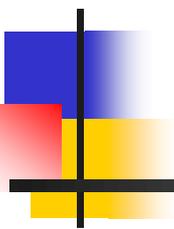


Is the RMB Asia's dominant reference currency? A reconsideration



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7 March 2015

Presentation Outline

- Introduction
- Problems with augmented F-W regressions
- Alternative model of exchange rate dynamics
- Concluding Remarks

Background

- Economic rise of China led to the question of whether exchange rate management in Asia has shifted course to pay more attention to RMB as a key reference currency.
- China is already one of the top trading partner for most Asian economies. Regional production networks have spread rapidly with China playing the role of an assembly hub for final goods.
- Strengthening investment & financial linkages also means its advantageous for Asian economies to maintain exchange rate stability wrt RMB. Strong export orientation means they also need to retain external competitiveness relative to China.

East Asian Dollar Standard

- Each weight in F-W regression picks up both direct effect of the major currency & its indirect effect via regional currencies.

$$\Delta e_t^i = \gamma + \delta_{USD} \Delta e_t^{USD} + \delta_{EUR} \Delta e_t^{EUR} + \delta_{YEN} \Delta e_t^{YEN} + \varepsilon_t$$

- The region was characterized as a “dollar bloc” instead of a “yen bloc” in the pre-Asian crisis periods.
- Despite greater exchange rate flexibility during the Asian crisis, the US dollar was found to be still heavily weighted in the currency baskets after the crisis (McKinnon, 2000). Region is called a “East Asian dollar standard”.

Intra-regional Exchange Rate Stability

- Joint (soft) pegging to the USD stabilized intra-regional exchange rates. Stability in intra-regional exchange rates was a crucial factor for developing of production networks.
- Intermediate goods trade in production networks is found to be more sensitive to exchange rate volatility than other kinds of trade.
- China's fixed exchange rate system, with RMB pegged to USD gave further incentives for Asian economies to benchmark their currencies against the USD.

Question

- Now that China is gradually decoupling RMB from USD, we expect Asian currencies exhibiting greater co-movement with RMB.
- Since USD is still the pre-eminent international currency enjoying incumbency advantages & network effects, it is likely to retain some level of influence on exchange rates in Asia.
- Has the RMB overtaken the US dollar as the dominant reference currency of the region?

Related Studies

- Chen, Peng & Shu (2009); Ito (2010) applied F-W regressions & found fluctuations in RMB that are orthogonal to USD movements exert a substantial impact on exchange rate movements in Asia.
- Balasubramaniam, Patnaik & Shah (2011) used a similar approach but allowed for structural breaks. They found 34 currencies in the world are sensitive to RMB movements, but RMB plays a limited role in Asia.
- Kawai & Pontines (2014) used a 2-step, rolling F-W type regressions and found the US dollar continues to be Asia's dominant anchor currency despite RMB's increasing importance in Asia's currency baskets.

Related Studies

- Fratzcher & Mehl (2011) constructed a regional factor which is Granger caused by RMB and found it to be highly important for explaining Asian currency movements.
- Cavoli & Rajan (2010) found several Asian currencies exhibited greater stability against RMB compared to the US dollar.
- Henning (2012) and Subramanian and Kessler (2013) used augmented F-W regressions to show that the RMB is already a dominant reference currency in Asia, suggesting the possibility that a *de facto* "RMB bloc" has emerged.

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Augmented Frankel-Wei (FW) Regressions

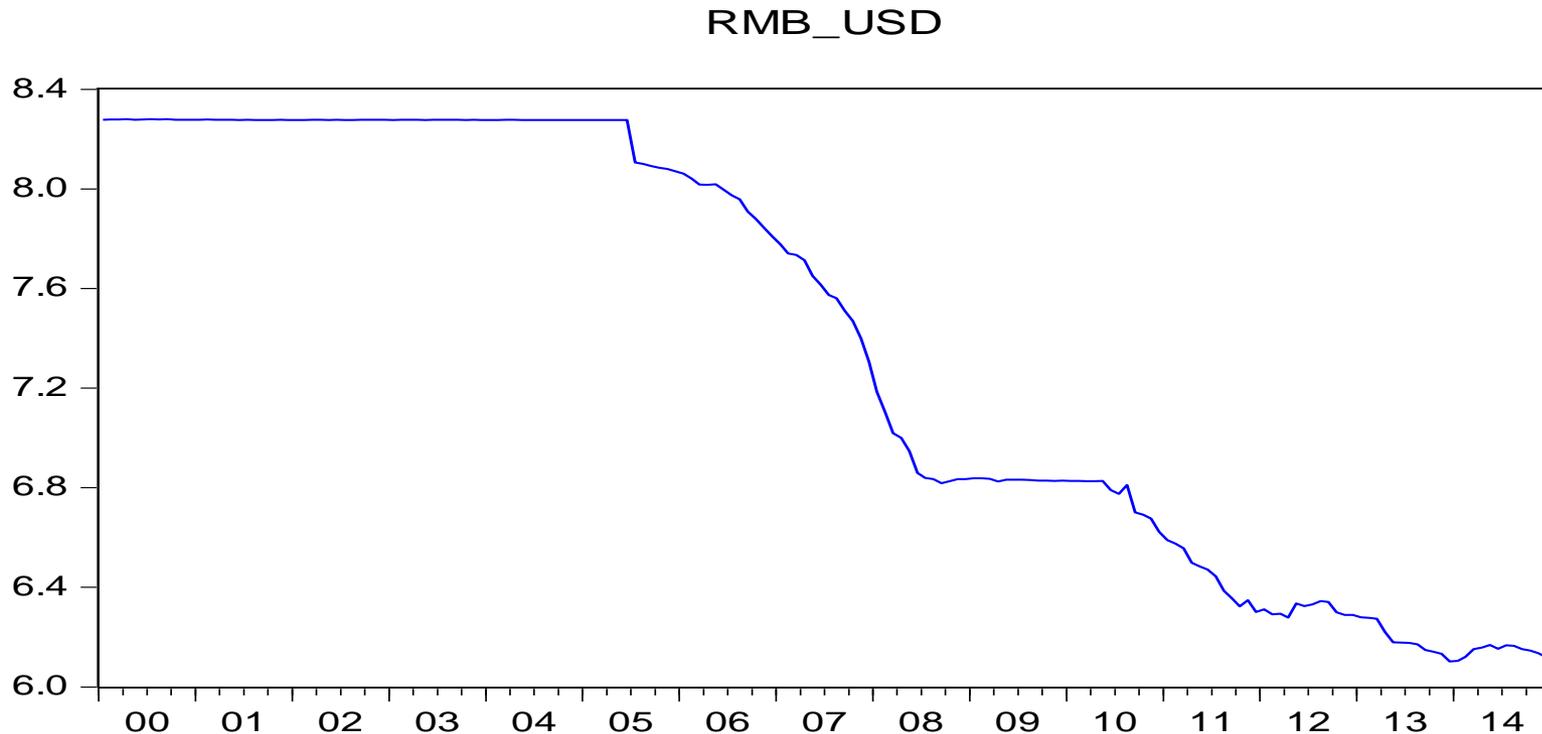
- In augmented F-W regressions, home currency has RMB added as a reference currency in its currency basket:

$$\Delta e_t^i = \gamma + \delta_{USD} \Delta e_t^{USD} + \delta_{EUR} \Delta e_t^{EUR} + \delta_{YEN} \Delta e_t^{YEN} + \delta_{RMB} \Delta e_t^{RMB} + \varepsilon_t$$

- Empirical investigations on influence of RMB are hampered by China's fixed exchange rate system which renders RMB variations as practically indistinguishable from USD movements most of the time.
- A judicious choice of the sample period is needed to overcome this identification problem.

RMB/USD Rate

- China abandoned its peg to USD & announced a shift to a basket peg in May 2005. It appreciated 21% over 3 years.
- In October 2008, RMB was re-pegged to USD in response to global financial crisis. Since June 2010, RMB has returned to a managed float against a basket of currencies.



Multicollinearity Problems

- It seems we may be able to overcome the identification problem by using 2 periods when RMB was somewhat decoupled from USD: mid-2005 to mid-2008 & from mid-2010 to April 2014.
- However, the correlation coefficient between RMB & USD movements against the euro remains very high at 0.93 and 0.79 respectively in those 2 sample periods.
- Such high collinearity means augmented FW regression is likely to suffer from multicollinearity problems so that it is difficult to tell apart the individual effects of RMB & USD on local currency movements.

Orthogonalized RMB Movements

- In some earlier studies, an auxiliary regression of RMB against USD movements is first performed. Residuals from this auxiliary regression are then used to capture RMB fluctuations independent of US dollar movements.
- Using residuals as RMB term in the augmented F-W regressions eg. in Chen *et al.* (2009) and Ito (2010) means we can no longer interpret the coefficients as weights.
- Using only the part of RMB movements that is orthogonal to USD fluctuations basically means whenever there is ambiguity in separating the effect of the 2 currencies, the effect will be attributed to USD.

Imprecise Weight Estimates

- Consequently, Henning (2012) and Subramanian and Kessler (2013) estimated augmented FW equation with non-orthogonalised RMB fluctuations.
- They found weight estimates of RMB tend to be higher than those for USD and concluded RMB is already a dominant reference currency in the region.
- However, multicollinearity problem leads to imprecise weight estimates which throw doubts on the inference regarding the regional influence of USD & RMB.

Endogeneity Problems

- As a regional currency, RMB and other Asian currencies are subject to common shocks from outside the region, this increases their correlation and RMB's weight in currency basket.
- Large RMB weight estimates obtained in more recent studies may well be the result of overestimation caused by the lack of exogeneity in RMB variable.
- When explanatory variable is simultaneously determined with dependent variable, coefficient estimates are biased and inconsistent. Statistical inferences on currency weights are no longer valid.

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Country-specific VAR Models

- To circumvent the simultaneity bias problem, we run country-specific VAR models for individual Asian currencies that allow for mutual interactions of the variables.

- For each country i :
$$\Delta e_t = \beta_0 + \sum_{k=1}^p \beta_k(L) \Delta e_{t-k} + \varepsilon_t$$

1st set of VAR models,

$$\Delta e_t = (\Delta e_{\text{usd/rmb},t}, \Delta e_{\text{eur/rmb},t}, \Delta e_{\text{jpy/rmb},t}, \Delta e_{i/\text{rmb},t})'$$

2nd set of VAR models,

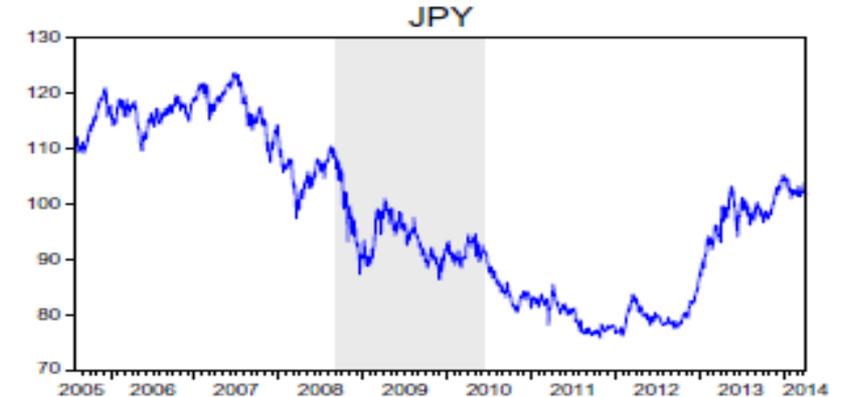
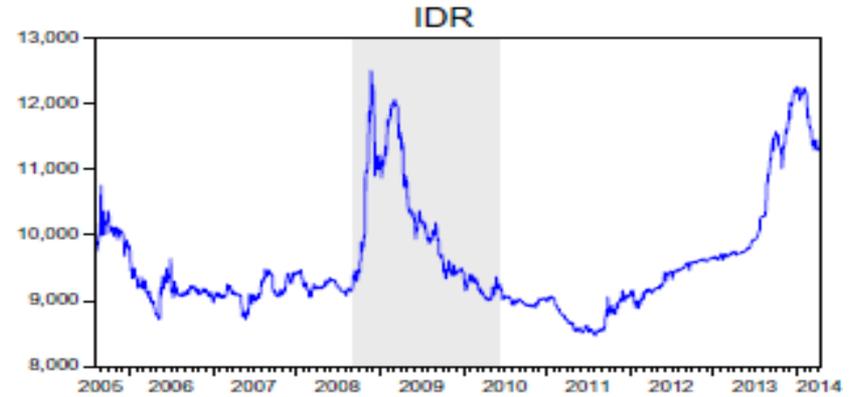
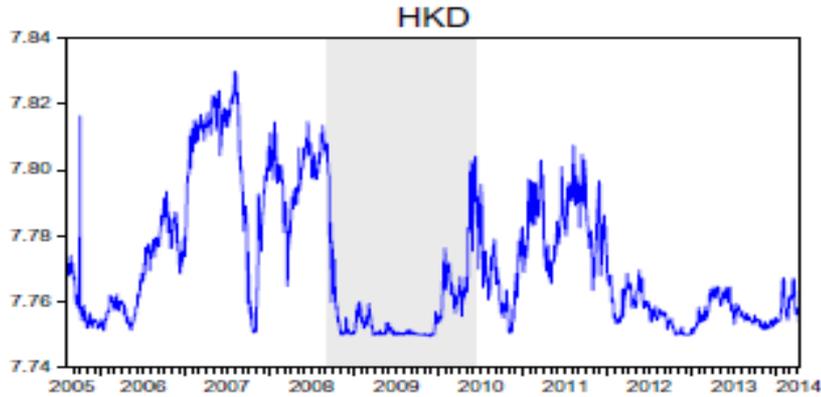
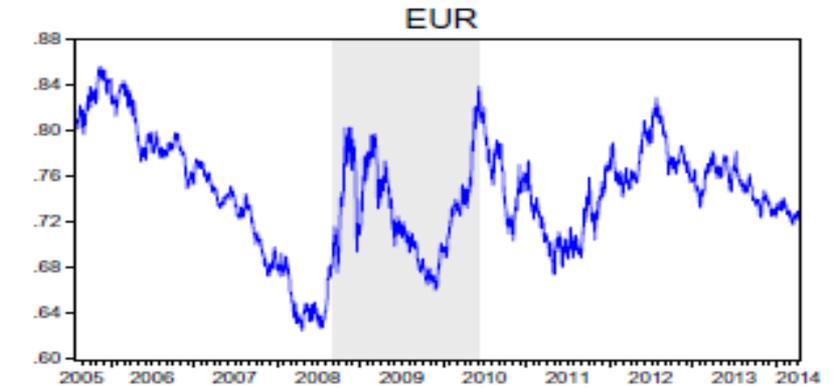
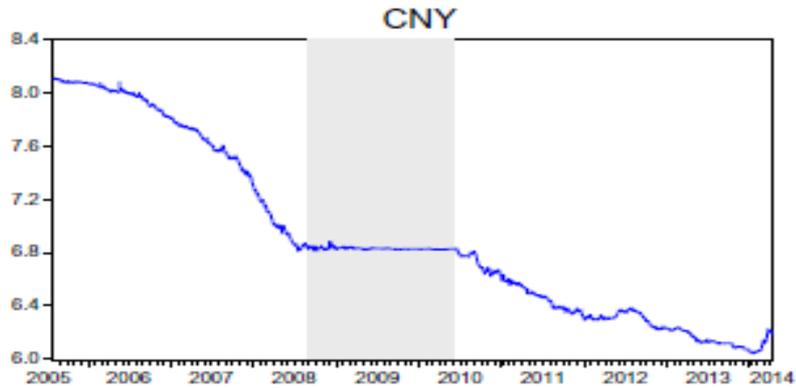
$$\Delta e_t = (\Delta e_{\text{rmb/usd},t}, \Delta e_{\text{eur/usd},t}, \Delta e_{\text{jpy/usd},t}, \Delta e_{i/\text{usd},t})'$$

- To facilitate comparisons across the two sets of models, we standardized the bilateral rates so that all exchange rate series have a standard deviation that is equal to one.

Daily Exchange Rate Series

- The VAR models are applied to daily exchange rate data of 9 countries: Hong Kong, Indonesia, India, Korea, Malaysia, the Philippines, Singapore, Taiwan & Thailand.
- 2 sample periods 1st August 2005 to 30th August 2008 & 1st June 2010 to 9th April 2014 which allows us to investigate how exchange rate dynamics have changed after the global financial crisis.
- Restricting the sample periods to such short time durations means employing higher frequency data in the analysis due to degrees of freedom consideration

Bilateral Exchange Rates Against USD



Bilateral Exchange Rates Against USD

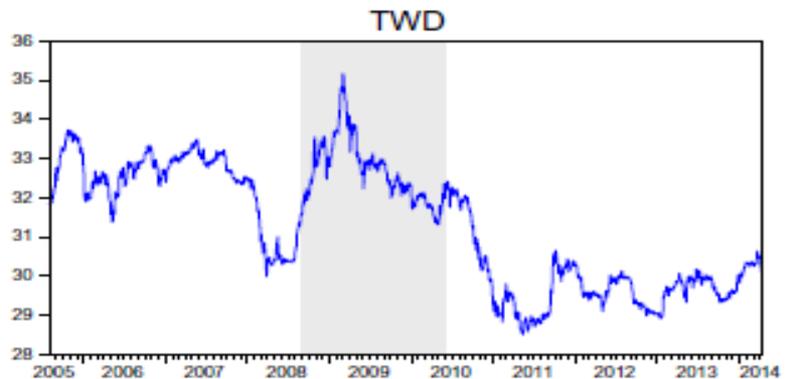
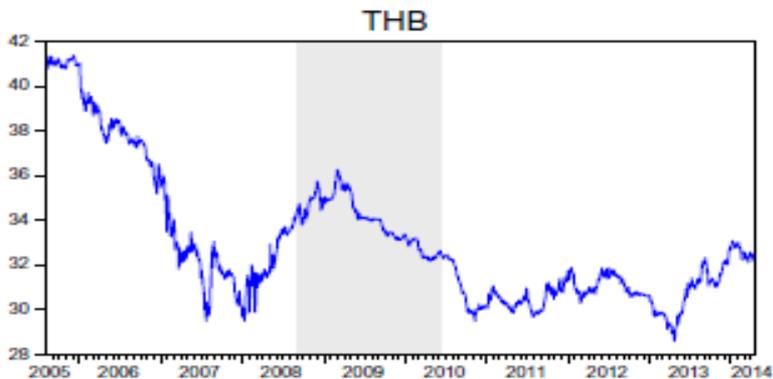
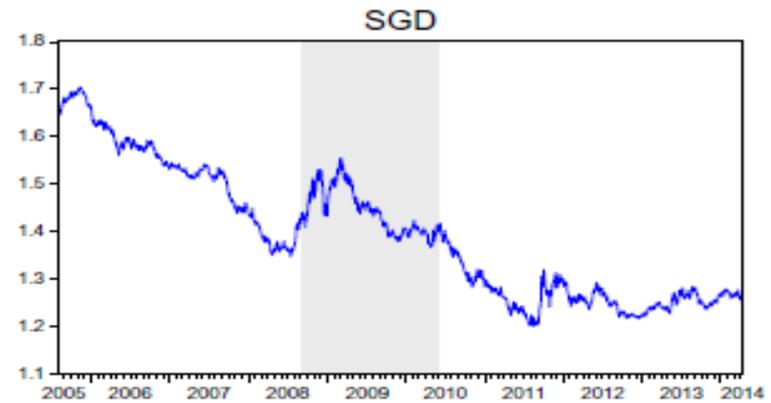
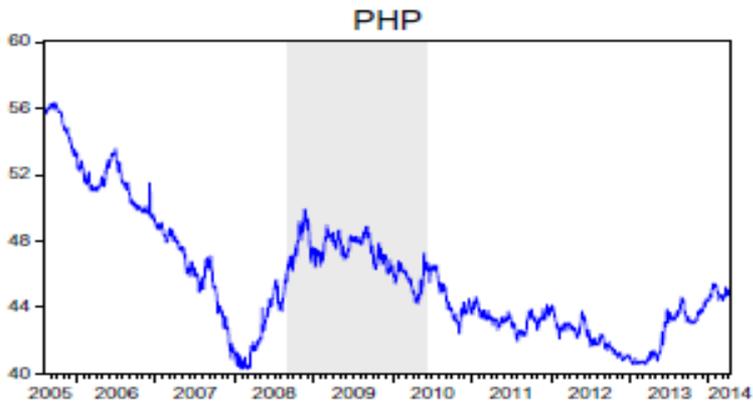
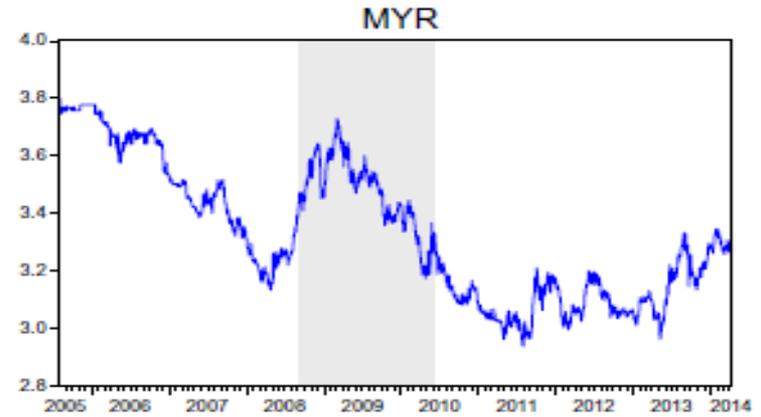
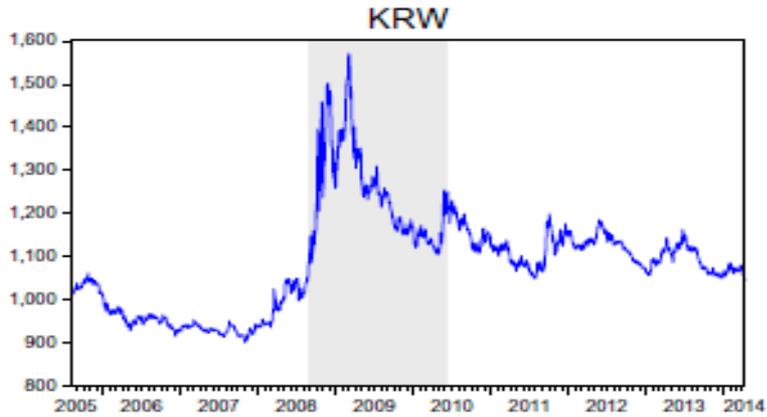


Table 1. Phillip–Perron unit root tests (p -values).

	Pre-crisis		Post-crisis	
	Levels	First differences	Levels	First differences
(a) Bilateral rates against renminbi				
EUR	0.40	0.00	0.42	0.00
HKD	1.00	0.00	0.11	0.00
IDR	0.87	0.00	0.97	0.00
INR	0.95	0.00	0.85	0.00
KRW	0.28	0.00	0.96	0.00
MYR	0.99	0.00	0.13	0.00
PHP	0.91	0.00	0.75	0.00
SGD	0.58	0.00	0.73	0.00
THB	0.54	0.00	0.20	0.00
TWD	0.60	0.00	0.82	0.00
USD	0.86	0.00	0.71	0.00
(b) Bilateral rates against US dollar				
CNY	1.00	0.00	0.09	0.00
EUR	0.81	0.00	0.09	0.00
HKD	0.35	0.00	0.06	0.00
IDR	0.19	0.00	0.98	0.00
INR	0.79	0.00	0.87	0.00
KRW	0.51	0.00	0.93	0.00
MYR	0.88	0.00	0.09	0.00
PHP	0.62	0.00	0.10	0.00
SGD	0.51	0.00	0.18	0.00
THB	0.85	0.00	0.01	0.00
TWD	0.47	0.00	0.28	0.00

Impulse Response Analysis

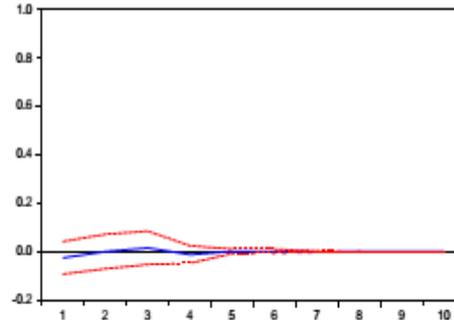
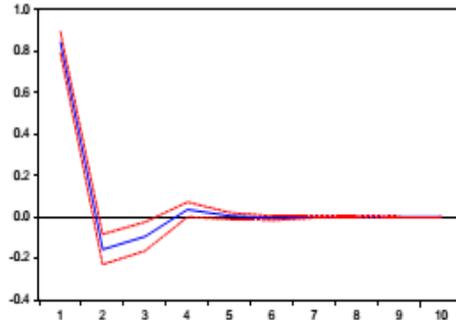
- All exchange rate data series are tested to be $I(1)$. The Thus, we model the first differences of the log exchange rate series.
- We derive impulse response functions to trace the dynamic effects of innovations in USD (RMB) on the domestic currency in the first (second) set of VAR models.
- All variables in both sets of VAR models are standardized to have a variance one so impulse responses are in terms of the number of standard deviations. This facilitates comparisons of the impulse responses across the two sets of models.

Impulse Responses of Home Currency (Pre-Crisis)

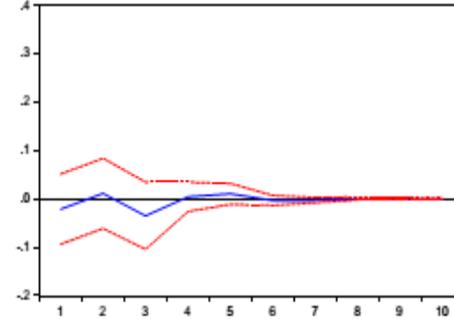
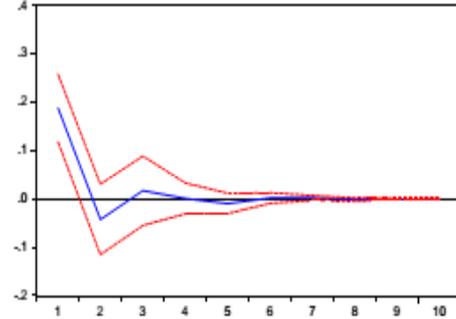
(a) US dollar shock

(b) Renminbi shock

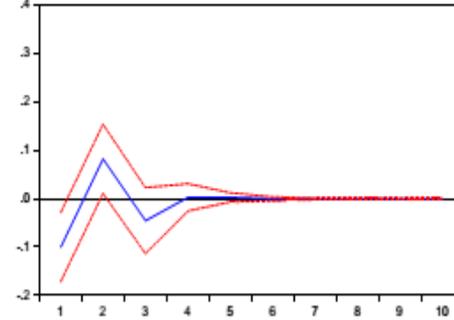
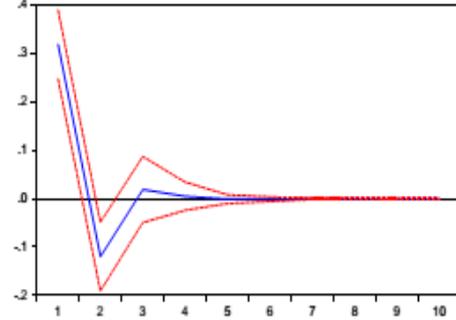
Hong Kong



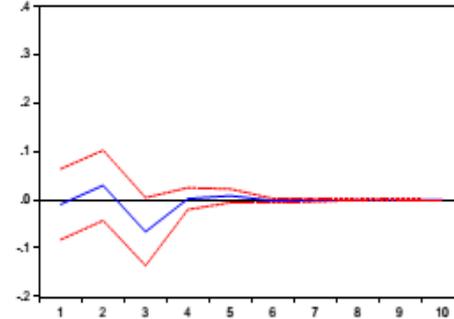
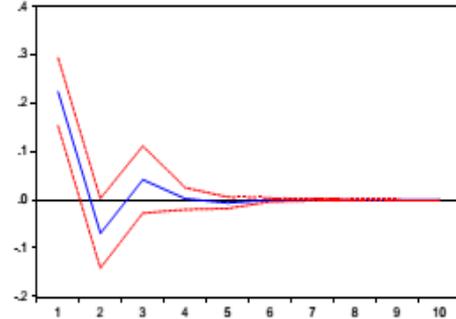
Indonesia



India

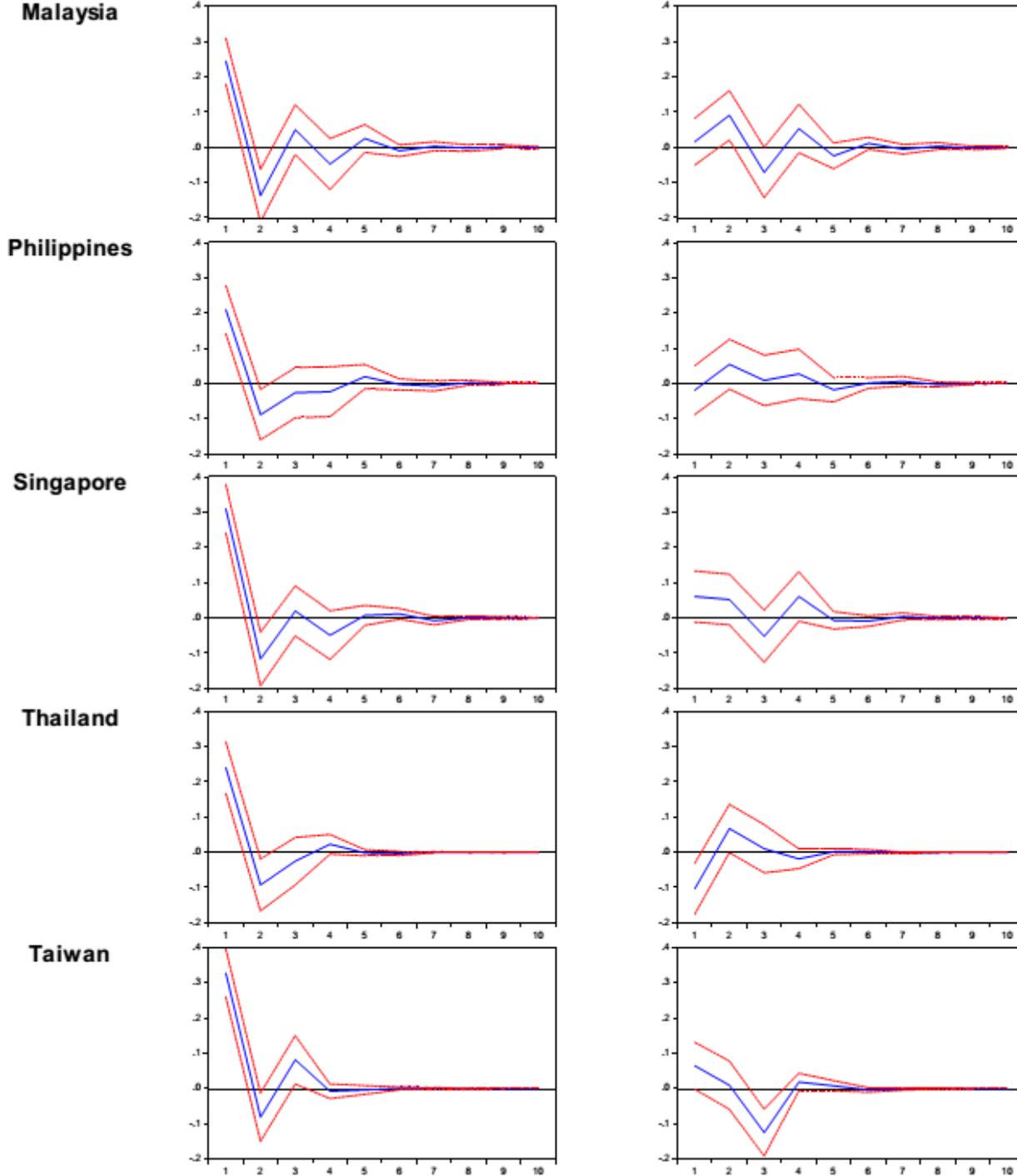


Korea



Home currency is more responsive to a USD shock than to a RMB shock in pre-crisis period.

An unanticipated one-standard deviation shock to USD produces significant impulse responses in all Asian currencies.



By contrast, an unanticipated one-standard deviation shock to RMB produces either insignificant or marginally significant impulse responses.

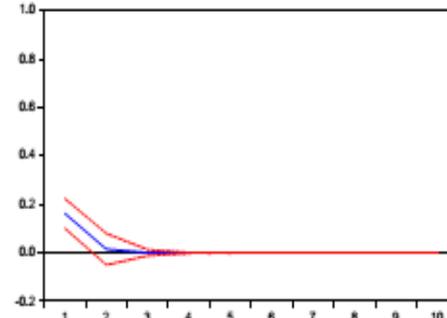
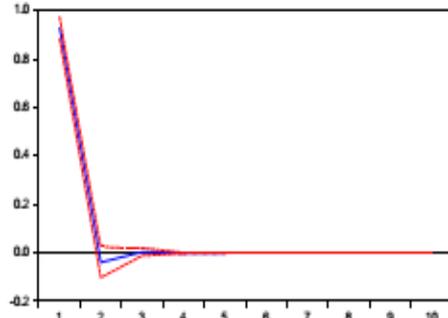
We infer USD shock played a bigger role than RMB in determining movements in Asian currencies before crisis.

Impulse Responses of Home Currency (Post-Crisis)

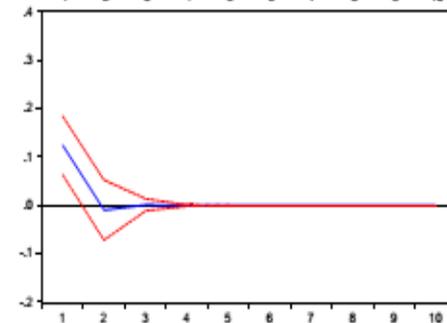
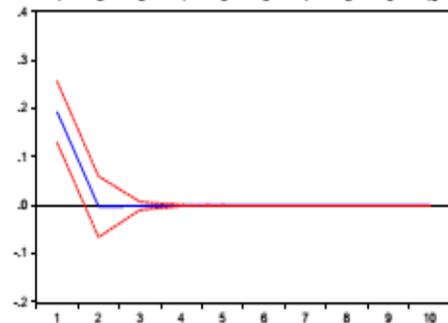
(a) US dollar shock

(b) Renminbi shock

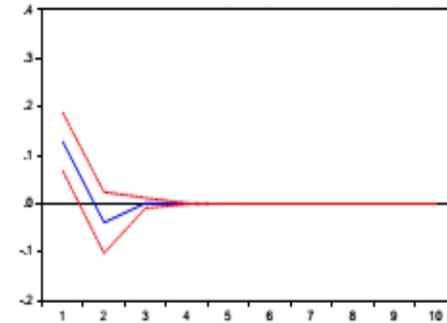
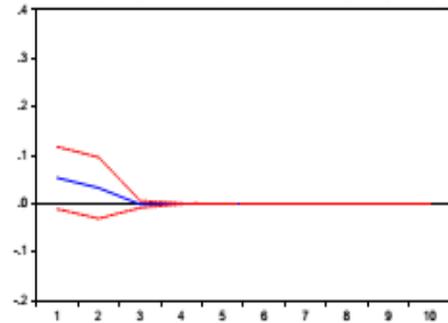
Hong Kong



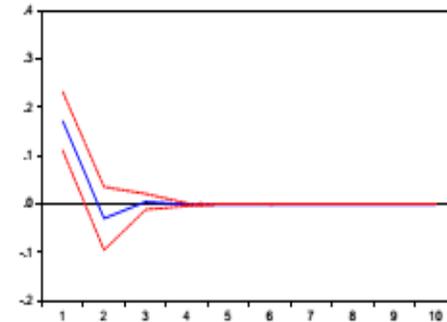
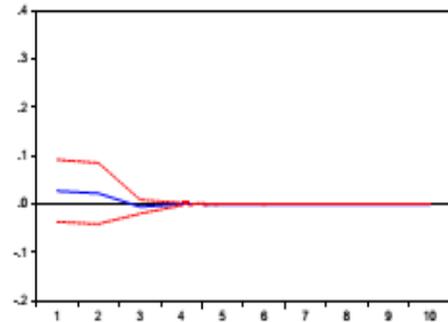
Indonesia



India

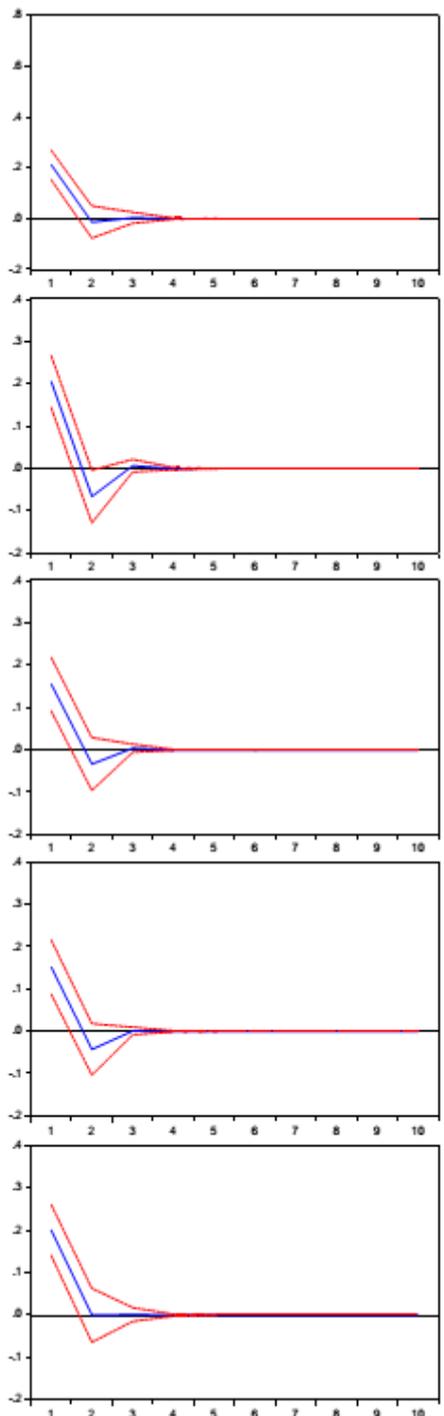
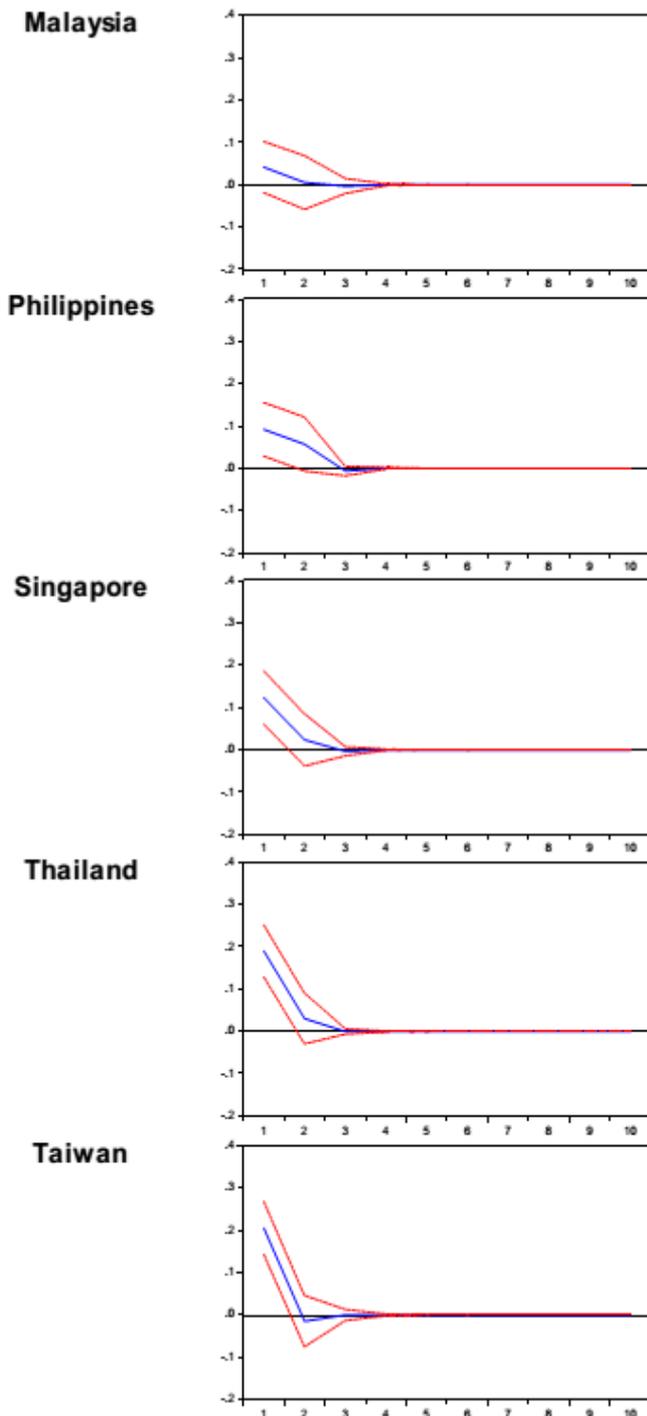


Korea



Except for Hong Kong, a RMB shock elicits either a stronger or a similar level of response from the home currency compared to a USD shock post crisis.

We obtain significant responses to a RMB shock in all cases, ranging between 0.1 to 0.2 standard deviations.



In comparison, the USD shock produced insignificant responses for India, Korea & Malaysia. Other currencies respond by 0.1 to 0.2 standard deviations.

Despite USD's weaker impact post crisis, it retains some influence as a reference currency in most cases. Do not support claim that a *de facto* "renminbi bloc" has already emerged in the region.

Robustness Checks

- We included the oil price as an exogenous variable in all the VAR models and used Cholesky decomposition with the following ordering of variables for the 2 sets of VAR:

$$(\Delta e_{\text{usd/rmb},t}, \Delta e_{\text{eur/rmb},t}, \Delta e_{\text{jpy/rmb},t}, \Delta e_{i/\text{rmb},t})$$

$$(\Delta e_{\text{rmb/usd},t}, \Delta e_{\text{eur/usd},t}, \Delta e_{\text{jpy/usd},t}, \Delta e_{i/\text{usd},t})$$

- With few exceptions, correlations between residuals from the reduced form VARs are weakly correlated. Hence, the results are qualitatively the same with different ordering of the variables.

Internationalization of RMB

- With the onset of crisis, China took concrete steps to reduce the dependency of its economy on USD & broaden the international use of RMB:
 - Allow companies to settle cross-border trades in RMB
 - Facilitate the issuance of RMB denominated financial products.
 - Allow offshore banks & central banks to invest in China's interbank bond market. RQFII scheme to widen investment channels for RMB recycling to China.
 - Launched RMB-denominated outward direct investment & FDI.
 - Signed bilateral swap agreements with other central banks.

Challenges to RMB Internationalization

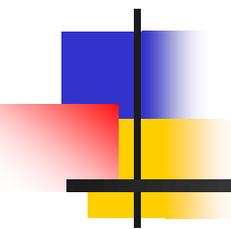
- RMB is not fully convertible, & the capital account is still tightly regulated.
- Capital account liberalization is tightly linked to domestic financial sector reforms including interest rate liberalization & adjustment of China's economic development model.
 - Pace depends on internal political economy & process takes time. Premature liberalization of capital account before domestic financial reforms are complete can lead to crisis.
 - Deregulating capital account when there is extreme & volatile global liquidity is risky.

A Future Yuan Bloc in Asia?

- RMB itself is on a basket peg with a trading band of plus/minus 2%. As long as the USD weight remains high we can expect the Asian currencies to continue their strong linkages to the USD.
- As RMB delinks from USD, China's central role in Asia's trade-production network suggests RMB will become a regional lead currency.
- Nonetheless, the concern about China's economic & political dominance means it is unlikely for a yuan bloc to emerge in Asia. Rather, Asian currencies are more likely to benchmark against more than one currency given their geographically diversified trade patterns.

Conclusion

- By not explicitly accounting for co-movements between Asian currencies & RMB due to common shocks, augmented FW results tend to be biased towards a substantial RMB influence on Asian currencies.
- We estimate 2 sets of country-specific VAR models. USD had a significant regional influence before crisis, but this weakened post crisis. By contrast, co-movement between Asian exchange rates & RMB increased post crisis.
- As usage of RMB in pricing & settling intra-regional trade widens, market forces will increase its co-movements with East Asian currencies. However, the results do not support the claim that a *de facto* “renminbi bloc” has already emerged in the region.



Thank you
