International Journal of Economics and Finance
www.ccsenet.org/journal.html
Vol. 1, No. 2
August 2009

# The Effect of Exchange Rate Disequilibrium and Financial Integration on Economic Growth

Amin U. Sarkar
Alabama A&M University, P.O. Box 429, Normal (Huntsville), AL 35762, USA
E-mail: amin.sarkar@aamu.edu
Thouraya H. Amor
University of Sophia Antipolis, CEMAFI, Avenue Doyen Louis Trotabas 06050 Nice, France
E-mail: Thouraya.HADJ-AMOR@unice.fr

**Abstract**

We identify the determinants of the equilibrium real exchange rates (RER) in 10 selected countries of South and South East Asia and estimate the RER distortion by testing the effect of international financial integration (IFI) on economic growth. We use a simple model that determines the equilibrium RER and a dynamic model of endogenous growth that traces the effect of the RER distortion. We applied the techniques of non-stationary dynamic panel, the tests of panel cointegration, and the method of least squared dynamics (DOLS) to estimate the relationship of cointegration. We also use the technique of Generalized Moments Method (GMM) in the system as applied to panel data to estimate the equation of dynamic growth. The IFI constitutes an important factor of long-term RER. An increase of it led to a long-term RER depreciation in the region. The evolution of the RER distortion for 1979-2004 was persevering and recurring: it was an alternation between periods of RER overvaluation and undervaluation in the region. The RER fluctuation in the short-term played against economic growth.

**Keywords:** DOLS, Economic Growth, Equilibrium RER, GMM of Dynamic Panel, International Financial Integration, Panel Cointegration, RER Distortion.

**JEL Classification:** F33, F36, O24 and O53

## 1. Introduction

The period after Bretton Woods has witnessed major instability of currencies and real exchange rates (RER) fluctuations, particularly in the emerging economies. The RER instability inhibited growth in some countries of Latin America while the expansion of South East Asian economies is largely attributable to the relative stability of their exchange rates. Some studies indicate that an overvaluation is not favorable for producing tradable goods and services, and sometimes it leads to monetary crisis. However, there are also studies that claim a positive relationship between the RER variability (depreciation or undervaluation) and an improvement of economic performances, stimulation of growth, and increase in exports. But, an excessive overvaluation tends to slow down growth and undervaluation tends to accelerate it. There does not seem to be a linear relationship between RER misalignment and economic growth.

With the integration of the majority of emerging economies in a process of international financial and commercial liberalization, recent literature pays considerable attention to the Equilibrium Real Exchange Rate (ERER) and RER misalignment. However, limited literature is available in the area of formalization of the relationship between RER variability and growth, particularly in the new context of financial integration.

The international financial liberalization that accompanied the collapse of the Bretton Woods system and the adoption of flexible exchange rate system (Eatwell, 1996) is characterized by the elimination of the capital movements control and the deregulation of domestic financial markets (Mussa and Goldstein, 1993). As a result, there is a reduction of barriers at the level of foreign direct investments (FDI) and of international trade (Obstfeld 1998 and Baldwin and Martin, 1999). Such economic policy in favor of financial liberalization entailed unexpected consequences relative to the political instabilities in some countries (Blecker, 2005). This new context engendered commercial imbalance, repeated financial crisis, and related business cycles on the international horizon, especially an external RER variability as well as persevering distance to the PPP (Reinhart and Smith, 2001 and Stiglitz, 2002, and Krugman and Obstfeld, 2003). But, the analysis of the effect of IFI on Equilibrium RER (ERER) remains inadequate, particularly for emerging economies.

Our objectives are to identify the determinants of the equilibrium RER in the South and South East Asian (SSEA) region, to estimate the RER misalignment by testing in particular the long-run effect of international financial

integration (IFI), and to determine the effect of RER variability on the level of economic growth. We use a simple model that determines the equilibrium RER, and a dynamic model of endogenous growth that traces the effect of the RER misalignment. We applied the techniques of non-stationary dynamic panel proposed, the tests of panel cointegration, and the method of least squared dynamics (DOLS) to estimate the relationship of cointegration. We use the technique of Generalized Moments Method (GMM) in the system as applied to panel data to estimate the equation of dynamic growth.

## 2. Review of Literature

### *2.1 Exhange Rate Behavior and Financial Integration*

In spite of the rarity of works examining the effect of IFI in the long-term RER, this issue does not turn out to be recent. Bruno (1976) shows that the effect of any liberalization depends on the interest rate prevailing before the liberalization, and the level of depreciation of the adjusted foreign exchange rate. When domestic interest rate exceeds the depreciation of foreign adjusted rate, further to an elimination of the control on capital movement, the RER begins to appreciate if there is an excess domestic demand, and a deficit of the current account. Consequently, there is an initial period of real appreciation, but a real depreciation in the long run. Obstfeld (1984) shows an initial period of real appreciation, and a real depreciation in the long-term due to the liberalization of capital. He also shows that with the demand transfer towards domestic production, a RER increase leads directly to an increase of the imports of intermediate products. The effect of the variation of relative prices is connected on the Marshall- Lerner condition that assumes a real depreciation of exchange rate with a positive effect on the current account, i.e. a RER depreciation (appreciation) is accompanied with a surplus (deficit) of the current account.

Hooper and Morton (1982) and Gavin (1992) present the relationship between Net Foreign Asset (NFA) and RER. Hooper and Morton (1982) develop a model in which exogenous shocks of trade create, in the long run, a positive correlation between NFA and RER. In a more complete theoretical model, Gavin (1992) shows that exogenous shocks of wealth entail a positive correlation between NFA and RER, if the condition of Marshall- Lerner is satisfied. The idea is that in equilibrium a country having a negative NFA must have a trade surplus to finance the payment of interest and dividends of these foreign assets. The mechanism used to produce this surplus is the RER depreciation. Any NFA shocks may affect the long-term RER.

Engel and Rogers (1999) formulate a dynamic model of general equilibrium indicating that after the financial liberalization in countries with weak capital trade deficits must be followed by trade surpluses. But the initial trade deficits and the RER appreciations have to come along with the RER depreciation and a trade surplus.

Lane and Milesi-Feretti (2001) develop a model of inter-temporal optimization where the prices of non-tradable goods are endogenous. They link RER and debt by controlling variables such as the terms of trade and productivity (Balassa-Samuelson effect). They conclude that creditor countries (developed) have appreciated RER while the debtor countries (developing) have depreciated RER. The result obtained by Lane and Milesi- Ferreti is confirmed by those of Ganelli et al. (2002) and Breton (2004).

Egert et al. (2004) and Benassy-Quéré et al (2004) show that in the long run, the NFA is reached its desired level. An improvement of NFA leads to RER appreciation because it implies an increase of the entries of incomes. Countries with a negative NFA stock (that seems to be the case of transition economies) register a current account deficit and a real appreciation. However, in the long run, the desirable NFA level can be realized. The payments of foreign debts stocks modify completely the link: more the foreign debt stock is raised; more the necessity of RER depreciation arises to maintain the debt by an improvement of the commercial account, and vice versa.

Obstfeld (1984) suggests that in the long term liberalization entails inevitably RER depreciation. However, in Chile, the real appreciation preceded the suppression of external financial limitations (Edwards 1989a). Hooper and Morton (1982). Faruquee (1995), Obstfeld and Rogoff (1995), and Gagnon (1993) confirm a positive relationship between NFA and RER.

Burgess and Mawson (2003) find a positive relationship between NFA situation and RER for three Baltic States: a decrease (increase) of NFA led to RER appreciation (depreciation). Alonso-Gamo et al., (2002) maintain the same conclusion for Lithuania, Czech Republic, Hungary and Poland. On the other hand, Hinnosar et al. (2003) indicate a negative sign for Estonia. It is the same for Rahn (2003) for the Czech Republic, Estonia, Hungary, Poland and Slovenia. In other words, a decrease (increase) of NFA position drives to RER depreciation (appreciation). Alberola (2003) also arrives at the same conclusion for Hungary and Poland and his conclusion is confirmed by Csajbok (2003) and Bitans and Tillers (2003).

Bénassy-Quéré et al. (2004) provide the long term effect of NFA on RER for the G-20 countries for 1980 - 2002. Using a panel cointegration technique, they find a fall of NFA in emerging economies engendering a real RER appreciation in the second half of the period. Égert, Lahrèche-Révil and Lommatzsch (2004) following the same technique show that an improvement of NFA position leads to a real appreciation in the small open economies of the OECD.

Lane and Milesi-Ferretti (2005) examine interactions between financial globalization and RER. In their estimations, they use assets and the external commitments of a sample of emerging economies and estimate the deterioration of the net foreign asset situation during periods of debt crisis. They provide evidence for stabilization of the NFA position for 1990-1996. They indicate a deterioration of the NFA situation caused by the decline of GDP and the RER depreciation characterizing the SSEA crisis. Countries accumulating substantial net assets include Indonesia, Korea, Malaysia, Thailand, and Russia.

*2.2 Real Exchange Rate Misalignments and Economic Growth*

With RER misalignment, the current exchange rate of a country deviates in the long run from its reference level or from desired equilibrium level. This phenomenon constitutes an important source of macroeconomic disequilibrium where correction is one of the important conditions to improve economic performance and to assure macroeconomic stability. In this context, Terra and Valladares (2003) underline that the persistence of this phenomenon generates macroeconomic imbalance that in turn requires costly external corrections. The main problem of the emerging economies that contributed to poor performance is not the RER volatility, but the overvaluation of their currencies and the adoption of inappropriate exchange policies (Amor and Sarkar (2008)).

The RER misalignment, with weak relative prices, results in a decline of the industry profitability (Ghura and Grennes (1993)). The RER disequilibrium often takes the form of an overvaluation of the domestic prices that may adversely affect international trade of goods and services. Consequently, the balance of payments and the external competitiveness of exports get affected. Dollar (1992) showed that the misalignment could entail lowering economic efficiency and cause capital flight. Inefficient resource allocation engendered by distorted domestic prices relative to international prices has an unfavorable effect on domestic investment. Misalignment can affect both domestic and foreign investment, and the process of capital accumulation. Giersch (1985) suggests that an emerging economy should profit by undervalued RER to assure its process of development.

According to Lahrèche-Révil and Guerin (2001), there is an evidence of the influence of competitive prices on growth as they promote exports and FDI. Shatz and Tarr (2000) suggest that there are canals by which a RER overestimation may adversely affect growth.

**3. The RER Determination**

Equilibrium Real Exchange Rate (ERER) is explained by its various determinants. The major determinants include public spending (Aguirre and Calderon, 2006); excess supply of domestic credit (Edwards, 1989a); trade opening effect (Baffes et al, 1999); Balassa-Samuelson effect (1964); terms of trade effect (Elbadawi and Soto, 1997), and effect of a change in foreign financial assets and capital flows (Lane and Milesi- Ferretti, 2006).

*3.1 Reduced ERER Equation and Sources of Data*

It is important to study the long-term relationship between RER and its determinants and to measure distances as possible RER distortions (Amor and Sarkar (2009)). The RER is defined as follows:

$$RER = \frac{P}{E.P^*}$$

where, P indicates domestic price index measured by the consumer price index, P* represents foreign price index measured by the consumer price index of the United States, E is represents nominal exchange rate defined as the number of domestic monetary units that exchange against a foreign monetary unit. So, our definition of RER implies that an increase (decrease) of RER means a real appreciation (depreciation).

By using logarithms Niperien, we rewrite the RER as follows:

$$rer = p - e - p^* = (p_e - e_e - p_e^*) + (1-\gamma)(p_{ne} - p_{ne}) - (1-\gamma)(p_{ne}^* - p_{ne}^*)$$

$$= x_t + y_t$$

where, γ indicates the part in total domestic dispenses of tradable goods.
Following the RER decomposition of Engel et al. (1999). we use $x_t = p_{et} - e_t - p_{et}^*$, the relative price of tradable goods and $y_t = (1-\gamma)(p_{nt} - p_{et}) - (1-\gamma)(p_{nt}^* - p_{et}^*)$, the relative price of non-tradable goods, $x_t$ as a stationary process, $y_t$ at the origin of a non-stationary behavior of RER. This last item can be due to some shocks such as technological shocks, demand, and terms of trade.

We developed the following logarithmic function for RER determination:

$$rer_{ij} = \beta_0 + \beta_1 tt + \beta_2\, dprod_{it} + \beta_3 ps_{it} + \beta_4 mon_{it} + \beta_5 open_{it} + + \beta_6 ifi_{it} + \varepsilon_{it},$$

$$i = 1, 2, 3..., N \quad et \quad t = 1, 2, 3..., T$$

where, rer indicates actual RER; te, the term of trade; *dprod*, the productivity differential; *ps*, the level of public spending in GDP; *mon*, the currency (money); trop, the trade opening; and ifi, a measure of International Financial Integration (IFI).

We also use the annual effective RER (EFRER) defined as the annual index of domestic prices (consumer price index) for a country (i) toward the annual index of the prices of main trading partners, multiplied by the nominal exchange rate of the country (i).(Note:1)

Our analysis is based on a panel of 10 countries of SSEA (Bangladesh, China, India, Indonesia, Korea Rep, Malaysia, Pakistan, Philippines, Sri Lanka, and Thailand). The period of study is 1979-2004. We adopted some estimates because of the problem of availability of some economic indicators. The first is related to public spending of non-tradable goods, as we cannot decompose it into tradable and non-tradable goods. We use the part of global dispenses in income, as a proxy. For the Balassa-Samuelson effect, we used the differential of growth rates in GDP. Another approximation concerns the trade policy that is determined by the part of the foreign trade in income. In our case, we use the part of total imports and exports in total domestic dispenses.

The variables of nominal exchange rate, IPC, GDP per capita, public consumption, the terms of trade, and trade openness are from WDI (2006). Data are also obtained from IMF CEDROM (2006), the Statistics of Balance of Payment (2005) and GDF (2006). The data on variables measuring international financial integration are from database of Lane and Milesi-Ferretti (2006).

## 4. Growth Model Specification and Methodology

We empirically estimate the impact of the RER variability on economic growth by adopting the panel dynamic approach and the estimation method of Generalized Moments Method (GMM). We refer to the empirical studies of Barro (1999) and Islam (1995).

### *4.1 Variables*

Our growth model in logarithmic form includes the following variables for which data are obtained from WDI (2006), except the ones indicated below. The dependent variable is the growth rate of real GDP/capita (constant $ of year 2000) as *ΔLnY*. Independent variables are classified in the following three groups:

Structural Policies

- Stock of human capital (*LnHK*) in mean number of schooling years of population from ages 15 to 64. Data interloped from observations over 10 years from Cohen and Soto's database (2007).
- Indicator of financial development *(LnFD)*: Domestic credit of private sector in % of GDP.
- Export *(LnX)*: Export in % of GDP.
- Indicator of capital inflows *(LnFDI)*: FDI net flows in % of GDP.
- Indicator of the government size *(LnPS)*: Public spending in % of GDP.

External Shock

- Indicator of external shock: Terms of trade *(LnTT)*.

Stabilization Policies

- Indicator of RER Volatility (VORER - standard deviation of RER variation)
- Indicator of RER Misalignment (*MISRER* - distance between observed RER and ERER).
- Indicator of International Financial Integration (IFI). According to Milesi-Feretti et al (2006), there are three indicators- the total of commitments and assets reported as GDP (IFI1), the sum of IDE, and portfolio investment stocks reported to GDP (IFI2) and the position of Net Foreign Asset (NFA) considered as an alternate indicator of IFI measured as the difference between the total of assets and commitments (in absolute values).

The growth equation is, therefore, as follows:

$$\Delta Lny_{i,t} = \alpha_i + \beta_0 \underset{(+)}{Lny_{i,t-1}} + \beta_1 \underset{(+)}{LnHK_{i,t}} + \beta_2 \underset{(+)}{LnX_{i,t}} + \beta_3 \underset{(+)}{LnFDI_{i,t}} + \beta_4 \underset{(-)}{LFD_{i,t}n} + \beta_5 LnPS_{i,t} + \beta_6 LnTT_{i,t} + \beta_7 \underset{(+/-)}{LnIFI_{i,t}} + \beta_8 \underset{(-/+)}{VOLRER_{i,t}} + \beta_9 \underset{(-)}{MISRER_{i,t}} + \varepsilon_{i,t} \underset{(-/+)}{} \quad \textbf{(1)}$$

where,

$\alpha_i$ = the fixed or specific effect of the country that allows to get the effect of no observed factors determining growth , $\beta$ = *the parameters*, $\varepsilon_{i,t}$ = the term of error, and, *i and t* = the indications of the country and time, respectively.

Models of growth theory imply that a rise of physical or human capital (Levine and Renelt, 1992) and of the openness of an economy (Berg and Krueger, 2003) entail an increase in economic growth. The financial deepening of an

economy or the level of development of the financial sector has also positive effects on growth. The term of trade being an important trade determinant contributes to the level of economic growth. The RER volatility plays against growth (Edwards, 1989 and Dollar, 1992) while, for misalignment, the sign is mitigated. Indeed, an overvalued RER hinders growth. On the other hand, an undervalued RER increases growth rate. Finally, the exchange system and the IFI are also important factors of economic growth.

*4.2 Estimation Technique*

We use the Generalized Moments Method (GMM), as indicated earlier. According to Arellano and Bond (1991). this method allows resolving problems of simultaneity bias, causality inverse, and omitted variables (Kpodar, K., 2007). This procedure presents several advantages relative to other methods of panel dynamic models. It allows elimination of bias generated by omission of some explanatory variables. Furthermore, the use of an instrumental variable allows better estimation of the parameters because explanatory variables such as trade opening ratios or investment rates are conceptually endogenous. It allows significant results even in the case of measurement errors (Note: 2).

**5. Interpretation of Empirical Results**

We test the integration order of our series. As indicated in Table 1, the tests of panel unite root according to Im, Pesaran, and Shin (2003) confirm that our series are integrated of order one.

Panel cointegration tests of Pedroni (2004) provide evidence for the existence of cointegration relationship that enters ERER and its major variables for the 10 selected countries of South and South East Asia. All statistics with the exception of panel statistic $\upsilon$ reject the null hypothesis of absence of cointegration between RER and its fundamental variables for our sample. Table 2 shows the results.

Compared with the critical value of 1.6445 at the level of 5 %, the majority of the statistics confirm the existence of a long-term relationship for these countries. This relationship can be estimated by the Dynamic Ordinary Least Squares (DOLS) method (Note: 3).

*5.1 Estimation of long run relationship and interpretation of results*

The technique developed by Pedroni allows testing the existence of a cointegration relationship between RER and its fundamental variables, but it does not allow estimating the vectorial model of correction errors. If these tests indicate that variables are cointegrated, it will be possible to use several methods to estimate parameters such as Pooled Mean Group estimator developed by Pesaran et al (1999), and the Fully Modified Estimator developed by Pedroni. In our evaluation, we refer to the DOLS developed by Kao and Chiang (2000) (Note: 4).

According to DOLS, our formulated model (Amor and Sarkar (2009)) is as follows:

$$erer_{it} = \alpha_i + \varphi_t + \beta_1\, tt_{it} + \beta_2\, dprod_{it} + \beta_3\, ps_{it} + \beta_4\, mon_{it} + \beta_5\, open_{it} + \beta_6\, ifi_{it} + \sum_{k=-q}^{k=q} \upsilon_{1k} \Delta tt_{it+k} +$$

$$\sum_{k=-q}^{k=q} \upsilon_{2k} \Delta dprod_{it+k} + \sum_{k=-q}^{k=q} \upsilon_{3k} \Delta ps_{it+k} + \sum_{k=-q}^{k=q} \upsilon_{4k} \Delta mon_{it+k} + \sum_{k=-q}^{k=q} \upsilon_{5k} \Delta open_{it+k} + \sum_{k=-q}^{k=q} \upsilon_{6k} ifi_{it+k} + \varepsilon_{it}$$

The number of lags and leads is chosen according to the Schwarz criterion. The long-term coefficients of the cointegration equation are important for our purpose. Table 3 provides the DOLS estimation results.

The cointegration coefficients relative to the measures of international financial integration (IFI) confirm our predictions (Hooper and Morton, 1982; Obstfeld, 1984; Gavin, 1992). We provide evidence of a long-term effect of RER depreciation of IFI for the region of SSEA. It is the net foreign asset (NFA), which we can retain as IFI's measure.

According to Table 3, a rise of 1 % of nfa indicator leads to the RER depreciation of 0.18 %, compared to 0.14% without Bangladesh and Pakistan in the sample (Amor and Sarkar (2009)). This effect of long-term RER depreciation is explained by the fact that further to positive shock carrying on financial integration parameter. An overvaluation of the RER seems to be necessary to cover the current account deficit of the short term and the Marshall-Lerner condition comes true in the case of SSEA countries. On the other hand, the middle term is characterized by the adjustment of NFA at their desired level. The region seems to have a negative NFA stock; it shows a deficit of the current account and an appreciation of the RER. In the long run, the desirable level of NFA justifies the increase of foreign debt stock that increases the RER depreciation to assure this debt service by the improvement of the current account.

Our results confirm that an improvement of the terms of trade entails an RER appreciation in this region, which implies that the wealth effect dominates the substitution effect in emerging countries. Indeed, an improvement of 1 % of terms of trade entails an appreciation of 1.12 %, compared to 1.04% without Bangladesh and Pakistan (Amor and Sarkar (2009)). The productivity differential does not contribute to long term RER variations in the region. This can be

explained by the poor approximation of the Balassa-Samuelson effect. Moreover, the sign of the coefficient of *dprod* is not expected. The effect of public spending on RER is positive and it is statistically significant (at 1 %). Indeed, a positive shock on public spending engenders a long-term RER appreciation that confirms our expectation that a rise of global demand of non-tradable goods leads to an increase in prices. The effect of the monetary variable on long-term RER depends on applied policies in this group of countries. A positive shock of the currency supply entails currency depreciation. This result can be explained by the adoption of a policy of expansionist domestic credit that is susceptible to undervaluation of the RER in the region. Negative coefficient corresponding to the variable of trade opening indicates that commercial liberalization is accompanied with depreciation of the RER.

*5.2 Determination and evolution of misalignment*

The misalignment is calculated as follows:

$$MIS = RER - RER^{p} = RER - X^{P}\beta$$

where, $X^{P}$ is the permanent composition that represents the trend of RER fundamental variables. If the distance is positive (negative), we observed over (under) valuation of local currency. Figure 1 presents the evolution of RER distortion in the 10 selected countries of the region. We observe an alternation between the episodes of overvaluation and undervaluation during the period of study. The determination of RER misalignment by our model confirms this evolution for the panel countries. There are persevering and recurring episodes of misalignments. These episodes take the form of undervaluation for the majority of the countries (China, Indonesia, Korea, Malaysia, Philippines and Thailand) and late 1990s experienced overvaluations. Such result is a consequence of the SSEA crisis in 1997-1998. Indeed, countries of the region are marked during the 1990s, especially from 1994 by the massive entry of capital flows that contributed to inflationary condition. This situation engendered an effective RER appreciation of more than 25 % over the period for 1990-96 and a very grave deficit of current account payments balance. Consequently, there is a loss of competitiveness of most of the region, notably Thailand, where its currencies are more or less attached to dollar. Such a situation is attributed to a fall of yen in 1997 and an immediate depreciation of the bath that exceeded 50 % relative to the dollar.

*5.3 RER Misalignments and Economic Growth: Empirical Analysis of Data from 10 SSEA countries*

Table 4 shows the results of regression analysis that we carried out for the 10 countries. Our tests of Sargan/Hansen verify the validity of lagged variables as instruments. Furthermore, the autocorrelation tests of Arellano and Bover (1995) do not reject the absence of second-class autocorrelation.

We estimate three growth equations. The first one includes all the explanatory variables of economic growth. The second equation improves the first one deleting the variables, which are statistically not significant such as financial development and public spending. In the last equation, we try to test nonlinear effect of RER misalignment and to estimate if RER overvaluation and undervaluation have a different impact on economic growth of SSEA countries. In other words, we test the following hypothesis: RER overvaluation damages the economic growth while undervaluation can improve it. For this, we have created a variable $D_t$ that takes value of 1, if RER is overvalued, and 0 if not. The two variables of overvaluation and undervaluation are defined, respectively, as:

$$MIS_{+} = (RER - ERER)\, D_t \quad \text{and} \quad MIS_{-} = (RER - ERE)\,(1 - D_t)$$

We modified the basic regression model by enclosing the variables of undervaluation and overvaluation instead of the RER misalignment. Noting that $MIS_{+}$ ($MIS_{-}$) take positive values (negatives) if RER is overvalued (undervalued), and 0 if not.

The level of economic growth of the SSEA countries is explained essentially by their export strategy, the terms of trade, and by their trade policy. In particular, the effects of exports and terms of trade seem to be significant in the three estimated equations at 1 % and 5 % respectively. Several countries of such as South Korea, China, and Malaysia adopted development primarily following export promotion strategies based on commercial opening than depending on FDI. Their price stabilization policy was also helpful.

Figure 2 shows the evolution of the growth rates of GDP/capita in the region. In South Asia, although the growth rate of Bangladesh remained at a lower level than that of India and Pakistan, its rate grew steadily over the years. However, Sri Lanka's rate remained more or less the same. Compared to Bangladesh, India, Pakistan, and Sri Lanka are significantly diverse in terms of ethnicity, language, and religion. These countries often struggle with separatist movement and violence. Their GDP growth rates fluctuated more than those of Bangladesh. On the other hand, except Philippines, the growth rate fluctuation of South East Asia showed similar pattern.

Our results also show that the short-term fluctuation of RER plays against economic growth. The effect, in the three equations (Table 4) is statistically significant at 1%. This indicates the importance of the RER volatility (Amor and Sarkar, 2008) as well as the role of the monetary stability to explain economic growth of the region. Indeed, the currencies of most of our selected countries remained relatively stable relative to the dollar over a long period.

Although we observe a negative effect of key variables on economic growth, the effect is not significant for RER misalignment (equations 1 and 2, Table 4). These results do not confirm most empirical studies (Hausman et al (2004)). So how do we verify the non-linear effect of RER distortion on economic growth in this region?

According to our study, undervaluation positively affects the economic growth rate. The effect is statistically significant at 1% and conforms to the result found by Dooley et al. (2003) and Aguirre and Calderon (2006). This result translates the orientation of the sample countries towards undervaluation of their currency in order to encourage the export oriented trade strategies and to increase their growth. On the contrary, the effect of overvaluation is negative and statistically significant at 10% level. This is explained by the alternation between undervaluation and overvaluation. (Chinn, 2005 and Aguirre and Calderon, 2006). There is a non-linear relationship between RER misalignment and economic growth.

We also show the negative effect of the new financial situation on economic growth in the region. Although the IFI variable has a weak coefficient, its effect remains unfavorable to economic growth. This seems to be due to the choice of the fixed exchange rate adopted by several countries. Such a choice, however, is incompatible with the new financial context characterized by a greater international financial integration (Amor and Sarkar, 2008). The human capital, although its effect is statistically significant, it is unexpected in theory. This result can explain by the relatively weak level of education in the region or by the choice of the explanatory variables.

Finally, the effect of financial development on economic growth remains relatively weak but not significant in the first model. This can be the result of a weak and insufficient development of financial system in order to realize desired economic growth in the region.

**6. Conclusion and Recommendation**

The long-term RER factors include the terms of trade, the public spending, the monetary policy, and the trade openness. The IFI constitutes a determining factor of long-term RER and that an increase of this leads to a long-term RER depreciation in this region. This confirms predictions of Hooper and Morton (1982). Obstfeld (1984). and Gavin (1992). We confirm the effect of long-term depreciation of the IFI on RER in the SSEA region.

Our analysis shows the evolution of the RER misalignment in the 10 countries of SSEA for 1979-2004. This evolution is persevering and recurring: it is about an alternation between periods of RER overvaluation and periods of undervaluation. These episodes were common in the majority of the countries in the region (Indonesia, Korea, Malaysia, Philippines and Thailand) and are explained by the consequence of the SSEA crisis in 1997-1998.

Our results also allowed us to emphasize the dimension and the nature of relationship between RER variability and economic growth. We confirm that the RER fluctuation in the short-term plays against economic growth and this effect is statistically significant at level of 1%. This result indicates the importance of the RER volatility in the region. For our key variables, we justify the non-linear effect and non-uniform relationship between RER disequilibrium and economic growth. Our result confirms theoretical predictions because the undervaluation effect on economic growth is positive and statistically significant (at the level of 1%), and confirms the result found by Dooley et al (2003), Aguirre and Calderon (2006), and Amor and Sarkar (2009). On the contrary, the effect of overvaluation is negative.

Although the IFI variable is attributed to weak coefficient, its effect remains unfavorable to the economic growth of the region. Such result can be explained by the choice of the adoption of fixed exchange rate in several countries of the region. Our result confirms the incompatibility between exchange rate policies and strategy of international financial integration for economic growth.

The question of the effect of RER variability on economic performance becomes even more central to the pursuit of any economic policy for growth. Our recommendation for the region is to reduce the adverse effect of the RER variability on growth by lowering the dimension of overvaluation with adopting more and more flexible exchange regime and by following a sequential strategy of financial integration that is compatible to its exchange rate systems.

**References**

Aguirre, A. and Calderón, C. (2006). "Real Exchange Rate Misalignments and Economic Performance," Working Papers Central Bank of Chile 316, Central Bank of Chile.

Alberola, E. (2003). “Real Convergence, External Disequilibria and Equilibrium Exchange Rates In EU Acceding Countries”. *Banco De España*. mimeo.

Alonso-Gamo, P., Fabrizio S., Kramarenko, V. and Wang, Q. (2002). "Lithuania: History and Future of the Currency Board Arrangement:," IMF Working Papers 02/127.

Amor, T. H. and Sarkar, A. U. (2008). “Financial Integration and Real Exchange Rate Volatility: Evidences from South and South East Asia", *International Journal of Business and Management*, vol.3, No.1, January, 2008.

Amor, T. H. and Sarkar, A. U. (2009) "Exchange Rate Misalignment in Asian Emerging Economies", *Indian Journal of Economics and Business 8(1), 17-41.*

Arellano M. and Bond, S., (1991). "Some Tests of Specification for Panel Data: Monte Carlo Evidence and an Application to Employment Equations," *Review of Economic Studies 58*, 277-297.

Arellano M. and Bover, O., (1995). "Another Look at the Instrumental-Variable Estimation of Error-Components Models," *Journal of Econometrics 68*, 29-51.

Baffes,J, Elbadawi, I. A, and O'Connell, S. A. (1999). "Single Equation Estimation of the Equilibrium Real Exchange Rate", in L. Hinkle & P. Montiel (eds). Exchange rate misalignment: concepts and measurements for developing countries, World Bank, Washington D.C

Balassa B. (1964). "The Purchasing Power Parity Doctrine: A Reappraisal", *Journal of Political Economy*, 72(6). December, pp, 548-96.

Baldwin R. and Martin, P. (1999). Two Waves of Globalization, Superficial similarities, fundamental Differences, *NBER* Working Paper, n° 6904, January.

Barro (1999). "Notes on Growth Accounting", *Journal of Economic Growth*, vol 4, no 2.

Bénassy Quéré.A, Duran Vigneron. P, Lahrèche Revil. A and Mignon. V., (2004). "Burden Sharing and Exchange Rate Misalignment within the Group of Twenty", *CEPII,* No 2004-13 September, pp 6-11.

Berg, A. and Krueger, A. (2003). "Trade, Growth And Poverty: A selective survey" , IMF Working Paper No. 03/ 30.

Bitans, M. and I. Tillers. (2003). "Estimates of Equilibrium Exchange Rate In Latvia. Latvijas Banka". Analysis Of the Real Exchange Rate In Latvia: 1994– 2001. *Bank Of Latvia*. mimeo.

Blecker, R.A. (2005). " Financial Globalization, Exchange Rates, and International Trade", From *Financialization and the World Economy*, edited by Gerald Epstein of the Political Economy Research Institute. Forthcoming from Edward Elgar, Spring 200, pp 1-10.

Breton C. (2004). ″Public Debt and Deal Exchange Rate in a Small Open Economy: A Model with Two Sectors in a Framework of New Open Economy", CEDERS.

Bruno, M. (1976). "The Two-Sector Model and the Real Exchange Rate." *American. Economic Review* 66, no. 4: 566-77.

Burgess, S. and Mawson, D. (2003). "Aggregate Growth and the Efficiency of Labour Reallocation," CEP Discussion Papers dp0580, Centre for Economic Performance, LSE.

Chinn, M. (2005). "Supply Capacity, Vertical Specialization and Tariff Rates: The Implications for Aggregate U.S. Trade Flow Equations," NBER Working Papers 11719, National Bureau of Economic Research, Inc.

Cohen, D. and Soto, M. (2007). "Growth and Human Capital: Good Data, Good Results," *Journal of Economic Growth, Springer*, vol. 12(1). pages 51-76, March.

Csajbok, A. (2003). "The Equilibrium Real Exchange Rate In Hungary: Results From Alternative Approaches". Paper Presented at the *2nd Workshop On Macroeconomic Policy Research,* National Bank Of Hungary, October 2– 3.

Dollar, D, (1992). "Outward-Oriented Developing Economies Really Do Grow More Rapidly: Evidence from 95 LDCs", 1976-1985. *Economic Development and Cultural Change 40(3).* 523-544.

Dooley, M., Folkerts-Landau, D. and Garber, P. (2003) "An Essay on the Revived Bretton Woods System," NBER Working Papers 9971, National Bureau of Economic Research, Inc.

Eatwell, J. (1996). "International Capital Liberalization: The Record." CEPA/New School for Social Research, Working Paper no. 1.

Edwards, S. (1989a). "Real Exchange Rate in the Developing Countries: Concepts and Measurement", NBER, WP, No 2950.

Égert, B. Lahrèche- Révil, A. and Lommatzsch, K. (2004). "The Stock- Flow Approach To the Real Exchange Rate Of CEE Transition Economies", No – 15 November *CEPII,* Working Paper No 2004 - 15 Pp 4-28.

Elbadawi, I. and Soto, R. (1997). " Real Exchange Rates and Macroeconomic Adjustment in Sub-Sahara Africa and other Developing Countries," *Journal of African Economics*, Vol. 6, N°3.

Engel, C. and Rogers, J. H. (1999). "Deviations from Purchasing Power Parity: Causes and Welfare Costs," Working Papers 0038, University of Washington, Department of Economics.

Faruqee, H. (1995). "Long- Run Determinants of the Real Exchange Rate: A Stock- Flow Perspective", *IMF Staff Papers*. 42 (1). 80- 107. Hinnosar, M., R. Juks,

Gagnon J. (1993). "Exchange Rate Variability and the Level Of International Trade", *Journal Of International Economics*, No 34, pp. 269- 287.

Ganelli, Giovanni and Lane, P. R. (2002). "Dynamic General Equilibrium Analysis: The Open Economy Dimension," CEPR Discussion Papers 3540, C.E.P.R. Discussion Papers.

Gavin, M. (1992). "Monetary Policy, Exchange Rates and Investment in Keynesian Economy," *Journal of International Money and Finance*, vol. 11, pp 145-161.

Ghura, D. and Grennes, T.J. (1993). "The Real Exchange Rate and Macroeconomic Performance in Sub-Saharan Africa", *Journal of Development Economics 42(1).* 155-174.

Giersch. H. (1985). "Real Exchange Rates and Economic development," in: Greenaway D. et Shaw G. K, Public choice, public finance and public policy, essays in honour of Alan Peacock Oxford: Basil Blackwell, pp. 176- 92.

Hausmann, R., Pritchett, L. and Rodrik, D. (2004). "Growth Accelerations". NBER Working Paper 10566.

Hinnosar, M., R. Juks, H. Kaadu and L. Uusküla. (2003). Estimating the Equilibrium Exchange Rate of the Estonian Kroon, Bank of Estonia. mimeo.

Hooper, P., and J. Morton. (1982). "Fluctuations in the Dollar: A Model of Nominal and Real Exchange Rate Determination," *Journal Of International Money And Finance* 1, 39- 56.

Im, K. S., H. Pesaran, Y. Shin, and R. J. Smith. (2003). "Testing For Unit Root In Heterogeneous Panels" *Journal Of Econometrics,* Vol. 115, pp. 53– 74.

Islam, N. (1995). "Growth Empirics: A Panel Data Approach," *Quarterly Journal of Economics*, 110 (4). pp 1127-1170.

Kao, C., and M. H. Chiang. (2000). "On the Estimation and Inference of a Cointegrated Regression in Panel Data," *Advances In Econometrics,* Vol. 15, pp. 179– 222.

Kpodar, K. (2007). "Manuel d'initiation à Stata ,", CERDI, CNRS. Janvier 2005, pp 5-77.

Krugman, Paul R. and Maurice Obstfeld. (2003). "Économic Internationale ,", 4e édition, De Boek éditeurs, 2003. ISBN : 2-8041-4359-7

Lahrèche-Révil, A. and Guérin J.-L. (2001). "Volatilité des Changes et Investissement", *Economie Internationale* 88 (2001). p. 5-22.

Lane. Philip R and Milesi-Ferretti G.M. (2001): "The External Wealth of Nations: Measures of Foreign Assets and Liabilities for Industrial and Developing Countries," *Journal of International Economics 55*, 263-294

Lane. Philip R and Milesi-Ferretti G.M. (2005). "Financial Globalization and Exchange Rates", International Monetary Fund, WP/05/3, January 2005, pp4-25

Lane. Philip R and Milesi-Ferretti G.M. (2006): "The External Wealth of Nations Mark II: Revised and Extended Estimates of Foreign Assets and Liabilities, 1970-2004", IMF 06/69.

Levine, R. and Renelt, D. (1992). "A Sensitivity Analysis of Cross-Country Growth Regression", *American Economic Review*, 82(4). September, pp. 942-63.

Mussa M. and Goldstein, M. (1993). "The Integration of World Capital Markets," Proceedings, Federal Reserve Bank of Kansas City, pages 245-330.

Obstfeld, M. (1984). "Balance-of-Payments Crises and Devaluation," *Journal of Money, Credit and Banking, Blackwell Publishing*, vol. 16(2). pages 208-17, May.

Obstfeld, M. (1998). "The Global Capital Market: Benefactor or Menace?" *Journal of Economic Perspectives*, Vol. 12 (Fall). pp. 9–30.

Obstfeld, M. and Rogoff, K.S. (1995). "Exchange Rate Dynamics Redux", *Journal of Political Economy, 103(3).* 624-660.

Pedroni, P. (2004). "Panel Cointegration. Asymptotic and Finite Sample Properties of Pooled Time Series Tests with an Application to the PPP Hypothesis", *Econometric Theory*, Cambridge University Press, vol. 20(03). pages 597-625, June.

Pesaran, H., Y. Shin, and R. Smith. (1999). "Pooled Mean Group Estimation Of Dynamic Heterogeneous Panels," *Journal Of the American Statistical Association,* Vol. 94, pp. 621– 34.

Rahn Jörg. (2003). "Bilateral Equilibrium Exchange Rates of the EU Accession Countries against the Euro," Quantitative Macroeconomics Working Papers 20306, Hamburg University, Department of Economics.

Reinhart Carmen M. and Todd Smith, R. (2001). "Temporary Controls on Capital Inflows," NBER Working Papers 8422, National Bureau of Economic Research, Inc.

Shatz, H J. and Tarr, D. G. (2000). “Exchange rate Overvaluation and Trade Protection: Lessons from Experience”, The World Bank in Policy Research Working Paper Series with number 2289.

Stiglitz, J. E. (2002). “Globalization and Its Discontents”, New York: Norton.

Terra, M. C. and Valladares, F. E. (2003). "Real Exchange Rate Misalignments”, Economics Working Papers, 493, Graduate School of Economics, G ulio Vargas Foundation (Brazil).

**Notes**

Note 1. For more details, see Amor T. H. and Sarkar, A. U. (2009)

Note 2. For more details, see Amor ,T. H. and Sarkar, A. U. (2008)

Note 3. All our results of panel cointegration tests and of DOLS are obtained by the software Rats 6.1. For the tests of panel unit root, we used the Views 5.1. These tests suppose an average relationship for the panel of our sample with unit coefficient of cointegration.

Note 4. Kao, C & Chiang, M.H. (2000).

Note 5.We compare static values with the critical one of 1.6445.

Table 1. Panel Unite Root Test of IPS

| **Real Exchange Rate** | | | |
|---|---|---|---|
| Level | | First Difference | |
| Constant | Constant with trend | constant | Constant with trend |
| 0.03 | -2.12 | -17.62 | -8.13 |
| **Term of Trade** | | | |
| Level | | First Difference | |
| Constant | Constant with trend | constant | Constant with trend |
| -4.12 | -1.57 | -13.12 | -6.82 |
| **Productivity Differential** | | | |
| Level | | First Difference | |
| Constant | Constant with trend | constant | Constant with trend |
| -3.52 | -2.91 | -8.12 | -14.18 |
| **Public Spending** | | | |
| Level | | First Difference | |
| Constant | Constant with trend | constant | Constant with trend |
| -1.07 | -2.84 | -5.37 | -4.62 |
| **Money** | | | |
| Level | | First Difference | |
| Constant | Constant with trend | constant | Constant with trend |
| -0.85 | -1.98 | -4.28 | -4.61 |
| **Trade Openness** | | | |
| Level | | First Difference | |
| Constant | Constant with trend | constant | Constant with trend |
| 2.32 | -1.02 | -7.34 | -4.12 |
| **Financial Integration** | | | |
| Level | | First Difference | |
| Constant | Constant with trend | constant | Constant with trend |
| -0.17 | -1.07 | -5.14 | -7.93 |
| **Net Foreign Assets Position** | | | |
| Level | | First Difference | |
| Constant | Constant with trend | constant | Constant with trend |
| -2.13 | 0.62 | -5.38 | -4.52 |

Table 2. Cointegration Test Results for 10 Asian Countries following Pedroni (2000)

| | |
|---|---|
| Panel statistic υ | -1.128 |
| Panel statistic ρ | 1.942 |
| Panel statistic t (no parameter) | -2.761 |
| Panel statistic t (parameter) | -1.694 |
| Panel group ρ | 1.842 |
| Panel group t (no parameter) | -2.813 |
| Panel group t (parameter) | -1.975 |

Table 3. Cointegration Vector of 10 Asian Countries following DOLS Method

| (lags, leads) | (1, 3) |
|---|---|
| *tt* | 1.12*** |
| | (0.01) |
| *dprod* | -0.37 |
| | (0.16) |
| *ps* | 0.46*** |
| | (0.02) |
| *mon* | -0.12** |
| | (0.05) |
| *open* | -0.16** |
| | (0.06) |
| *nfa* | -0.18* |
| | (0.10) |
| $R^2$ | 0.78 |
| No. of Obs. | 254 |

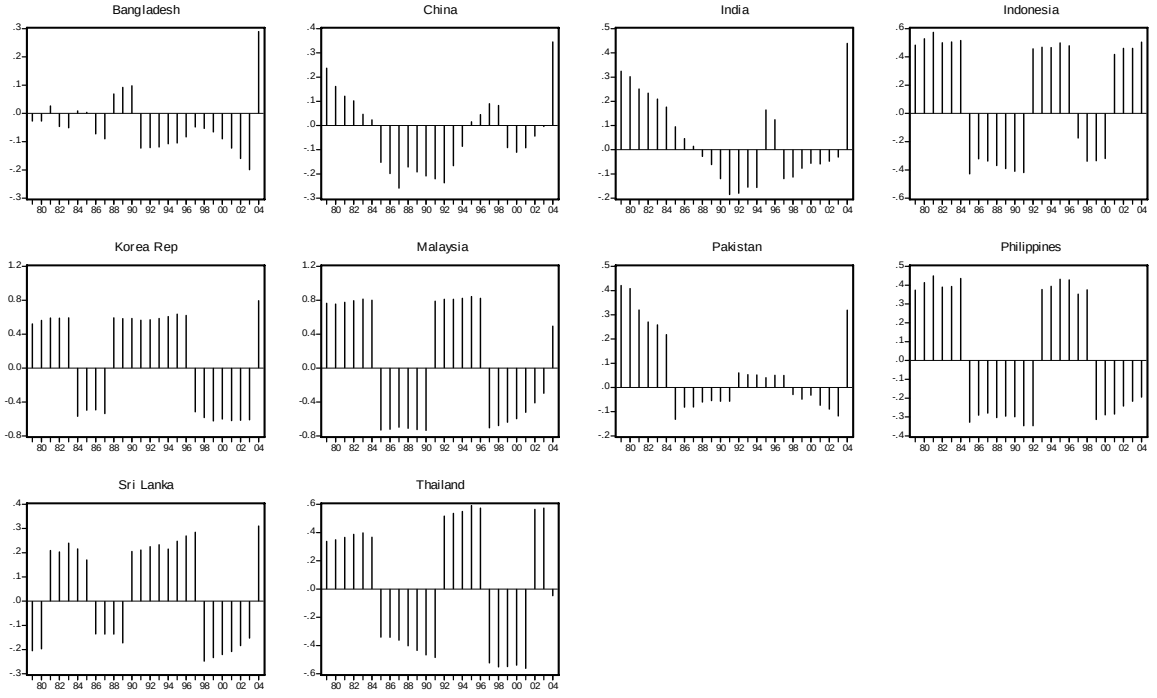
*The numbers between parentheses indicate the p-value*

Table 4. Basic Regression Model: RER disequilibrium and Economic Growth of 10 Asian Countries Dependant Variable: Growth rate of real GDP per capita.

Estimation Method: GMM in system (Arellano and Bover, 1995)

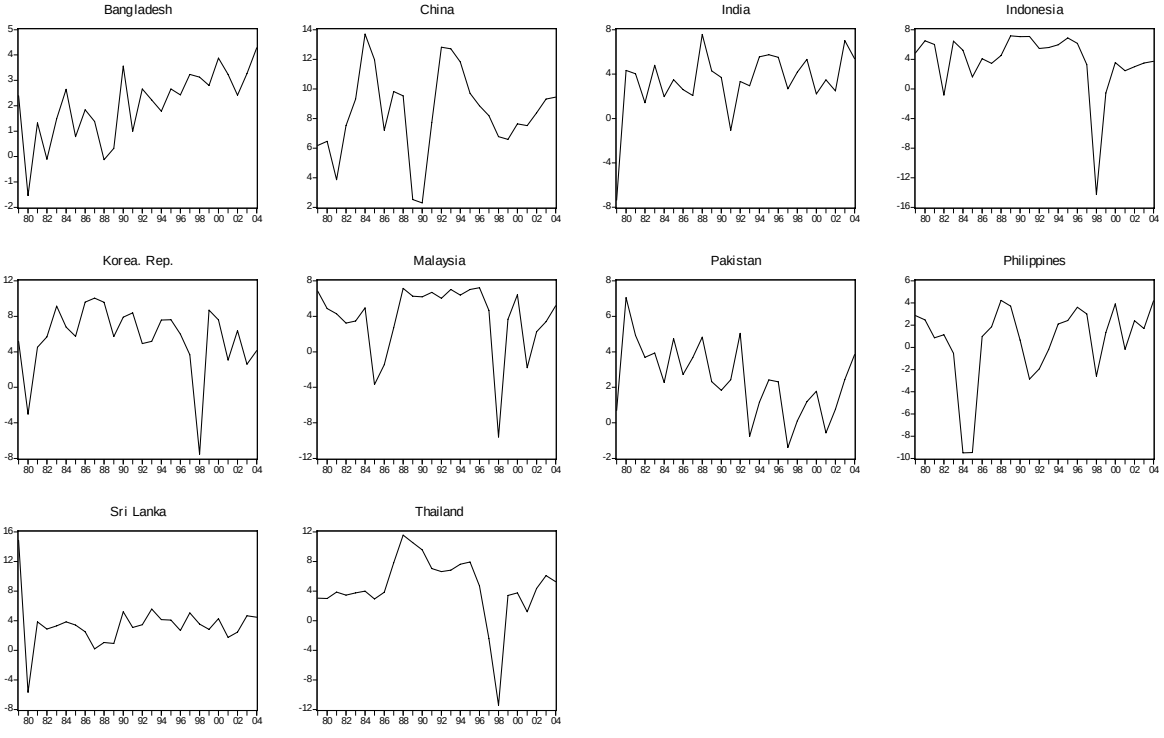
| **Variables** | **[1]** | **[2]** | **[3]** |
|---|---|---|---|
| $\Delta Lny_{i,\,t-1}$ | 0.172* | 0.124* | 0.104* |
| | (0.10) | (0.08) | (0.10) |
| Human Capital | -23.592*** | -17.395*** | -20.553*** |
| | (0.00) | (0.01) | (0.02) |
| Export | 9.254*** | 10.147*** | 9.363*** |
| | (0.02) | (0.02) | (0.01) |
| Foreign Direct Investment | 0.351* | 0.417 | |
| | (0.10) | (0.42) | |
| Financial Development | -1.628 | | -2.517* |
| | (0.32) | | (0.08) |
| Spending Dispense | -4.614 | | |
| | (0.34) | | |
| Terms of Trade | 0.184** | 0.156** | 0.219** |
| | (0.05) | (0.04) | (0.05) |
| Financial Integration | -0.087*** | -0.064*** | -0.112*** |
| | (0.02) | (0.00) | (0.01) |
| RER Volatility | -0.371*** | -0.328*** | -0.173*** |
| | (0.01) | (0.01) | (0.00) |
| RER Misalignment | -0.539 | -0.548 | |
| | (0.62) | (0.47) | |
| Undervaluation | | | 9.037*** |
| | | | (0.01) |
| Overvaluation | | | -3.824* |
| | | | (0.09) |
| Number of country | 10 | 10 | 10 |
| Number of Obs. | 30 | 30 | 30 |
| Tests Specification (p- values) | | | |
| - Sargan Test | 0.39 | 0.34 | 0.29 |
| - Correlation 2nd. | 0.76 | 0.66 | 0.58 |

Fig. 1: Evolution of RER Misalignment in SSE Asia (1979-2004)




Sources: WDI (2006). FMI (2006) and calculation of authors

Fig. 2: Evolution of Growth Rate of GDP/capita in SSE Asia (1979-2004)




Sources: WDI (2006) and calculation of authors