and for different durations. To manage these discontinuous paths of the series, a few of the recent studies have used some unit root test techniques for a time series with nonlinearity or structural breaks. Liew et al. (2004) and Zhou (2008) applied Kapetanios et al.'s (2003) nonlinear unit root test to eleven and thirteen Asian real exchange rates against the US dollar, respectively, and found stationarity properties in more than half of the countries. Wu et al. (2004) conducted the univariate unit root test with a one-time

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[1] Examples of the first application studies include Frankel and Rose (1996), Oh (1996), Papell (1998), and Taylor and Sarno (1998).

0264-9993/$ – see front matter.
http://dx.doi.org/10.1016/j.econmod.2012.11.056

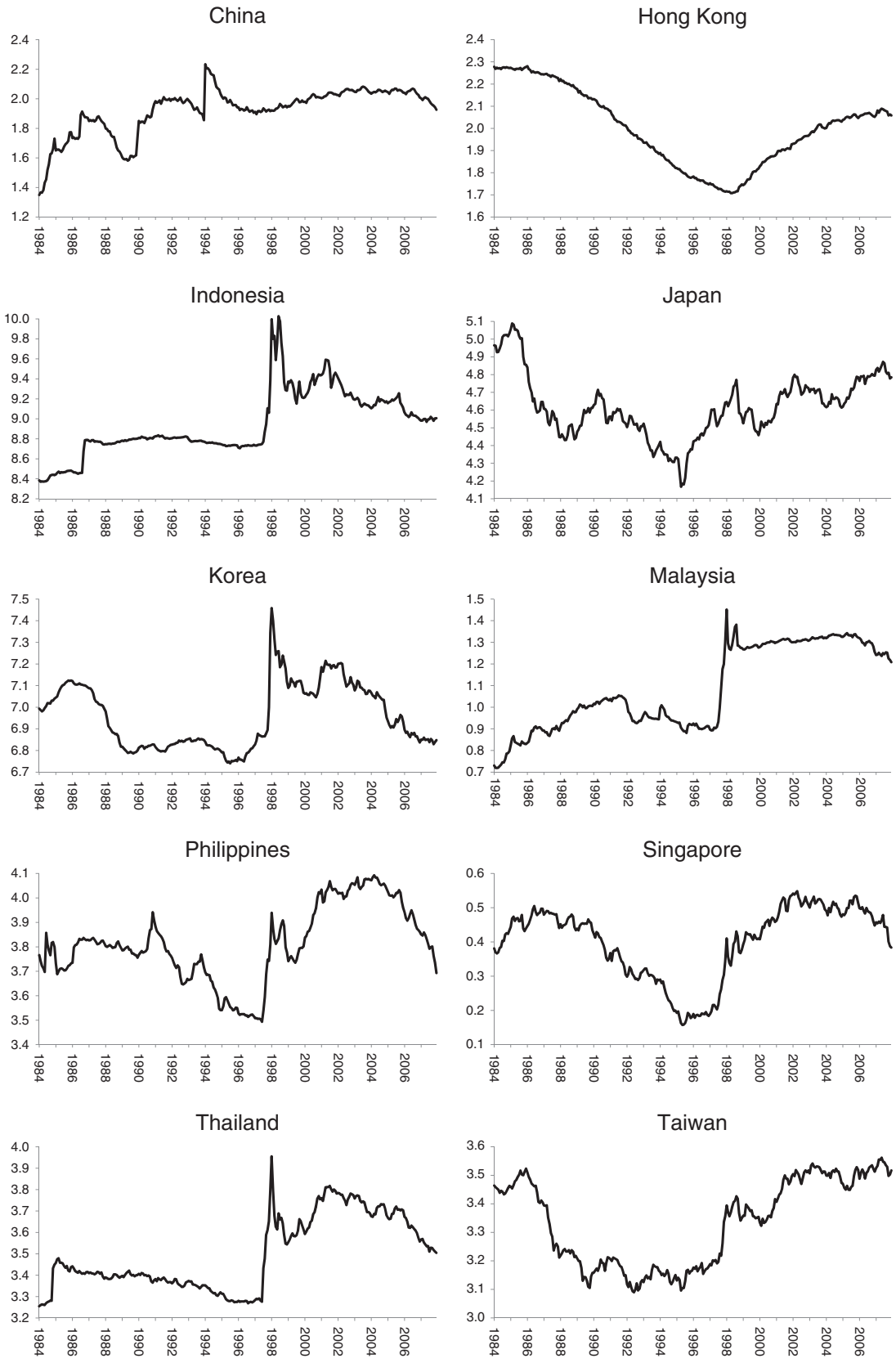

Fig. 1. Asian real exchange rates.

structural break proposed by Zivot and Andrews (1992) and concluded that eight Asian currencies were stationary. Based on the panel Lagrange Multiplier (LM) unit root test with one or two structural breaks, Hooi and Smyth (2007) significantly rejected the joint unit root null hypothesis for fifteen Asian countries. Like the recent empirical findings of other PPP studies, their results seem to be somewhat consistently in favor of the stationarity alternative, that is, the PPP hypothesis, for some Asian countries.