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# Who cares about the Chinese Yuan?

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Vimal Balasubramaniam\*    Ila Patnaik    Ajay Shah

May 3, 2011

## Abstract

The rise of China in the world economy and in international trade has raised the possibility of a rise of the Yuan as an international currency, particularly after the Chinese authorities have undertaken policy initiatives such as Yuan settlement and Yuan swap lines. In this paper, we measure one dimension of Yuan internationalisation: the role of the Yuan in the exchange rate arrangements of other economies. While the magnitudes are small, our findings show that as many as 34 currencies in the world have been sensitive to movements in the Yuan. This suggests that the Yuan potentially has a significant role to play in global exchange rate arrangements. Contrary to popular belief, however, we find a limited role of the Yuan among Asian economies.

JEL Code: F31, F33

Key words: Renminbi, Yuan, Exchange rate regime, Internationalisation, East Asia

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# 1 Introduction

There are two mechanisms through which China's exchange rate policy can have spillovers upon the policy choices of other economies. First, economies which compete with China in export markets may be averse to appreciation against the Yuan. Second, economies that are part of the Asian production network may have an incentive to lower bilateral exchange rate volatility against the Yuan, to the extent that their firms are engaged in international transactions denominated in Yuan. This second class of motivations has been highlighted in recent years, with Chinese initiatives on Yuan settlement, Yuan swap lines and Yuan denominated bonds that aim to establish the Yuan as an international currency.

In this paper, we trace the role of the Yuan in exchange rate arrangements worldwide since July 2005. In this setting, we ask three questions. First, has there been a role for the Yuan in worldwide exchange rate arrangements? Second, has there been a particularly important role for the Yuan in exchange rate arrangements in Asia? Third, what has been the magnitude of the role of the Yuan? In the first two cases, we test the null hypothesis of no-effect, and in the third, we measure the magnitude of the relationship.

This work is important in understanding the role of China in the world economy, the new phenomenon of Yuan internationalisation, the evolution of exchange rate arrangements among emerging markets and developing economies, and the Asian production network. It yields a measure for one dimension of Yuan internationalisation: its role in the exchange rate regime outcomes of other currencies.

One additional dimension which motivates this work lies in the extent to which Chinese appreciation is important for global rebalancing. The Chinese current account surplus is 0.74 per cent of world GDP. Even if a substantial appreciation took place in China, it would have a relatively modest impact upon global aggregate demand. If, however, a Chinese appreciation encouraged or enabled many other economies to also appreciate, then the overall impact upon global aggregate demand would be larger. Thus, if we find that the Yuan has come to play a significant role in global exchange rate regimes, there is a greater importance of Yuan exchange rate regime reform for global rebalancing.

We use the exchange rate regression, where percentage changes in an exchange rate against a numeraire currency are regressed on changes in the dollar, the pound, the yen and the euro (Haldane and Hall, 1991; Frankel and Wei, 1994; Frankel, 2009). We focus on the period from October 2005 to February 2011, a period in which there have been modest changes in the CNY/USD rate. A natural extension of this model would involve an additional CNY regressor. However, weekly changes in the CNY/CHF rate have a correlation coefficient of 0.988 against the USD/CHF rate. Hence, we construct a time-series ( $d\log(CNY_o/CHF)$ ) by extracting the autonomous movement of the Chinese exchange rate, that is, independent of movements in the USD/CHF rate.

This regression suffers from the problem of structural change, either owing to changing policies on the part of authorities in a country, or owing to changes in external shocks.

We draw on recent developments in the econometrics of structural change in the exchange rate regime in order to obtain a set of break dates of structural change (Zeileis, Shah, and Patnaik, 2010). This permits estimation of the coefficient of the  $CNY_o$  in each sub-period.

An analysis of 132 currencies reveals 375 periods in global exchange rate arrangements. Of these, there are 85 instances with a statistically significant role for the autonomous movements in the Chinese exchange rate. These reveal an interesting picture of the footprint of Chinese exchange rate policy, including large developing economies (e.g. India during Oct-2005 to Mar-2007), many economies in Africa, strategic allies (e.g. Pakistan from Dec-2007 to Nov-2008) and even one OECD country (Israel between Oct-2005 and Dec-2007).

Turning to East Asia, there are three periods where there was a statistically significant  $CNY_o$  coefficient: Malaysia (from 2005 to 2007), Viet Nam (after 2009) and Taiwan (all through). Barring these three periods, the remainder of East Asia has not exhibited dependance upon China's exchange rate arrangement.

We turn to the examination of GDP-weighted mean of the  $CNY_o$  coefficient in order to ascertain the economic significance of the footprint of Chinese exchange rate policy. At a global level, we find a small value in the years 2006 and 2007. However, from early 2008 onwards, Chinese exchange rate policy has not influenced global exchange rate arrangements. Similar results hold when analysing the group of emerging markets and developing economies: Here there is a marginally stronger value in 2006 and 2007. Again, from early 2008 onwards, the null hypothesis of no role for the Chinese Yuan cannot be rejected.

In Asia, the role of Chinese exchange rate policy in its exchange rate arrangement is absent through most of the post-2005 experience, other than a short period during the crisis where we obtain a point estimate of 0.03 with a 95% confidence interval running from 0.01 to 0.07.

These results suggest that while China has made enormous strides in terms of achieving a major role in international trade, in establishing Yuan settlement mechanisms and in establishing Yuan swap lines to many economies, there is relatively limited evidence of the emergence of the Yuan as an international currency in one key dimension: The role of the Yuan in the exchange rate regime arrangement of other economies. The average Asian country appears to appreciate by roughly 0.05 per cent when China appreciates by 1 per cent.

A surprising result is the footprint of the Chinese Yuan well beyond Asia. If these economies care about Chinese exchange rate flexibility, to the extent of their revealed preferences, a larger autonomous movement of the Yuan can play a significant role on global exchange rate arrangements in the future.

**Table 1** China's bilateral currency swap agreements as of Jan'11

Country	Date	Maturity	Amount	Renewable
Korea	12-Dec-2008	3 yrs	180bn Yuan 38tn Won	✓
Hong Kong	20-Jan-2009	3 yrs	200bn Yuan 227bn HKD	✓
Malaysia	08-Feb-2009	3 yrs	80bn Yuan 40bn Ringgit	✓
Belarus	11-Mar-2009	3 yrs	20bn Yuan 8000bn Belarusian ruble	✓
Indonesia	23-Mar-2009	3 yrs	100bn Yuan 175tn Rupiah	✓
Argentina	30-Mar-2009	3 yrs	70bn Yuan 38bn Peso	✓
Iceland	10-Jun-2010	3 yrs	3.5bn Yuan	✓
Singapore	24-Jul-2010	3 yrs	150bn Yuan 30bn Singaporean Dollar	✓

*Source:* Xinhuanet, ASEAN, HKMA.

## 2 Motivation

With 30 years of high growth rates of imports and exports, China has emerged as a major part of international trade. In merchandise trade, China is the world's largest exporter and the second largest importer. Through this rise to prominence on the international stage, Chinese exchange rate policy has come to matter beyond China.

### How might Chinese exchange rate policy matter to other economies?

In many less developed economies (LDCs) and emerging markets (EMs), governments have hindered exchange rate flexibility. One motivation for this 'fear of floating' lies in concerns about export competitiveness. To the extent that a country competes against Chinese exports, a Chinese appreciation would tend to improve export competitiveness, and reduce the resistance to flexibility. Through this mechanism, China's policy choices on the exchange rate could have effects beyond China. **Pontines and Siregar (2010)** point out the role of the Chinese Renminbi in the attempts in East and Southeast Asia to avoid appreciation.

In recent years, Chinese authorities have embarked on a set of policy initiatives that could potentially result in certain kinds of Yuan internationalisation: Relaxing restrictions on Yuan deposits in Hong Kong, issue of Yuan-denominated bonds by Chinese and Foreign companies in Hong Kong, trade settlement for Chinese companies in Yuan and currency swap agreements with foreign central banks.

Since December 2008, swap lines worth about 800 billion Yuan have been put in place. The

timing of such agreements suggest that the Chinese authorities could have been concerned about the global disruption of trade financing at that time. However, such lines were arranged with economies such as Belarus, Argentina and Iceland, which are not important trading partners to China. The intention to internationalise the Yuan became more pronounced when trade settlement for companies in five Chinese cities with counterparties in Hong Kong, Macau and other economies in the Asian production network was announced in July 2009. By December 2010, some estimates suggest that over 60 thousand companies have settled trade in the Yuan.

Trade settlement agreements have been routed through banks. In 2010, Bank of China's total volume of Yuan-denominated cross-border trade settlement reached about 510 billion Yuan (\$77.6 bn). Industrial and Commercial Bank of China reported 150 billion Yuan in trade settlement business over the July 2009 to March 2011 period. A survey by HSBC reported that about 30% of cross-border trade of small and medium size companies in HK in 2010 was settled in Yuan.<sup>1</sup>

In another round of reforms, the Hong Kong Monetary Authority (HKMA) announced that non-financial corporations from China will be allowed to issue Yuan-denominated bonds in Hong Kong in February 2010. The first year of Yuan-denominated bonds totalled 17.5 billion Yuan, with Yuan denominated deposits growing fivefold from a year earlier to 407.7 billion Yuan.<sup>2</sup>

A mechanism through which cross-country spillovers of exchange rate policy could arise is rooted in the rise of complex production chains in Asia, centred in China. China is now the nerve centre of a complex and large production chain, where elements of economic activity take place across Asia (Branson and Healy, 2005; Zhang, 2008). The initiatives in recent years may have influenced the extent to which contracts within the Asian production network are denominated in the Yuan. To the extent that invoicing relationships in the Asian production chain is expressed in the US Dollar or other international currencies, exchange rate policy in China does not influence other Asian economies. However, if (say) a Malaysian producer sells into China with invoicing in Chinese Renminbi, then this creates an interest in stability of the MYR-CNY exchange rate on the part of this producer. If there is a sufficiently large mass of such producers, the Malaysian authorities may come to desire a reduction in the volatility of the MYR-CNY exchange rate.

This suggests that two kinds of motivations might encourage an LDC or an EM to take heed of Chinese exchange rate policy: concerns about export competitiveness, and Yuan-denominated international transactions either in the private or in the public sector.

To the extent that (say) the Malaysian authorities are concerned about export competitiveness, they are more likely to appreciate the MYR/USD exchange rate when the CNY/USD exchange rate has appreciated. And to the extent that the Malaysian authorities are concerned about achieving low volatility of the CNY/MYR exchange rate, they would adjust

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<sup>1</sup>Sources: <http://goo.gl/CVZtd>; <http://goo.gl/bo1JU>

<sup>2</sup>Bloomberg, as on 22, April 2011.

the MYR/USD exchange rate alongside changes in the CNY/USD exchange rate.

While China has made an impressive start on the problem of Yuan internationalisation, many critical elements of an international currency are absent in China. The Yuan is perhaps decades away from becoming a serious alternative to the US dollar, Euro, British Pound and the Japanese Yen (Lee, 2010b). The currency distribution of global foreign exchange market turnover suggests that the US dollar remains the dominant currency (at 84.9%) with the Euro as the distant second (at 39.1%). The Yuan's role fell from 0.7% in 2007 to 0.3% in 2010.<sup>3</sup> A paper by the State Administration of Foreign Exchange Taskforce<sup>4</sup> lists various steps that the Chinese authorities could take to potentially accelerate Yuan internationalisation. Factors such as Value Added Tax (VAT) rebate restrictions, and foreign exchange control have been identified by the authorities as important steps forward. Further, strengthening the range of domestic financial services is also seen as an important stepping stone for an international Yuan.

To the extent that such reforms have a direct bearing upon the role of China's exchange policy in the exchange rate arrangements of other economies, it could have significant global ramifications. It is in this perspective that an examination of the Yuan's role since 2005 gains significance. Specifically, in this paper, we ask three questions:

1. Which currencies in the world care about the Yuan?
2. Is there an East Asian bloc where the Yuan matters?
3. How large are these effects?

While two kinds of motivations may shape the thinking of economies in taking heed of Chinese exchange rate policy, our goal is to measure the overall role of China in the exchange rate regime, in East Asia and elsewhere. We do not seek to disentangle the two factors.

## 2.1 Larger implications

An understanding of these questions is interesting from the viewpoint of understanding international currencies, Asian production networks, Yuan internationalisation, and the role of China in the world economy. While there are many aspects to international currencies and Yuan internationalisation, in this paper we concretely measure one dimension: the role of a country in the exchange rate regime outcomes of other economies.

In addition, the extent to which such phenomena are at work is of importance in the debate about global imbalances. Some economists and governments believe that a Yuan appreciation would help increase global aggregate demand. There are two channels through

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<sup>3</sup>Since two currencies are involved in any transaction, the percentage mentioned here are on 200 and not on 100. Source: Bank of International Settlements (2010), Table 3.

<sup>4</sup>'The use of renminbi for trade and non-trade denomination and settlement'

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**Table 2** Current account surpluses: China and other parts of Asia

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	(Per cent of World GDP)		
	China	Newly Industrialised Asia	Developing Asia
2001	0.05	0.15	0.12
2005	0.35	0.17	0.37
2008	0.74	0.14	0.71

*Source:* World Economic Outlook database

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which this would work. First, it would have a direct impact upon the Chinese current account surplus. In addition, to the extent that some other economies also appreciate in response to a Chinese appreciation, this would yield an additional impact.

Table 2 shows that in 2008, the Chinese current account surplus was 0.74 per cent of world GDP. However, the remainder of Asia had a current account surplus adding up to 0.85 per cent of world GDP. Appreciation in China would have a certain impact upon the Chinese current account surplus. However, if other Asian economies would also appreciate, in response to a Chinese appreciation, then the potential impact upon global aggregate demand is potentially larger. In this case, Chinese exchange rate policy is an important element of global macroeconomic policy. If, alternatively, we find that other economies are not greatly influenced by Chinese exchange rate regime choices, then Chinese exchange rate regime reform would have a more muted significance for the world at large.

### 3 Methodology

Our work supplements Ito (2010) and Lee (2010b). Both Ito (2010) and Lee (2010b) measure internationalisation as the percentage of world reserves denominated in the Yuan and using simulations project likely scenarios in 2035. In doing so, Lee (2010b) suggests that the Yuan has the potential to move from about 3% to 12% of international reserves by 2035. We offer specific estimation strategies and a measure of Yuan's role in the exchange rate arrangement of economies across the world.

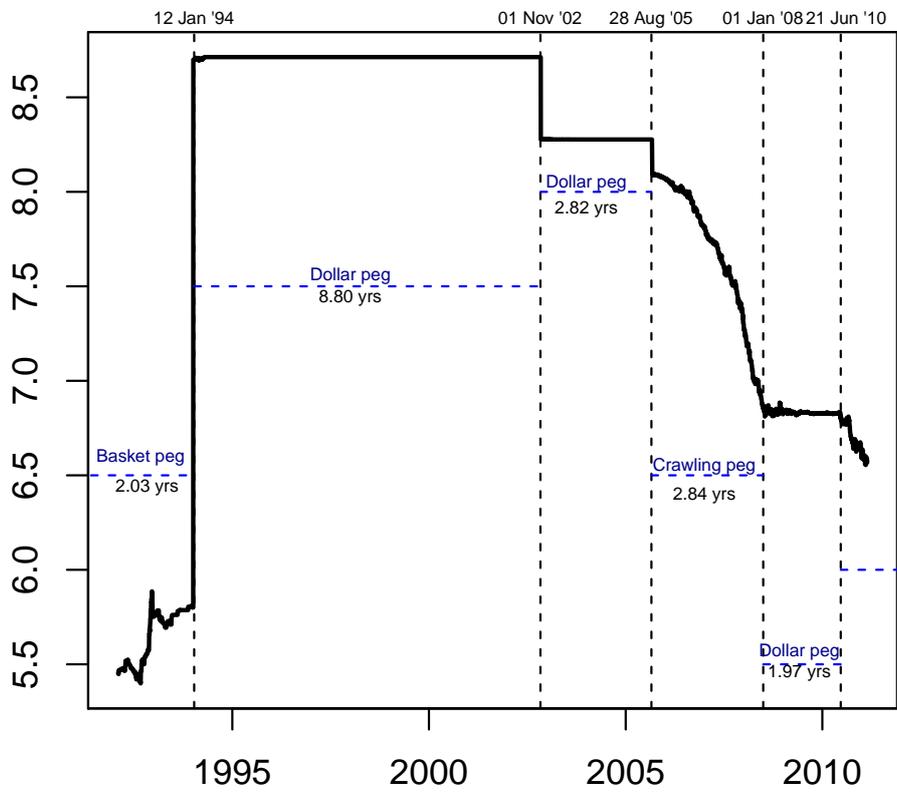
Table 1 shows the time-series of the CNY/USD exchange rate. On 22 July 2005, the Chinese departed from the fixed-but-adjustable rate to the USD which had prevailed until then. Hence, in this analysis, we only focus on the data following this reform. Weekly percentage changes in the CNY/USD exchange rate prove to be near-zero until October 2005. Hence, the analysis of this paper starts in October and not July 2005. Over this period, we see a certain variability in the exchange rate, which can potentially support estimation of the spillovers on other currencies.

A natural starting point for this analysis is the exchange rate regression (Haldane and Hall, 1991; Frankel and Wei, 1994). In this approach, an independent currency, such as the Swiss Franc (CHF), is chosen as an arbitrary 'numeraire'. If estimation involving the

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**Figure 1** The Yuan exchange rate arrangement

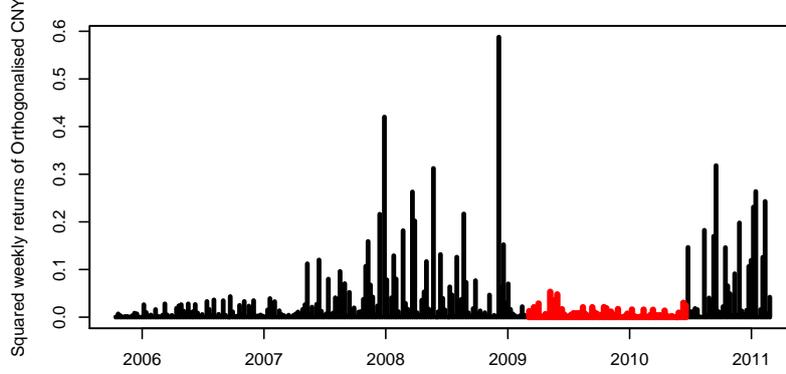
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**Figure 2** Squared weekly orthogonalised Yuan returns

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Malaysian Ringgit is desired, the model estimated is:

$$d \log \left( \frac{\text{MYR}}{\text{CHF}} \right) = \beta_1 + \beta_2 d \log \left( \frac{\text{USD}}{\text{CHF}} \right) + \beta_3 d \log \left( \frac{\text{GBP}}{\text{CHF}} \right) + \beta_4 d \log \left( \frac{\text{JPY}}{\text{CHF}} \right) + \beta_5 d \log \left( \frac{\text{DEM}}{\text{CHF}} \right) + \epsilon$$

This model can be extended to have an explanatory variable CNY/CHF, where a  $\beta_6$  parameter would pickup the extent to which the Malaysian authorities respond to a unit change in the CNY/CHF exchange rate. A number of studies have attempted to extract the role of the Yuan in the exchange rate arrangements of other currencies using this methodology and have also pointed to the shortcomings of this approach (Ito, 2008; Ma and McCauley, 2010). One of the main problems this approach would suffer is that of multicollinearity: the high correlation between the percentage changes in the USD/CHF and CNY/CHF exchange rates. As an example, from 2005 to 2010, weekly percentage changes in these two currencies had a correlation of 0.988.

Hence, we first orthogonalise the CNY/CHF exchange rate with respect to the USD/CHF exchange rate, in order to purge it of this high correlation. This is done using the regression:

$$d \log \left( \frac{\text{CNY}}{\text{CHF}} \right) = \gamma_1 d \log \left( \frac{\text{USD}}{\text{CHF}} \right) + \epsilon$$

The  $\epsilon$  from this regression represents the autonomous movement of the CNY. We term this  $d \log \left( \frac{\text{CNY}_\epsilon}{\text{CHF}} \right)$ . This time-series is plotted in Figure 2.<sup>5</sup> With this in hand, an augmented exchange rate regression can be considered:

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<sup>5</sup>Some studies have pointed out to different exchange rate arrangements for the Yuan since July 2005

$$d \log \left( \frac{\text{MYR}}{\text{CHF}} \right) = \beta_1 + \beta_2 d \log \left( \frac{\text{USD}}{\text{CHF}} \right) + \beta_3 d \log \left( \frac{\text{GBP}}{\text{CHF}} \right) + \beta_4 d \log \left( \frac{\text{JPY}}{\text{CHF}} \right) \\ + \beta_5 d \log \left( \frac{\text{DEM}}{\text{CHF}} \right) + \beta_6 d \log \left( \frac{\text{CNY}_o}{\text{CHF}} \right) + \epsilon$$

This regression would yield estimates of  $\hat{\beta}_6$ , the impact of a unit change in the orthogonalised Yuan upon the MYR/CHF exchange rate. Some economies may ignore the Yuan, while other economies may have positive values for  $\beta_6$ . There is no economic logic in favour of a negative coefficient (i.e. a country which depreciates when the Chinese appreciate). Hence, we use a one-tailed test when judging the statistical significance of  $\beta_6$ .

This regression suffers from the problem of structural change. Economies are known to change their exchange rate regime, either in terms of shifting the weights  $\beta$ , or in terms of the flexibility which is parametrised in this model through  $\sigma_\epsilon$ . In addition, changes in currency market *outcomes* can come about through changes in external shocks. As an example, tests of structure change in the exchange rate regression for Asian economies [Patnaik, Shah, Sethy, and Balasubramaniam \(2011\)](#) find there has been significant structural change in all economies. In order to address this problem, we draw on the the inferential strategy for measuring and classifying the exchange rate regime of [Zeileis, Shah, and Patnaik \(2010\)](#). This yields estimates of dates of structural change, which lead on to  $\hat{\beta}_6$  within each sub-period.

In order to assess the usefulness of this strategy, and to obtain intuition into the methodology, we first examine three examples. The first example is that of the Hong Kong dollar, which is a hard peg to the USD. For this case, the estimation strategy should consistently yield  $\hat{\beta}_6 \approx 0$ . The second example is that of the Malaysian Ringgit. This is of interest because on 22 July 2005, when the Chinese announced a change in exchange rate policy, the Malaysians immediately followed suit. The third example is that of a large exporting nation which competes with China in labour-intensive exports: India. Here, exchange rate policy might have exhibited concerns about the Yuan.

**Hong Kong** Hong Kong is a currency board, a hard peg to the USD. Hence, we expect the coefficient  $\beta_6$  to always be near 0. [Table 3](#) shows the results of our estimation strategy. It portrays two structural breaks, with small but statistically significant changes in the USD coefficient. Across all these three periods, the  $\text{CNY}_o$  coefficient is near zero.

**Malaysia** On 22 July 2005, when the Chinese announced a shift in their exchange rate regime, the Malaysian authorities followed suit. Our estimation strategy applied to

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([Funke and Gronwald, 2008](#); [Frankel, 2009](#); [Goldstein and Lardy, 2009](#); [Fidrmuc, 2010](#); [Patnaik, Shah, Sethy, and Balasubramaniam, 2011](#)). However, the difference in the time series of  $\frac{\text{CNY}_o}{\text{CHF}}$  when such structural breaks are taken into account are hardly discernible – an empirical estimation that is commented on by [Crockett \(2008\)](#).

**Table 3** A pure peg to the US dollar: Hong Kong

Start date	End date	$R^2$	USD	...	CNY <sub>o</sub>	Variance
2005-10-14	2009-03-20	1.00	1.00	...	-0.01	0.00
			(77.93)	...	(-0.22)	
2009-03-27	2009-12-11	1.00	0.99	...	-0.02	0.00
			(175.68)	...	(-0.59)	
2009-12-18	2011-02-11	1.00	1.01	...	0.00	0.00
			(38.91)	...	(0.01)	

**Table 4** The role of the CNY in the Malaysian Ringgit

Start Date	End Date	$R^2$	USD	...	CNY <sub>o</sub>	Variance
2005-10-14	2007-06-01	0.89	1.23	...	1.13	0.13
			(5.31)	...	(2.89)	
2007-06-08	2011-01-14	0.71	1.01	...	0.22	0.56
			(9.28)	...	(0.87)	

Malaysia, yields results (Table 4) that are consistent with this. For the first period, which runs till 1 June 2007, the point estimate for  $\beta_6$  is 1.13 and  $H_0 : \beta_6 = 1$  cannot be rejected. In other words, for each 1% appreciation by the Chinese, the Malaysians appreciated by roughly the same amount.

However, this exchange rate regime was abandoned on 8 June 2007, where the Malaysian authorities simultaneously dropped the  $\beta_6$  to zero, and increased flexibility, with the regression  $R^2$  going down from 0.89 to 0.71.

This analysis thus shows that there were spillovers of Chinese exchange rate policy into Malaysia from 2005 till 2007, but not thereafter.

**India** India exports labour-intensive manufacturing, and it can be argued that the authorities should be concerned about export competitiveness. Our analysis reveals a period, until 16 March 2007, when there was a small  $\beta_6$  coefficient with a point estimate of 0.86, and a  $t$  statistic of 1.67 which is significant using a one-tailed test.

On 23 March 2007, India had a structural break in the exchange rate regime, shifting towards greater flexibility. The regression  $R^2$  went down from 0.86 to 0.60. As a part of this reform, the role of Yuan was extinguished.

These three examples encourage us about the usefulness of this estimation strategy. It is then applied across 132 economies. For each country, a set of structural breaks are identified, and then a  $\beta_6$  coefficient is identified within each of these sub-periods.

In examining this large set of results, seeking statistically significant values of  $\beta_6$ , there is a possibility of data-mining bias. Even if  $H_0 : \beta_6 = 0$  were always true, if 100 tests are conducted, on average there would be five rejections at a 95% level of significance. Hence, the frequency of rejection should be compared against the size of the test in assessing whether the results merely reflect data mining.

**Table 5** The Indian rupee

Start Date	End Date	$R^2$	USD	...	CNY <sub>o</sub>	Variance
2005-10-14	2007-03-16	0.86	1.28	...	0.86	0.18
			(4.30)	...	(1.67)	
2007-03-23	2011-02-25	0.60	1.37	...	0.10	1.04
			(9.33)	...	(0.27)	

**Table 6** Where did the Yuan ever matter (post-2005)?

Angola	Argentina	Bosnia and Herzegovina		Burundi
Bolivia	Belarus		Algeria	Estonia
Eritrea	Fiji		Ethiopia	Gibraltar
Honduras	Israel		India	Kuwait
Libya	Madagascar		Macedonia	Maldives
Oman	Pakistan		Serbia	Saudi Arabia
Sierra Leone	Suriname		Seychelles	Sao Tome and Principe
Tunisia	Tanzania		Taiwan	Viet Nam
Indonesia				

## 4 Results

We analyse a total of 132 currencies of the world. This analysis reveals 375 currency-periods. Of these, there are 85 significant coefficients for the Yuan. This rejection rate, of 22.66%, well exceeds the size of the test. These results are also consistent with the findings by [Chen and Cheung \(2011\)](#) that the current role of Yuan is quite small.

### 4.1 A Yuan bloc?

Table 6 shows the economies where, in the post-2005 period, there was even one sub-period where the Yuan coefficient was significant at a 95% level of significance. Detailed results for these currency-periods, where the Yuan mattered, are presented in Appendix A. This reveals an interesting footprint of Chinese exchange rate policy, in some large developing economies (e.g. India), many economies in Africa, some close allies (e.g. Pakistan) and even one OECD country (Israel).

In seven of the thirty-four economies for which the Yuan is significant, gross trade with the USA is higher than that with China. For the rest, China is one of the biggest gross (and net) trading partner and surpasses that with the USA. Table 7 presents one of the two underlying channels of influence: trade relationship with China for a sample set of economies. The other channel of influence, export competitiveness, is also likely to have played a role in all these economies. For instance, although China is India's largest gross trading partner, it competes with China on export of certain goods and services to common destinations such as Europe and North America.

**Table 7** Gross trade with China and USA

	per cent of total gross trade			
	2001		2010	
	China	USA	China	USA
Angola	9.25	33.21	37.22	22.37
Argentina	8.18	13.18	14.14	8.89
Ethiopa	5.48	5.84	18.82	5.83
Belarus	0.64	1.41	3.61	0.76
India	3.44	13.69	11.56	9.40
Kuwait	3.22	12.06	10.75	11.11
Libya	0.44	0.25	10.25	4.87
Madagascar	4.10	14.27	15.79	5.22
Oman	5.42	4.79	19.47	2.88
Pakistan	4.41	15.92	15.77	9.95
Saudi Arabia	4.49	18.72	13.62	12.66
Sierra Leone	4.06	5.89	10.17	8.12
Tanzania	3.04	2.56	20.75	2.50
Indonesia	4.56	12.54	13.57	8.05

Source: IMF Direction of Trade Statistics.

**Table 8** To whom does the Yuan matter in East Asia?

Start Date	End Date	$R^2$	USD	CNY	Variance
<i>Malaysia</i>					
2005-10-14	2007-06-11	0.89	1.23 (5.31)	1.13 (9.28)	0.13
<i>Taiwan</i>					
2005-10-14	2011-02-11	0.83	1.03 (14.23)	0.45 (2.67)	0.26
<i>Viet Nam</i>					
2009-10-16	2011-02-11	0.71	0.82 (3.90)	1.39 (2.51)	0.72

## 4.2 An East Asian Yuan bloc?

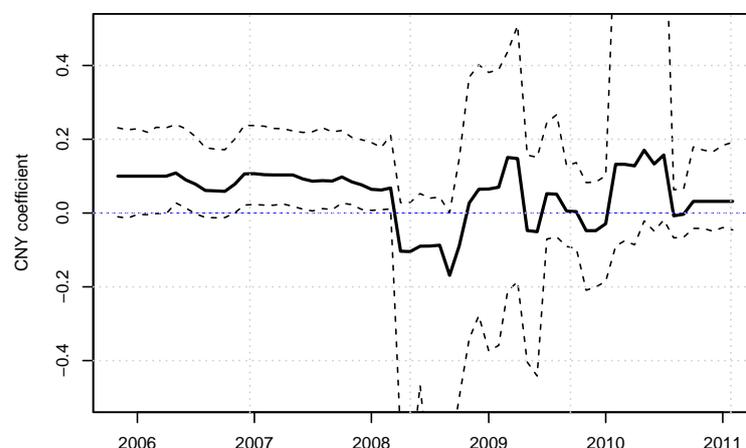
For this analysis, we define East Asia as: Malaysia, Indonesia, Philippines, South Korea, Taiwan, Hong Kong, Singapore, Thailand and Viet Nam. When our estimation strategy is applied to these 9 economies, 23 currency-periods are identified. Of these, there are three situations where the  $CNY_o$  coefficient is significant using a 95% level of significance. This rejection rate of  $H_0 : \beta_6 = 0$ , of 13%, exceeds the size of the test.

As seen in Table 8, the Malaysian exchange rate regime involved a role for the Yuan, but this ended in June 2007. In Viet Nam's case, from 16 October 2009 onwards, there is a statistically significant  $\beta_6$ . Here also, the null hypothesis of  $H_0 : \beta_6 = 1$  cannot be rejected, so we can say that the Viet Nameese authorities appreciate by 1% for each 1 percentage point appreciation in China. Finally, the Taiwanese exchange rate regime has not had any structural break through this period, and the point estimate for  $\beta_6$  is 0.45.

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**Figure 3** GDP-weighted CNY coefficient

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Ordering these events in time, we see that in October 2005, Taiwan and Malaysia both cared about the Yuan. In June 2007, the Malaysians stepped away from the Yuan. In October 2009, the Viet Nameese initiated a role for the Yuan in their exchange rate regime. Thus, in February 2011, two of the nine economies of Asia had a role for the Yuan in their exchange rate regime.

### 4.3 What is the magnitude of the role of the Yuan?

In order to obtain a summary statement about the role of the Yuan in international exchange rate arrangements, at each point in time, we compute the GDP-weighted average of the  $\hat{\beta}_6$  for all economies. Bootstrap inference is used to construct the 95% confidence interval for this estimate.

These results are shown in Figure 3. They show a period from 2006 to 2008, where the overall average coefficient was teetering into significance. However, by early 2008, many structural breaks appear to have taken place in exchange rate regimes. From early 2008 onwards, the overall GDP-weighted average coefficient for  $CNY_o$  is indistinguishable from zero.

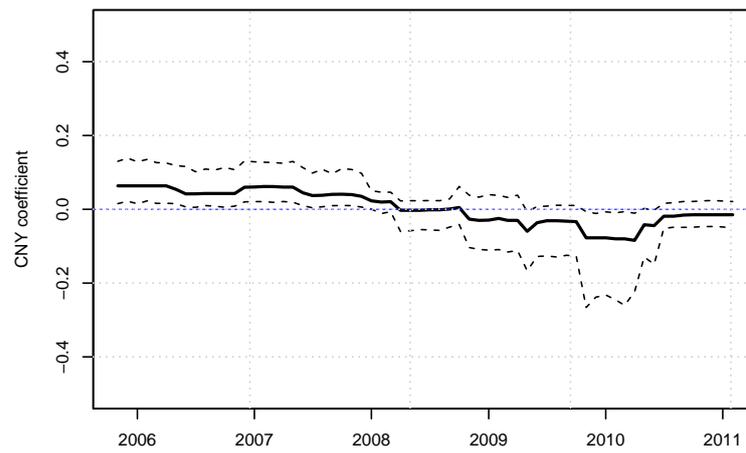
Given that the economies with the biggest GDPs in the world tend to have floating exchange rates, we turn to the set of emerging markets and LDCs. This analysis is shown in Figure 4. Here also, we see that from early 2006 till late 2007, there was statistical significance in the GDP-weighted Yuan coefficient. But from early 2008 onwards, this has subsided.

Finally, Figure 4 focuses only on Asia. Here, it appears that from mid-2006 onwards, there has been statistical significance, other than a crisis interlude in which this was interrupted. At the same time, the developments on Yuan internationalisation from 2009 onwards have not, as yet, led to a change in the role of the Yuan in the Asian exchange rate arrangement.

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**Figure 4** The CNY in EMs and LDCs

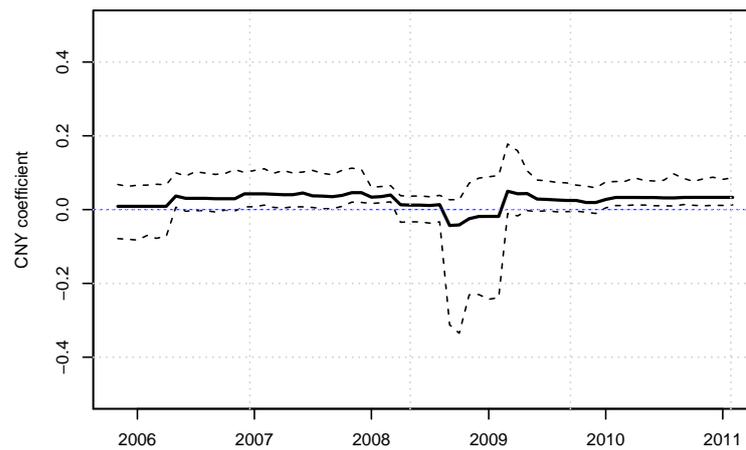
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**Figure 5** The CNY in Asia

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## 5 Conclusion

The emergence of China as a very large economy, with a very high trade/GDP ratio, has led many observers to expect that the Yuan will become a major international currency. In recent years, the Chinese authorities have undertaken significant moves on Yuan internationalisation, with the establishment of payments mechanisms for Yuan settlement, swap lines in Yuan, and controlled convertibility with Hong Kong.

In this paper, we have utilised recent advances in measurement of the exchange rate regime in order to measure one dimension of Yuan internationalisation: the role of the Yuan in global exchange rate regimes.

Our results suggest that the role of the Yuan in the exchange rate arrangements of other currencies was significant when the Yuan was not pegged to the USD. As many as 34 currencies were influenced by the Chinese exchange rate. However, with the reinstatement of the peg to the dollar in 2008, the role of the Yuan declined.

Throughout the period of analysis, the footprint in East Asia has been small and restricted to Malaysia (between October 2005 and June 2007), Taiwan (throughout) and Viet Nam (October 2009 till date). In February 2011, at the end of the dataset, the role of the Yuan was relatively modest. While the null hypothesis of zero can be rejected, the GDP-weighted coefficient of the autonomous movements in the Yuan in Asia is small. The GDP-weighted coefficient is roughly zero when computed at the level of LDCs and EMs and when computed for the entire world.

These results must also be viewed in the context of small movements in the Yuan-Dollar rate in the recent period. The Yuan may have decades to go before it gains economic significance as an internationalised currency and the process, as [Lee \(2010b\)](#) concludes, may be systematic and drawn out. However, as our analysis shows, a large number of economies in the world have cared about the Yuan despite small movements in the Yuan-Dollar rate since 2005. Though the magnitude of Yuan's role in the exchange rate arrangements of economies across the world has been subdued, it could potentially rise with greater flexibility in the Yuan-Dollar rate.

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## A Who cared about the Chinese Yuan?

Table 9: Who cared about the Chinese Yuan?					
Start Date	End Date	$R^2$	USD	CNY	Variance
Republic of Angola					
2006-11-24	2007-05-18	0.71	0.85 (0.71)	6.24 (3.29)	0.79
People's Democratic Republic of Algeria					
2008-10-17	2009-04-10	0.59	1.67 (2.67)	4.43 (1.79)	3.85
Argentine Republic					
2005-10-14	2008-09-05	0.90	0.98 (7.20)	0.33 (1.68)	0.18
2008-09-12	2009-04-10	0.84	1.28 (4.59)	2.63 (2.31)	0.97
Republic of Belarus					
2007-12-28	2008-11-14	1.00	1.01 (36.12)	0.11 (2.12)	0.01
Plurinational State of Bolivia					
2007-06-15	2009-06-12	0.97	1.10 (16.82)	0.35 (2.41)	0.10
Republic of Bosnia and Herzegovina					
2005-10-14	2008-08-08	0.61	1.15 (4.53)	0.78 (2.17)	0.56
Republic of Burundi					
2009-10-16	2011-02-25	0.96	1.00 (14.85)	0.45 (2.51)	0.08
Western African Franc					
2007-04-20	2007-12-07	1.00	1.97 (97.14)	0.05 (2.00)	0.00
2008-07-04	2009-01-30	0.92	1.87 (15.27)	0.80 (2.42)	0.13
2009-02-06	2011-02-25	0.99	1.96 (95.53)	0.20 (3.33)	0.01
Central African Republic					
2008-02-01	2009-01-30	0.93	1.97 (23.27)	0.45 (2.36)	0.10
Republic of Estonia					
2005-10-14	2010-01-08	0.96	2.00 (71.06)	0.11 (1.82)	0.02
Federal Democratic Republic of Ethiopia					
2009-01-09	2010-02-26	0.47	1.33 (2.23)	8.54 (1.87)	2.11
Republic of the Fiji Islands					
2005-10-14	2008-10-03	0.63	1.65 (7.66)	0.75 (2.27)	0.52
French Polynesia					
2005-10-14	2009-05-08	0.37	1.82 (8.70)	0.92 (2.08)	1.19

Republic of Honduras					
2009-02-06	2009-10-02	1.00	0.99 (157.92)	0.21 (3.78)	0.00
Republic of India					
2005-10-14	2007-03-16	0.86	1.28 (4.30)	0.86 (1.67)	0.18
State of Israel					
2005-10-14	2007-12-07	0.63	2.45 (6.27)	1.51 (2.55)	0.66
State of Kuwait					
2007-05-25	2008-10-03	0.96	1.02 (9.99)	0.28 (1.86)	0.07
2008-10-10	2009-04-03	0.92	1.03 (5.43)	1.45 (1.90)	0.39
Socialist People's Libyan Arab Jamahiriya					
2005-10-14	2011-02-25	0.71	1.31 (12.00)	0.45 (1.72)	0.62
The Former Yugoslav Republic of Macedonia					
2005-10-14	2008-07-04	0.62	1.43 (6.51)	0.69 (2.21)	0.40
Republic of Madagascar					
2005-10-14	2008-09-05	0.48	1.12 (3.75)	0.81 (1.87)	0.86
Republic of Maldives					
2007-06-01	2011-02-25	1.00	0.99 (140.44)	0.04 (2.58)	0.00
Sultanate of Oman					
2010-01-29	2011-02-25	1.00	1.00 (211.64)	0.04 (3.01)	0.00
Islamic Republic of Pakistan					
2007-12-28	2008-11-21	0.73	1.57 (3.52)	2.15 (2.32)	1.78
Democratic Republic of Sao Tome and Principe					
2008-02-15	2009-03-27	1.00	1.00 (69.86)	0.10 (2.68)	0.00
Kingdom of Saudi Arabia					
2008-09-26	2009-06-26	1.00	0.96 (60.00)	0.13 (2.06)	0.00
Republic of Serbia					
2005-10-14	2006-06-23	0.68	3.41 (5.59)	2.14 (2.06)	0.17
Republic of Seychelles					
2007-10-12	2008-08-08	1.00	1.04 (23.25)	0.14 (2.12)	0.01
Republic of Sierra Leone					
2005-10-14	2006-04-07	0.99	1.10 (4.76)	0.75 (1.68)	0.02
Republic of Suriname					
2005-10-14	2006-04-07	0.99	1.10 (4.76)	0.75 (1.68)	0.02

Taiwan, Province of China					
2005-10-14	2011-02-25	0.83	1.05 (14.57)	0.45 (2.64)	0.27
United Republic of Tanzania					
2005-10-14	2007-10-05	0.56	0.27 (0.50)	2.06 (2.49)	0.94
Republic of Tunisia					
2008-10-10	2011-02-25	0.82	1.54 (20.47)	0.44 (1.93)	0.20
Socialist Republic of Viet Nam					
2009-10-16	2011-02-25	0.72	0.84 (4.05)	1.36 (2.49)	0.71