



Purchasing power parity and dynamic error correction Evidence from Asia Pacific economies

Daniel Y. Lee*

Department of Economics, Shippensburg University, Shippensburg, PA 17257, USA

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Abstract

This study investigates the validity of purchasing power parity (PPP) hypothesis as a long run equilibrium condition for thirteen Asia Pacific economies using a generalized error correction model. The results of the generalized dynamic specification appear to support PPP for more countries than do standard tests for unit roots. Out of the thirteen bilateral exchange rates, evidence of PPP is found for only one (the Mexican peso/U.S. dollar rate) under traditional tests for unit roots, while seven of them support PPP under the generalized dynamic error correction model. It appears that one of the factors that lead standard tests for unit roots to fail to detect evidence of PPP may be the undue restrictions imposed on the model specification. Published by Elsevier Science Inc.

Keywords: Purchasing power parity; PPP; Exchange rates; Dynamic error correction

1. Introduction

The purchasing power parity (PPP) theory states that the equilibrium value of an exchange rate is determined by the changes in the relative national price levels. For example, if the U.S. price level rises by 5% over a year while Japan's price level rises by 3%, then relative PPP predicts that the dollar will depreciate against the yen by 2%. The dollar's 2% depreciation against the yen just cancels the differential in the inflation rates, leaving the relative domestic and foreign purchasing powers of both currencies unchanged. The theory recognizes national price levels and their interactions with exchange rates as a key factor in understanding why exchange rates can change dramatically over periods of several years.

The PPP theory has been tested for several countries using various statistical meth-

* Corresponding author. Tel.: 717-477-1556; fax: 717-477-4015.

E-mail address: DYI@ark.ship.edu (D.Y. Lee)

ods, sample periods and frequency of data. Some empirical studies find evidence of a tendency toward PPP in the long run, especially during high inflation periods, while others reject the hypothesis that there exists a long run relationship between exchange rate and price ratio.¹ For example, Adler and Lehmann (1983), Ballie and McMahon (1989), Cochran and DeFina (1995), Corbae and Ouliaris (1988), Fisher and Park (1991), and Meese and Rogoff (1988) find little support for the hypothesis, while Abuaf and Jorion (1990), Glen (1992), Kim (1990), Pippenger (1993) and Whitt (1992) find some evidence of PPP. This mixed nature of empirical findings has inspired further studies in search of answers to the puzzle. Some researchers attempt to explain failure of PPP by looking at the assumptions behind the theory such as trade impediments, transportation costs, non-traded goods, productivity growth differentials between countries, and so on. When these assumptions are relaxed, PPP is more likely to receive empirical support. For example, Bahmani-Oskooee (1992) finds that productivity differential between countries is one of the major factors contributing to the deviation of PPP from the equilibrium exchange rate. Other empirical studies have focused on refining statistical methods in search of the PPP evidence leading to, most notably, testing for unit roots in recent years. Although testing for unit roots has been applied extensively in the PPP literature, there remain some methodological issues associated with the statistical procedure. In particular, as discussed in the following section, traditional tests for unit roots often impose undue restrictions on several variables. Failure to support PPP in many of previous empirical studies may be attributable to these restrictions.

The main purpose of this paper is to test the validity of PPP using a model that relaxes the restrictions implicit in traditional tests for unit roots. Following Steigerwald (1996), a dynamic error correction procedure of Phillips and Loretan (1991) is applied to overcome the statistical problems implied in traditional tests for unit roots. For a comparison purpose, the results from both standard testing for unit roots and the dynamic error correction model will be reported.

Recently, it has been suggested that nonstationarity of the real exchange rate may be due to some structural shifts. If that is true, PPP may be supported when allowances are made for changes in the mean of the real exchange rates. For example, using the cases of U.S./Finland and U.S./U.K. exchange rates, Perron and Vogelsang (1992) find evidence of PPP by allowing a one-time change in the mean of the exchange rates, which contradicts their results from a standard Dickey-Fuller test. This paper will consider the issue of potential structural shifts by separately testing PPP for the entire sample and the sample from the floating exchange rate period for each country.

Furthermore, this paper will empirically investigate the PPP proposition using data from thirteen Asia Pacific countries, including several newly industrialized economies. Most previous empirical studies used data from developed countries only; PPP studies on developing economies have been rather limited.² To close this gap, we include in our study Australia, Canada, Chile, Hong Kong, Indonesia, Japan, Malaysia, Mexico, the Philippines, Singapore, South Korea, Taiwan, and Thailand. The bilateral exchange rates between these countries and the United States will be used to examine the long-run PPP relationship for monthly data over a period of up to 36 years (1957–1994).³

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