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政治景氣循環，央行改革與匯率不確定性—混合資料模型 分析 研究成果報告(精簡版)

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中文摘要

本計畫檢驗實質匯率不穩定性與政治景氣之間的關連性。研究中比較之國家包含七個東亞國家(台灣、新加坡、韓國、泰國、馬來西亞、印度、香港),樣本採用之時間為1980-2004年之月資料。本計畫內容與既有相關文獻有三方面之差異:(一)一般文獻使用名目匯率,而本計畫使用之實質匯率較為貼切形容經濟決策與結果;(二)導引可容許殘差條件變異與橫斷相關之統計模型,以檢定選舉所造成之匯率不穩定效果;(三)計畫檢驗央行改革於選舉及實質匯率貶值之間的角色。根據此,我們可以提供央行自主下之實際經濟效果,與其是否可緩衝匯率不穩定之證據。計畫中模型同時檢定選舉和改革效果對實質匯率之均值與條件變異之影響,是一新的嘗試。另外,不同於過去文獻運用非時變性(non-time varying)之央行改革指標,並與匯率線性相關之假設,而使用央革之變動時段(timing of changes)來檢測央改效果,是另一新的嘗試。本計畫驗證匯率升值與其未來預測性具顯著正相關之假設。

關鍵詞：政治景氣循環，實質匯率，不確定性，Panel GARCH

計畫英文摘要

In this project we investigate the interaction between real exchange rate depreciations and elections in a sample of seven Asian countries. Our work extends the existing research on the subject in three ways: (1) we emphasize the real, instead of the nominal, exchange rate, which is the more relevant economic variable; (2) we use a statistical model which both allows for conditional heteroscedasticity and cross-sectional correlation in the errors and allows us to test for electoral effects on exchange rate uncertainty; and (3) we investigate the role of central bank reform on the relationship between elections and real exchange rate depreciation and the evolution of the real exchange rate in general. We provide new evidence on the proposition that legal central bank independence can have real economic effects and suggest a policy recommendation that central bank reform accompany democratic reforms in order to mitigate any tendency for elections to create exchange rate instability. These results are novel in that they test for electoral and reform effects both on the mean and conditional variance of the real exchange rate. They are also novel in that they test for effects of central bank reform using the timing of changes in central bank reform within each country rather than using a non-time varying index and assuming it to be linearly related to the exchange rate.

We also demonstrate there exists a strong positive and significant link between appreciation of the real exchange rate and its future predictability. Thus, as the real exchange rate appreciates there is increased uncertainty over the future value of the real exchange rate.

Keywords: Political Business Cycle, Real Exchange Rate, Uncertainty, Panel GARCH

(一) 研究計畫之背景及目的

Central bank reform has been widely prescribed for developing countries, but the efficacy of central bank independence is still controversial. Most of the empirical work on the economic effects of central bank independence focus on the industrialized countries and the results of these studies often are not powerful enough to apply to other regions (for example, when developing countries are considered). One of the reasons for the mixed empirical findings may be due to the difficulty, especially in developing countries, where the use of legal status to determine central bank independence may be inappropriate insofar as real world practices diverge significantly from the real rule. Most of the bank independence literature uses a quantitative index or a measure of leadership turnover to measure independence, which forces the index number to be linearly related to the economic variable under study (see, for example Grier, 2004)). Furthermore, the measure is an average of several different cardinal rankings, which raises the question of which rankings should be included to best measure independence (see, for example, Temple, 1998; Cukierman et.al. 1992).

We take a different approach in this project. Instead of trying to find the right combination of rankings to best measure independence, we use a simple before and after approach to investigate whether the timing of central bank reforms affects the strength of electorally timed real exchange rate depreciations, as well as testing for their direct effects.

Our sample is composed of seven East Asia countries (Hong Kong, Indonesia, Malaysia, Singapore, South Korea, Taiwan, and Thailand) that adopted central bank reform during the 1980-2004 period. Our baseline model for the evolution of the real exchange rate is based on the work of Goldfajn & Valdes (1999) and Grier (2004). We extend their work by embedding it in a statistical model which allows for both conditional heteroscedasticity and cross sectional correlation in the error process. This allows us to both more efficiently estimate the coefficients in the conditional mean equation as well as to directly test hypotheses about how events affect the predictability of the real exchange rate. Specifically, we test whether the timing of central bank reforms affects the strength of electorally timed exchange rate depreciations, as well as for any direct effects of central bank reform on the real exchange rate or real exchange rate uncertainty.

The purpose of this study is empirical. In this study, we use the real (as opposed to the nominal) exchange rate because it is the relevant variable for economic decisions and outcomes, even though government policies are often stated in terms of nominal exchange rate objectives. Given that there is not a monotonic relationship between nominal and real exchange rate fluctuations, studying only the nominal exchange rate can give misleading inferences about whether politics affects the economically more important real exchange rate.

All of the countries in our sample have undertaken significant central bank reform during the 1980-2004 period. For example, Taiwan and Thailand have changed the charter of the central bank so that its sole (or at least primary) objective is now price stability. Second, the reforms in this period have reduced the political dependence of central banks in the regions on the executive branch of government. If central bank reform has been an effective and credible means

for governments to reduce monetary manipulation, then we would expect to see any pre-reform relationship between real exchange rate depreciation and elections to be diminished in the conditional mean equation.

Our finding that real appreciations raise uncertainty will be important for two reasons. First, if exchange rate uncertainty often has negative effects on economic activity in developing countries, we demonstrate that real appreciations can be economically costly because of their effect on uncertainty. Second, our findings will shed light on the proposition that an outcome from the delayed appreciation can be empirically relevant.

(二) 研究方法及研究假設

In this sections, we set out our statistical model of the real exchange rate and test whether the timing of elections and central bank reform play a significant role in the determination of real exchange rates, and test the hypothesis that real appreciations raise uncertainty about subsequent values of real exchange in our panel countries.

The model and hypotheses

Our sample is a monthly panel of seven East Asian countries countries from 1980-2004. We chose this sample of countries because they have complete data and their elections are conducted at regular intervals, suggesting that their timing is exogenous to economic variables. Thus, we can avoid issues of simultaneity between the economy and the election date.

Following Grier (2007), our model allows for both conditional and unconditional heteroscedasticity and conditional cross-sectional correlation of the error terms. Equations 1-3 below present the specifics.

$$\Delta \ln(R_{it}) = \alpha_0 + \sum_{j=1}^t (\alpha_j \Delta \ln(R_{it-j}) + \beta_1 \Delta \ln(\text{TOT}_{it}) + \beta_2 \Delta \ln(\text{openness}_{it}) + \beta_3 \Delta \ln(\text{GOV}_{it}) + \beta_4 \Delta \ln(\text{tbill}_t) + \mu \text{Post}_{it} + \varepsilon_{it} \quad (1)$$

$$h_{it} = \phi_1 \varepsilon_{iit-1}^2 + \phi_2 h_{iit-1} + \phi_3 \text{Taiwan}_t + \phi_4 \text{HK}_t + \phi_5 \text{IND}_t + \phi_6 \text{Sing}_t + \phi_7 \text{Mala}_t + \phi_8 \text{Thai}_{it} + \phi_9 \text{KR}_t + \theta \text{Post}_{it} \quad \text{For all } i = 1 - N \quad (2)$$

$$h_{ikt} = \rho_{ik} \times h_{iit} \times h_{kkt} \quad \text{For all } i \neq k \quad (3)$$

The real exchange rate data comes both from J.P. Morgan and the IMF's International Financial Statistics (IFS). Higher value of the index is associated with a higher real value of the currency under study. Thus, real appreciations are denoted by increases in the index.

We construct an electoral dummy variable called Post with data from Bienen & van de Walle's guide (2005) for East Asia. Post is equal to one for the month of the election and the

subsequent five months. We would expect to find a negative and significant coefficient on Post, reflecting the delayed real exchange rate depreciation that occurs after the election date.

Reform_{it} is equal to 0 before reform was undertaken in country *i* and equal to 1 after that date. In addition, we interact this variable with Post to investigate whether the reform has significantly varied with the relationship between the political business cycle and the mean and conditional variance of the real exchange rate.

We control for economic variables which affect the real exchange rate by adopting as our baseline model the empirical model of Goldfajn & Valdes (1999). They identify terms of trade, trade liberalization, government spending, and the international interest rate as important factors in the determination of the real exchange rate.

Shocks to the terms of trade, either through a fall in the price of exports or an increase in the price of imports, can have a negative income effect on small, open economies (see Diaz-Alejandro (1982)). We use a terms of trade index (TOT) from the World Bank's World Tables, where 1987 is equal to 100. Openness is the ratio of exports and imports to GDP. The data is available monthly from the IMF IFS CD-ROM, TEJ and AREMOS. The size of government (GOV) is measured with monthly data on general government expenditures as a percentage of GDP from the IMF-IFS CD-ROM, and AREMOS. The international interest rate (tbill), the 3 month US Treasury bill rate in secondary markets, is taken from the St. Louis Fed's FRED database. Finally, we include lagged real exchange rate values on the right hand side of our models to capture any persistence in the series.

The key coefficients testing for electoral effects on the RER process are μ and θ . If politicians purposefully put off needed real exchange rate depreciations until after elections, then μ will be negative and significant. If elections create additional RER uncertainty, then θ will be positive and significant.

After examining the results of this initial model, we continue by adding a dummy for reform in each country along with interaction variables between central bank reform and the electoral dummies. This changes equations (1) and (2) to the following:

$$\Delta \ln(R_{it}) = \alpha_0 + \sum_{j=1}^t (\alpha_j \Delta \ln(R_{it-j}) + \beta_1 \Delta \ln(\text{TOT}_{it}) + \beta_2 \Delta \ln(\text{openness}_{it}) + \beta_3 \Delta \ln(\text{GOV}_{it}) + \beta_4 \Delta \ln(\text{tbill}_t) + \mu \text{Post}_{it} + \varphi \text{Reform}_{it} \varepsilon_{it} + \gamma \text{Post}_{it} \times \text{Reform}_{it} + \varepsilon_{it} \quad (1)$$

$$h_{it} = \phi_1 \varepsilon_{iit-1}^2 + \phi_2 h_{iit-1} + \phi_3 \text{Taiwan}_t + \phi_4 \text{HK}_t + \phi_5 \text{IND}_t + \phi_6 \text{Sing}_t + \phi_7 \text{Mala}_t + \phi_8 \text{Thai}_{it} + \phi_9 \text{KR}_t + \theta \text{Post}_{it} + \kappa \text{Reform}_{it} + \tau \text{Post}_{it} \times \text{Reform}_{it} \quad (2)$$

With this model we can test whether the timing of bank reform is significantly correlated with direct changes in the real exchange rate process and whether it has any influence on how elections affect the real exchange process.

(三) 研究結果與討論

In our empirical work, we estimate the panel GARCH model using the Berndt et al (1974) numerical optimization algorithm (BHHH) to calculate the normal maximum likelihood estimates of the parameter. To determine the exact lag structures of Eq.(1)-(2), we perform a Box-Jenkins (1976) approach and consider up to 12 autoregressive terms in the execution of these tests. Based on the results from correlograms for both series, the LR test and Schwartz information criterion (SIC) criterions, the final best-fitted model for the equation of real exchange rate were determined. More important for our purpose, the key coefficients testing for electoral effects on the RER process are μ and θ . If politicians purposefully put off needed real exchange rate depreciations until after elections, then μ will be negative and significant. If elections create additional RER uncertainty, then θ will be positive and significant. The coefficient μ is statistically significant (-0.246) at the 5% level while in the conditional variance equation the coefficient θ (0.176) is significant at the 5% level. We thus find strong empirical support for the proposition that there is a delaying effect from the election. Besides, strong support also lend to the proposition that election created a more turmoil in the real exchange dynamics. Of primary interest are the answers as to whether or not political business cycle lowers or has an impact on average real exchange rate and real exchange uncertainty. In doing so, we interact Reform with Post to investigate whether the central bank reform has significantly changed the relationship between the political business cycle and the mean and conditional variance of the real exchange rate. The sign and significance of the coefficient (τ) on the $Post_{it} \times Reform_{it}$ can provide such answers. The insignificant and negative coefficient (-1.42) on $Post_{it} \times Reform_{it}$ in the conditional variance equation do not provide solid evidence in favor of the effect that central bank reform is assumed to have.

For other variables, their coefficients in the equations are showing insignificant effect, we suspect there are other factors needed to be examined to spur the dynamics of the real exchange rate in the Asian counties. Future research could direct to a more thorough variable screening to ensues the that pertinent variables be included. However, our model appears well specified. The Ljung-Box Q-statistics are calculated for the standardized residuals, and their corresponding squares. None of these values is significant at conventional levels; hence we conclude that the standardized residuals and the squared residual are not serially correlated. Further, the means and variances are statistically different from 0 and 1, respectively

(四) 計畫成果自評

This project is finished within one year, and proceed in the following three phrases. On the first phase, we had collected and rearranged the relevant literature and data, over which we had completely controlled when the proposal was written. On phase two, we had focused on the specifications of the working models, which extend the work of Goldfajn & Valdes (1999) and Grier (2004), in which we had demonstrated a success to carry out our study purposes. In the

final phase, we will rewrite the project and submit it to a noted international journal.

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