International Review of Economics and Finance 20 (2011) 800–811

Contents lists available at ScienceDirect

International Review of Economics and Finance

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

The real exchange rate determination: An empirical investigation

Wong Hock Tsen *

School of Business and Economics, Universiti Malaysia Sabah, Locked Bag No. 2073, 88999 Kota Kinabalu, Sabah, Malaysia

ARTICLE INFO

Article history:
Received 18 February 2010
Received in revised form 7 February 2011
Accepted 7 February 2011
Available online 13 February 2011

JEL classification:
F31
F37
F10

Keywords:
Real exchange rate
Terms of trade
Reserve differential
Real oil price
Cointegration

ABSTRACT

This study examines the real exchange rate determination in Asian economies. The methods show that the real exchange rate and terms of trade can be jointly determined. Productivity differential, terms of trade, the real oil price, and reserve differential are found to be important in the real exchange rate determination in the long run. However, the significant impacts of those variables on the real exchange rate determination are different across economies. Moreover, the results of the generalised forecast error variance decompositions show that the important contributors of the real exchange rate are different across economies.

1. Introduction

The real exchange rate plays an important role in the international trade and investment determination. Appreciation of the real exchange rate could retard exports and inflows of foreign direct investment and thus economics growth can be affected. Moreover, the real exchange rate is argued to influence balance of payment of a country. Therefore it is important to determine factors that influence the real exchange rate (Miyakoshi, 2003: 173). A suitable or targeted level of the real exchange rate can be achieved through influencing the real exchange rate determinants. There are a number of views on the real exchange rate determination (Copeland, 2008; Williamson, 2009). Miyakoshi (2003) shows that productivity differential is important in the real exchange rate determination for some countries whilst the real interest rate differential is more important in the real exchange rate determination for other countries. Wang and Dunne (2003) show that fundamentals or real variables explain some but not all the variations of the real exchange rates and different disturbances have different degrees of importance for different real exchange rates. There is no universal panacea for changes in the real exchange rate. This issue remains open and little consensus exists on the factors that influence the real exchange rate.

There are some important factors that influence the real exchange rate but not considered in some of previous studies (Miyakoshi, 2003; Wang & Dunne, 2003). Amano and Van Norden (1995), Karfakis and Phipps (1999), Aruman and Dungey (2003), and Bleaney and Francisco (2010), amongst others, present the evidence of the strong relationship between the real exchange rate and terms of trade. De Gregorio and Wolf (1994) demonstrate that, amongst others, improved terms of trade will lead to an appreciation of the real exchange rate. The impact of terms of trade on the real exchange rate is found to be stronger than the impact of the expected real interest differential.[1] In contrast, Gruen and Wilkinson (1994) report that the real interest rate differential is qualitatively more important than

* Tel.: +60 88 320000x1616.
E-mail address: htwong@ums.edu.my.

[1] The expected real interest rate differential captures financial market development particularly capital flows and terms of trade captures good markets development (Bagchi, Chortareas, & Miller, 2004: 77).

1059-0560/$ – see front matter © 2011 Elsevier Inc. All rights reserved.
doi:10.1016/j.iref.2011.02.002

Table 1
Trade openness.

Year	Japan	Korea	Hong Kong
1960–1969	19.5	26.5	163.4
1970–1979	22.9	56.0	187.1
1980–1989	23.4	69.1	209.5
1990–1999	18.4	61.5	265.1
2000–2005	22.8	76.8	322.4
2006	30.9	85.1	399.5
2007	34.0	82.3	405.3
2008	34.2	107.0	414.1

Note: Trade openness is measured by exports plus imports of goods and services divided by GDP and multiplied by 100.

terms of trade in explaining the real exchange rate.[2] Reserve differential could influence the real exchange rate. A country with a high international net-asset position tends to have a strong currency whereas a country with a low international net-asset position tends to have a weak currency. One way to increase international net-asset position is to increase exports through depreciation of the real exchange rate (Wang, Hui, & Soofi, 2007; Aizenman & Riera-Crichton, 2008).

This study examines the real exchange rate determination in Asian economies, namely Japan, Korea, and Hong Kong. These economies adopt different exchange rate regimes and trade openness is not the same. Japan and Korea adopt an independently floating exchange rate regime most of the time, which exchange rate is market-determined and official foreign exchange market intervention is aimed to moderate the rate of change and not to set a level for it. Hong Kong adopts a currency board arrangement most of the time, which an explicit legislative commitment to exchange domestic currency for a specified foreign currency at a fixed exchange rate is carried out (Fischer, 2008). Japan is relatively a closed economy. Korea and Hong Kong are relatively open economies. Trade openness, namely exports plus imports of goods and services to Gross Domestic Product (GDP) of Japan was 25.8% for the period 1960–2008. For Korea and Hong Kong, the trade openness ratios were 70.5% and 295.8% for the same period, respectively (Table 1). Hence this study provides some evidence of the real exchange rate determination in different exchange rate regimes and different degrees of trade openness. More precisely, this study estimates the real exchange rate model of Chen and Chen (2007) augmented by terms of trade and reserve differential.[3] These two variables are not examined in many previous studies. Moreover, this study examines the period including the Asian financial crisis period, 1997–1998 whereas many previous studies cover up to the period before the crisis (Miyakoshi, 2003; Wang & Dunne, 2003). The residual based tests for cointegration with the Generalised Least Squares (GLS) detrended data of the Elliot et al. (1996) (ERS) is used in addition to the uses of the Johansen (1988) cointegration method and the Saikkonen and Lütkepohl (2000) (SL) cointegration method to examine the cointegration of the variables in this study.

The rest of this study is structured as follows. Section 2 gives a literature review of the real exchange rate determination. Section 3 explains the data and methodology used in this study and Section 4 presents empirical results and discussions. The last section includes some concluding remarks.

2. A literature review

The Balassa (1964) and Samuelson (1964) (BS) hypothesis argue that an increase in productivity differential of traded goods to non-traded goods will lead to appreciation of the real exchange rate. Miyakoshi (2003) examines the real exchange rate determination between Japan and East-Asian countries, namely Korea, Malaysia, Indonesia, and the Philippines. Productivity differential is found to be more important in the real exchange rates of Indonesia and the Philippines against Japanese yen, respectively whilst the real interest rate differential is found to be more important in the real exchange rates of Korea, Malaysia, and Indonesia against Japanese yen, respectively. Generally, productivity differential and the real interest rate differential shall be considered when estimating the real exchange rates. In contrast, Wang and Dunne (2003) investigate the dynamic of the real exchange rates in East Asia, namely Japan, Korea, Malaysia, Singapore, Indonesia, the Philippines, and Thailand. The results of generalised variance decompositions demonstrate that fundamentals such as productivity differential explain some but not all the variations of the real exchange rates and different factors have different degrees of importance for each real exchange rate. Moreover, Lee, Nziramasanga, and Ahn (2002) find the real variables, namely terms of trade and industry productivity to have long-run impacts on the real exchange rate whereas the nominal variables, namely relative money supply and current account to have short-run impacts on the real exchange rate between New Zealand and Australia. Chinn (2000), Choudhri and Khan (2005), Egert, Lommatzsch, and Lahreche-Revil (2006), and Guo (2010), amongst others, find the importance of the BS hypothesis in the real exchange rate determination.

[2] Chen (2006) examines the nexus of interest rate and exchange rate and the effectiveness of interest rate defence in six developing countries (Indonesia, Korea, the Philippines, Thailand, Mexico, and Turkey). The results of the Markov-switching specification of the nominal exchange rate with the transition probabilities assumed time varying show that an increase in interest rate will lead to a higher probability of switching to a crisis regime. Thus high interest rate policy may be unable to defend exchange rate. Moreover, a high interest rate would lead to a high exchange rate volatility (Chen, 2007).

[3] Cavallo and Ghironi (2002) develop a two-country monetary model with incomplete asset markets, stationary net-foreign assets, and endogenous monetary policy. The model de-emphasises the role of exogenous money supply and emphasises the relationship between the exchange rate and the net-foreign assets and the endogeneity of interest rate setting in exchange rate determination.