Is China or India more financially open?

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Abstract

This paper starts with the disagreement between the Chinn-Ito measure of de jure capital account openness and the Lane-Milesi-Ferretti measure of de facto capital account openness for China and India. It then examines six dimensions of de facto capital account openness. Of these, we give prominence to measures based on the on/offshore deviations from the law of one price and also introduce two new dimensions into the debate: the openness of *consolidated* banking systems and the internationalisation of currencies. In three of the six dimensions, the Indian economy appears to be more open financially. Generally, the measures show both economies becoming more financially open over time. Nevertheless, policy continues to segment onshore and offshore markets and policymakers in each country face challenges in further financial integration.

# Contents

1.   Introduction

The world economy has an immense stake in China's and India's smoothly integrating their finances into global markets. Were either to suffer anything like the Asian financial crisis of the late 1990s, it would be bad news for the world at large. It is as if these economies were travelling a road lined with memorials to victims of previous accidents.

How China and India manage capital flows has gained salience recently. Capital inflows enabled a credit and asset price boom and bust in the United States and central banks in major advanced economies have since set policy interest rates at zero and expanded their balance sheets. These have renewed interest in capital controls.[2] Recent research places them in a broad policy context, including prudential, monetary and exchange rate policy.[3]

This study examines the international financial integration of China and India, subjects of repeated comparisons.[4] Both are on the road to opening up to capital flows. Yet economists disagree on these economies' location on the road and their speed of movement.

Much analysis uses the Chinn-Ito (2006, 2008) index, an interval, *de jure* measure derived from four on-off variables in the IMF *Annual Report on Exchange Arrangements and Restrictions* (Graph 1, left-hand panel).[5] According to this measure, China and India are stalled on the road. "The most widely used measure" (IMF, 2010, p 51)) of *de facto* openness is the ratio of the sum of international assets and liabilities to GDP (Lane and Milesi–Ferretti (2003, 2007)), Graph 1, right-hand panel). It shows both moving forward, that is, opening up.

Graph 1

Capital account openness

Chinn-Ito indices

International assets and liabilities (% of GDP)
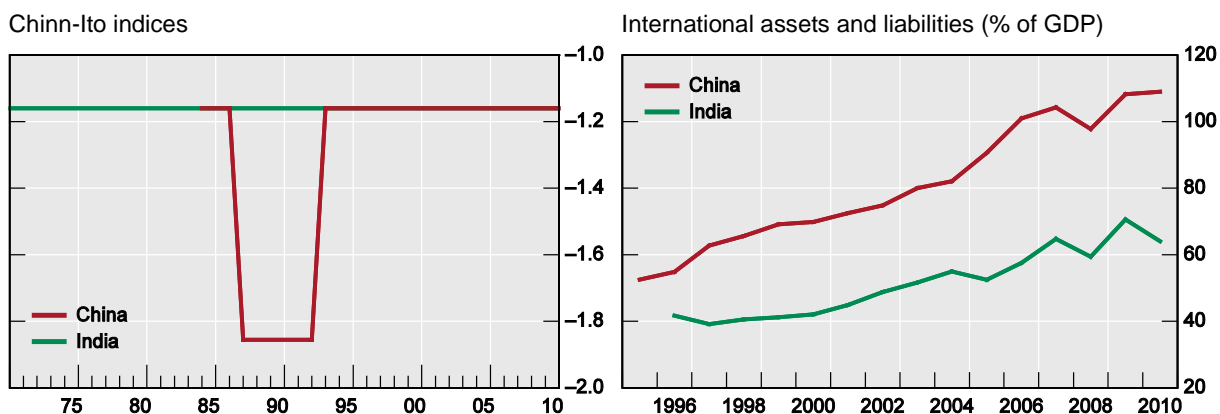
Sources: IMF *IFS*; IMF *WEO*; the Chinn-Ito index from http://web.pdx.edu/~ito/Chinn-Ito_website.htm; Lane and Milesi-Ferretti (2007) from http://www.philiplane.org/EWN.html .

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[2]   See Bernanke (2011), Bernanke et al (2011); on capital controls, see Ostry et al (2010, 2011a,b), IMF (2011), Pardee Centre (2012). Empirical investigation of capital controls has surged; see Magud et al (2011).

[3]   See Glick and Hutchison (2009), Aizenman, Chinn and Ito (2010a,b, 2011, 2012), Kohli (2011), Mohan and Kapur (2011a,b). Hutchison et al (2012), Patnaik and Shah (2012).

[4]   See Srinivasan (2004a,b), Lane (2006), Lane and Schmuckler (2007), Bussière and Mehl (2008), Ma and McCauley (2008c), Bardhan (2010), Aizenman and Sengupta (2011).

[5]   A wider coding (Schindler (2009)) has not been as much used.

Thus, Lane and Milesi-Ferretti disagree with Chinn and Ito on the comparison of China and India. In the cross-section, the former suggests that China is more open, while the latter pegs China and India as equally closed. As noted, in the time series, the former suggests that both economies are opening up, while the latter suggests shared stasis. Quinn et al (2011) note that the information conveyed by de jure measures like Chinn-Ito differs from that conveyed by the de facto measures. Like Gupta Sen (2010), Patnaik and Shah (2012, p 195) note the time series difference and criticise Chinn-Ito for "not adequately captur[ing] the gradual easing of capital controls, since it continues to give the same score unless all restrictions [in any dimension] are removed".

We approach this question by gathering in one place existing de facto measures and by proposing two new measures, namely the **internationalisation of consolidated banking systems** and **currency internationalisation**. Both use BIS data. For our price-based measures, we analyse average on/offshore deviations and speed of convergence. We discuss differences across measures and draw conclusions based on all six dimensions.[6]

We advance three hypotheses, two in the time series (ts) and one in the cross-section (xs):

- Hts1: Lane-Milesi-Ferretti is right: both China and India are opening.

- Hxs1: Chinn-Ito and Lane-Milesi-Ferretti are wrong: India is more open than China.

- Hts2: Both China *and* India remain some distance from financial openness.

This paper is organised in eight sections. The next two sections take up measures of integration based on prices. Section 2 analyses currency and fixed income markets, and Section 3 equity markets. Taking a macroeconomic approach, Section 4 reports Feldstein-Horioka regressions of investment on savings flows in the two economies. The remaining sections focus on financial stocks and flows. Section 5 discusses Lane-Milesi-Ferretti ratios of external positions and flows to activity. Sections 6 and 7 introduce consolidated measures of banking and securities market integration and currency internationalisation into the debate. Section 8 puts the measures together and Section 9 concludes.

2.   Generalised Frankel analysis of on-offshore yield gaps

This section contrasts foreign exchange and interest rates onshore in Shanghai or Mumbai, on the one hand, and offshore, in Hong Kong, Singapore, London or New York, on the other. The general idea is that financial integration and capital mobility would more or less equalise onshore and offshore exchange and interest rates for the renminbi and rupee (Frankel, 1992). The currency that displays smaller differences in rates and yields at home and abroad indicates an economy more financially open or integrated.

We define these cross-border price or yield gaps consistently across instruments such that a positive value indicates that financial contracts are cheaper onshore. In the case of foreign exchange, a positive onshore/offshore forward gap indicates that a dollar exchanges for more renminbi or rupee onshore in Shanghai or Mumbai than offshore. In the case of money market instruments and bonds, a positive gap indicates that a given stream of fixed payments is cheaper (ie yields are higher) in Shanghai or Mumbai than offshore. A bigger onshore/offshore gap suggests less financial openness.

The evidence from all three markets points to greater financial integration of India than China in 2003-2012. Moreover, the three financial instruments are generally cheaper onshore than

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[6]   Data reduction methods are an option (OECD, 2005)). But Dawes (1979) argues that even improper linear models are conducive to robust decisions.

offshore for both China and India, indicating that on average both economies face pressures from non-residents wishing to invest in the countries in the course of their financial opening.

2.1 Onshore and offshore foreign exchange forwards

Both countries have had onshore forward foreign exchange markets since China inaugurated its market in 2003. Since traders can gain access to the domestic forward currency market only on the basis of "real demand", ie underlying transactions backed by trade documents, domestic forward exchange rates can differ from those in the offshore non-deliverable market, where all comers can transact.[7] With arbitrage, one would expect forward rates onshore and offshore to reflect the relevant rates of interest on local currency and dollars; however, owing to restrictions, dollars can yield more onshore than in global money markets while the domestic currency can yield more or less offshore as compared to onshore, depending on the weight of speculative positioning.

We define the onshore-offshore forward premium gap as follows:

$$\text{Forward premium gap}_t = (F_t - NDF_t)/S_t \tag{1}$$

where F_t is the onshore forward expressed as domestic currency per US dollar; NDF_t is the nondeliverable offshore forward expressed in the same way; and S_t is the onshore spot exchange rate. A positive forward premium gap indicates the respective currency is cheaper, that is, priced for less appreciation, onshore than offshore.

This straightforward measure requires no assumption about the relevant dollar interest rate (Liu and Otani, 2005). In particular, it is robust to the heterogeneity of dollar yields during the so-called dollar shortage after the Lehman failure—although clearly the offshore NDF depreciated sharply in both cases then, leaving the offshore forward cheap in relation to the more stable onshore rate (a negative gap in Graph 2).

Graph 2

Onshore foreign exchange forward less offshore NDF

As a percentage of spot rate
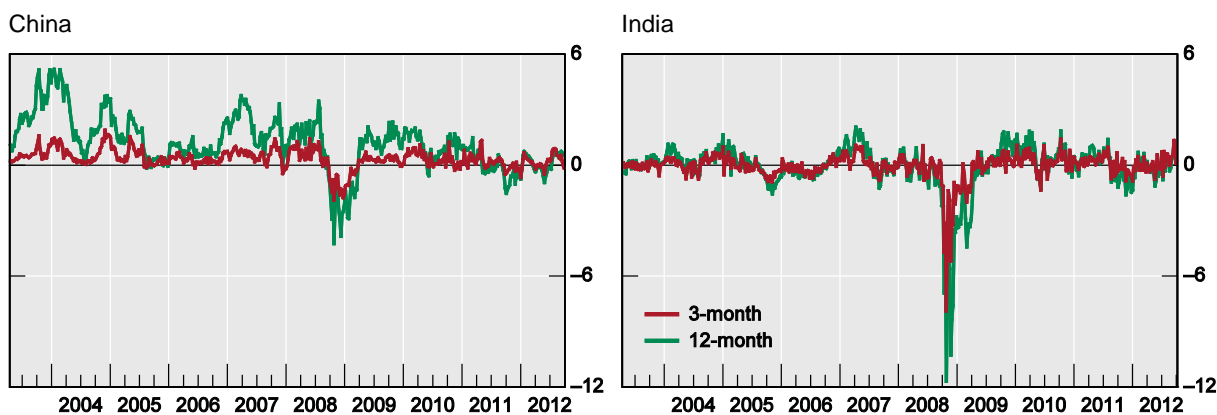
Sources: Bloomberg; CEIC.

On average over the period 2003-2012, the forward Chinese renminbi traded more cheaply in the onshore market than offshore, while forward Indian rupee traded at much the same level (Table 1, third row). In particular, forwards in Shanghai have offered 0.33% to over 1%

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[7] This nondeliverable market came into existence as a side bet among non-residents denied access to the onshore market. See Ma, Ho and McCauley (2004); Misra and Behera (2006); and Ma and McCauley (2008a, b, and c)..

more renminbi per dollar than those offshore while forwards in Mumbai have traded within 0.01-0.13% of those offshore. Excluding the most tumultuous period of the global financial crisis, September through December 2008, makes surprisingly little difference.

Table 1: Onshore less offshore foreign exchange forward premiums[1]

As a percentage of the spot

	CNY				INR			
	3-month		12-month		3-month		12-month	
	Full sample	Excl. crisis	Full sample	Excl. crisis	Full sample	Excl. crisis	Full sample	Excl. crisis
Maximum	1.89	1.89	5.67	5.67	1.89	1.89	2.55	2.55
Minimum	−3.07	−1.22	−5.45	−2.90	−9.85	−3.42	−13.64	−5.98
Average	0.33	0.38	1.20	1.31	−0.09	−0.01	−0.13	0.03
Average of abs. value	0.46	0.44	1.49	1.48	0.41	0.34	0.74	0.60
Annualised volatility	8.05	6.82	23.03	21.20	11.55	7.59	20.87	13.70
Corr (F_t, NDF_t)	1.00	1.00	0.99	0.99	0.99	0.99	0.99	0.99

[1] Daily data of forward premium gap is calculated as the difference between onshore forward and offshore non-deliverable forward as a percentage of spot price. The full sample period is between April 7, 2003 and June 30, 2012 while the period of September to December 2008 is excluded for the sample excluding crisis.

Sources: Bloomberg, CEIC.

In absolute terms, the comparison of the forward exchange rate gaps varies by maturity. At the 3-month maturity, the absolute value of the gap is quite similar at somewhat less than a half percent of the spot exchange rate (Table 1, fourth row). But the rupee's forward premium gap at the 12-month maturity is less than half of the renminbi's, suggesting greater financial integration of the former.

2.2   Onshore and offshore short-term interest rates

Our next measure recasts the information contained in the non-deliverable forward into an offshore interest rate that can be compared to the onshore interest rate. This inference from NDF-implied money rates allowed Ma et al (2004) and Ma and McCauley (2008a and b) to draw the onshore-offshore comparison that Otani and Tiwari (1981) consulted for the effectiveness of capital controls on the yen and Frankel (1992) recommends as the test for capital mobility. Absent capital controls, the forward exchange rate of the home currency is linked by arbitrage to its spot rate and the interest rate differential between the home currency and the dollar through covered interest parity

$$F = S(1+r)/(1+r^\$), \tag{2}$$

where r is the onshore interest rate on the home currency and $r^\$$ the dollar interest rate. When there are no cross-border restrictions, borrowing and lending ensure that the above holds in normal times. However, when capital controls bind, non-residents may not have full access to onshore credit or placements, giving rising to NDFs.

$$NDF = S(1+i)/(1+r^\$) \tag{3}$$

where i is the NDF-implied yield on the home currency offshore. The onshore-offshore money yield gap is defined as (r-i). If it differs significantly from zero, money markets on the same currency are segmented. A positive money yield gap indicates that short-term money market instruments are priced cheaper (have a higher yield) onshore than offshore. A smaller mean of the absolute yield gap points to greater financial openness.
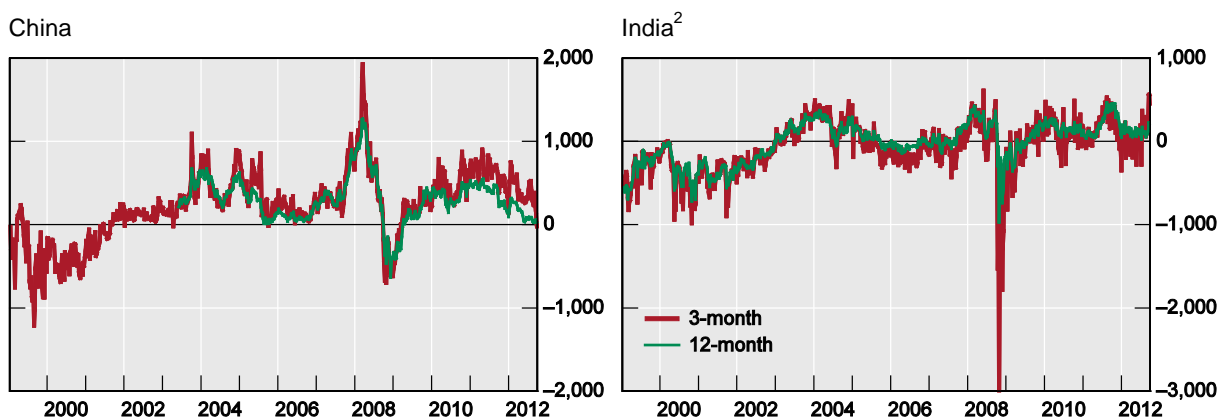
The global financial crisis, however, created a problem for the required inference by leading to a generalised breakdown in covered interest parity (Baba and Packer (2009), and Chen (2012)). A Martian examining deviations from the covered interest parity in the last four

months of 2008 might conclude that there had been a global adoption of capital controls. With a global "dollar shortage" (McGuire and von Peter (2009)), it becomes very risky to insert US dollar Libor into Equation 3 in order to back out the offshore yield of the renminbi or rupee.[8] All that said, the gap between the onshore and offshore money yields can serve as a useful measure of financial integration, particularly in calmer times (Hutchison et al, 2010 and 2011, and Kohli, 2011).

The relationship between onshore and offshore yields showed similarities and differences in 2003-2012. On average, the sign was positive for both the 3-month and 12-month instruments, indicating cheaper short-term money market instruments onshore (Graph 3). Both currencies spent most of this sample period under appreciation pressure, with non-residents paying up by accepting lower renminbi or rupee interest rates embedded in the non-deliverable offshore instruments.

Graph 3

Onshore money market yield less offshore NDF-implied yield[1]

In basis point

[1] Weekly data. For China: 3-month (12-month) NDF, three-month CHIBOR (one-year PBOC bill auction yield before Jul 2008; secondary market yield thereafter), and 3-month (12-month) LIBOR. For India: 3-month (12-month) NDF, 91-day (364-day) treasury bill implicit yield, and 3-month (12-month) LIBOR.   [2] -3240 bps on 20 Oct 2008.

Sources: Bloomberg; CEIC.

That similarity aside, however, the evidence strongly suggests that arbitrage had freer play in India to keep onshore and offshore yields in line. In particular, the average yield gap of the renminbi was ten times as large that of the rupee at the three-month maturity and three times as large at the 12-month maturity (Table 2), indicating China's more limited financial integration. With respect to absolute value of the differences, the renminbi's yield gap was twice that of the rupee. Excluding the most acute months of the global financial crisis does not much change these observations. In terms of the time series, inspection of Graph 3 confirms and extends the finding of Kohli (2011) that the Indian off/onshore yield spread narrowed in 2004-2008 from that seen through 2003. Graph 3 is also consistent with the evidence of Hutchison et al (2011) that from 2008, the non-arbitrage band inferred from this yield gap shrank for the rupee but not for the renminbi.

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[8]   In a path-breaking paper, Mancini and Ranaldo (2011) abandon the use of Libor and use the combination of overnight repo rates and overnight index swaps to build up effective term rates in order to measure deviations from interest rate parity. See Chen (2012) for a different way to deal with the problem.

Table 2: Onshore money market yield less offshore NDF-implied yield[1]

In basis points

	CNY				INR			
	3-month		12-month		3-month		12-month	
	Full sample	Excl. crisis	Full sample	Excl. crisis	Full sample	Excl. crisis	Full sample	Excl. crisis
Maximum	2117	2117	1336	1336	735	735	552	552
Minimum	−1397	−525	−796	−425	−3904	−1472	−1173	−428
Average	399	427	312	332	31	56	102	112
Average of abs. value	437	438	345	348	206	186	151	146
Annualised volatility	5295	4734	4358	4030	4841	3652	2608	2303
Corr (Onshore, offshore)	−0.12	−0.17	−0.32	−0.38	0.56	0.63	0.65	0.69

[1] Daily data. For China: 3-month (12-month) NDF, three-month CHIBOR (one-year PBOC bill auction yield before Jul 2008; secondary market yield thereafter), and 3-month (12-month) LIBOR. For India: 3-month (12-month) NDF, 91-day (364-day) treasury bill implicit yield, and 3-month (12-month) LIBOR. The full sample period is between May 26, 2003 and June 30, 2012 while the period of September to December 2008 is excluded for the sample excluding crisis.

Sources: Bloomberg, CEIC.

2.3   Onshore and offshore bond yields

One can also test for the equality of yields on- and offshore at the longer end of the yield curves. In both currencies, offshore market participants can enter into essentially longer-term version of short-term nondeliverable currency transactions. Instead of, in effect, exchanging dollars against renminbi or rupee over a six or twelve month horizon, market participants can borrow or lend renminbi or rupee at a fixed rate for longer terms against floating-rate dollars, settling up differences between the streams of payments in dollars.

Thus one useful measure of the onshore and offshore bond yield gap is onshore government bond yield less offshore cross currency swap, at the three-year maturity in our case (Graph 4).[9] A positive bond yield gap indicates bonds are priced cheaper onshore than offshore and a wider yield gap reveals greater bond market segmentation. By juxtaposing bank-related private yields offshore to sovereign yields onshore, we accept a credit mismatch in order to use data from the liquid government bond market as the representative onshore yield.[10]

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[9]   Note that range of Graph 4 of 1750 basis points is narrower than the 4000 basis point range of Graph 3.

[10]   To the extent that the Chinese sovereign is a stronger credit than the Indian sovereign, our use of the government bond will tend to bias the comparison toward finding a smaller gap for China. Therefore, our finding of a larger gap for China is strengthened by the difference in the credit-worthiness of the two sovereigns.

Graph 4

Domestic government bonds less non-deliverable cross-currency swaps[1]

In basis points

[1] Three-year maturity.

Source: Bloomberg.

In the local currency bond markets as in the forward currency and money markets, onshore and offshore markets are segmented, but to different extents (Table 3). First, bonds have been priced cheaper onshore than offshore for both China and India. Second, the cross-border wedge in bond yields is on average larger for the renminbi than the rupee. Third, the onshore and offshore bonds are negatively correlated for the renminbi but positively so for the rupee. Our evidence on the bond yield gap once again indicates greater financial openness for India than China.

Table 3: Onshore less offshore bond yields for the CNY and INR[1]

In basis point

	CNY		INR	
	Full sample	Excl. crisis	Full sample	Excl. crisis
Maximum	824.00	824.00	489.18	489.18
Minimum	−583.00	−368.00	−129.20	−83.40
Average	213.32	229.77	175.99	176.80
Average of abs. value	246.61	247.62	178.42	178.49
Corr (Onshore, offshore)	−38.83	−39.67	58.83	60.08

[1] Daily data. Bond premium is calculated as the difference between three-year onshore government bond yield and three-year offshore non-deliverable swaps rate. The full sample period is between March 28, 2003 and June 30, 2012 while the period of September to December 2008 is excluded for the sample excluding crisis.

Source: Bloomberg.

To reinforce this finding, we show in Graph 5 how much more expensive (lower yielding) Chinese government bonds trade offshore than offshore. This is a natural experiment that the Chinese Ministry of Finance has performed, but the Indian Ministry of Finance has not. The green line is the Chinese government bond yield curve in Shanghai, while the red dots the yields on renminbi-denominated Chinese government bond that were issued in Hong Kong. Same obligor, same currency and same maturity: the only difference is the market access of foreign investors. On 30 November 2010 and 17 August 2011, when the Ministry of Finance issued bonds offshore, it reduced borrowing costs relative to the levels prevailing onshore. By mid-2012, however, the renminbi bond yields offshore had to some extent

converged to those onshore. We interpret the latest observation in Graph 5 as reflecting more conjunctural developments than a significant relaxation in the controls that segment the two renminbi bond markets.[11]

Graph 5

Chinese government renminbi bond yields, onshore and offshore

In per cent

Source: Bloomberg.

The results of this natural experiment hang together with the evidence on currencies, money market instruments and bonds in the rest of this section. Foreign investors pay up more in the offshore markets for renminbi instruments relative to prices onshore.

3.   International integration of the domestic equity market

Another natural experiment has been run by both the Chinese and Indian authorities in allowing shares in particular companies to be traded ("cross-listed") not only in Shanghai or Mumbai but also in Hong Kong or New York. Given time zone differences (which are absent in the case of Chinese shares listed in Shanghai and Hong Kong), deviations from the law of one price point to markets segmented by official limits on foreign shareholdings in domestic markets.[12] Thus, following (Levy-Yeyati et al, 2009), we analyse the prices of identical shares traded inside and outside each country, their differences and speeds of convergence.

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[11] For one thing, the slowdown in the Chinese economy caused the domestic yield curve to shift down, and it would have taken negative yields at the short end to maintain the spread. In addition, the risk-off mode in global markets squeezed speculative demand for the offshore bonds. Most important, offshore investors lost confidence that the renminbi was a one-way bet against the dollar.

[12] In principle, there are two channels for portfolio equity inflows — one is to let foreign investors into the domestic stock markets, and the other is to raise proceeds through overseas listing of domestic companies. Regarding the first channel, China caps inflows via the Qualified Foreign Institutional Investor (QFII) scheme (in which quotas have generally been fully used), while India imposes neither quota nor minimum investment period on inflows by registered Foreign Institutional Investor (FII). For the second route, most Indian public companies have chosen to be listed locally ("M shares") first and some later also seek overseas listing as American depository receipts (ADR). In contrast, the Chinese blue chip companies typically opted to have first listed in Hong Kong ("H-shares"), some of which subsequently have also been listed in Shanghai ("A shares") and New York (ADR).
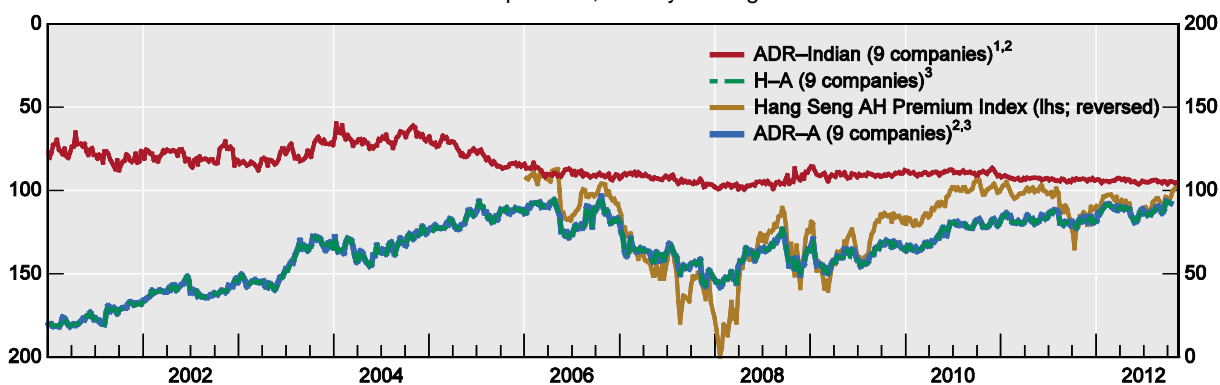
Equity markets support conclusions that accord with our overall hypotheses: India's equity market is evidently much more internationally integrated than that of China in that the size of cross-market share price premium or discount is on average smaller for Indian companies than for their Chinese counterparts. And the onshore and offshore markets for both Chinese and Indian shares have become more integrated over our sample period. But the cross-border integration of both equity markets has a long way to go when measured against the integration evident in the trading of Chinese shares in Hong Kong and New York.

We measure the onshore/offshore differences in share prices by constructing our own indices of shares that are cross-listed in Shanghai, Hong Kong and New York, on the one hand (Peng et al, 2008), and Mumbai and New York on the other (Ma and McCauley, 2008c). The price gap is defined as the ratio of the offshore to onshore prices so that a ratio greater than unity suggests the same stock shares trade cheaper onshore than offshore. Individual share price differentials are weighted by the market capitalisations in Hong Kong and Mumbai (Graph 6). As a check, we also graph the Hang Seng China AH [A shares in Shanghai, H shares in Hong Kong] Premium Index (McCauley, 2011).

Graph 6

Ratios of overseas share prices to equivalent local share prices

In per cent; weekly average

[1] Weighted average of ICICI Bank, Wirpo, Dr. Reddy's Laboratories, HDFC Bank, Sterlite Industries (India), Mahanagar Telephone Nigam, Teta Motors, Teta Communications and Infosys Technologies based on their market capitalization at National Stock Exchange of India and Bombay Stock Exchange.   [2] Ratio of Asian closing and New York opening of the same day.   [3] Weighted average of China Eastern Airlines, China Life Insurance, China Petroleum & Chemical, China Southern Airlines, Guangshen Railway, Huaneng Power International, Sinopec Shanghai Petrochemical, Aluminum Corporation of China and Petro China based on their market capitalization at Hong Kong Stock Exchange.

Sources: Bloomberg; authors' calculations.

A threshold observation from Graph 6 is that the red line for India lies above 100, while the blue, green and yellow lines for China lie below 100. Indian shares, like Chinese and Indian currency forwards and fixed income products, tend to be cheaper in Mumbai. By contrast, Chinese shares consistently trade at a premium in Shanghai over their prices in Hong Kong or New York. In other words, global investors generally wish they could buy the rupee and rupee fixed income products at Mumbai prices and similarly, global investors wish they could buy the renminbi and renminbi fixed income products at Shanghai prices. Global investors also wish they could buy Indian shares at Mumbai prices, but they happily buy Chinese equities at Hong Kong or New York prices.

To analyse the size of the onshore-offshore price gaps and their dynamics, we model the evolution of the H-A share price premium for those Chinese companies that are dual-listed in Shanghai and Hong Kong. For Chinese companies triple-listed in New York as ADRs as well, we model their H-A, ADR-A and ADR-H share price premium. In particular, the ADR-H premium serves as a benchmark of real-world full financial integration, given that there is little restriction beyond the clock to arbitrage between Hong Kong and New York. Finally, we

model the ADR-M share price premium of the Indian companies dual-listed in New York and Mumbai.

Our estimations use the following equation, following Peng et al (2008):

$$\Delta q_{i,t} = \alpha + \beta q_{i,t-1} + \Sigma\, \varphi_n\, \Delta q_{i,t-n} + \varepsilon_{i,t} \qquad (4)$$

where $q_{i,t}$ is the logarithm of the overseas-local share price ratio for the cross-listed companies, Δ is the first difference operator.[13] As a measure of the average cross market share price premium, $\alpha = 0$ would suggest that the price gap has a zero mean and the share prices of cross-listed companies will eventually equalise. On the other hand, $\alpha \neq 0$ would imply long-run or persistent premium/discount. An estimated $\beta \geq 0$ would mean the price gap $q_{i,t}$ is non-stationary, implying persistent or explosive price divergence. On the other hand, $\beta < 0$ indicates price convergence, with the speed of convergence given by the half-life of a shock to the premium as $-\ln(2)/\ln(1+\beta)$. Therefore, while $\alpha = 0$ and $\beta < 0$ can be interpreted as long-term price equalisation, $\alpha \neq 0$ and $\beta < 0$ represent a case of non-explosive but persistent cross-market share price premium.

Table 4: Stock share price premium and convergence of cross-listed companies					
	H-A premium	**H-A premium**	**ADR-A premium**	**ADR-H premium**	**ADR-India premium**
	41 dual-listed companies	**9 triple-listed companies**	**9 triple-listed companies**	**9 triple-listed companies**	**9 dual-listed companies**
	(1)	(2)	(3)	(4)	(5)
α	-0.262***	-0.378***	-0.381***	-0.051***	0.104***
	(0.025)	(0.062)	(0.066)	(0.010)	(0.023)
β	-0.003***	-0.005***	-0.006***	-0.552***	-0.014***
	(0.000)	(0.001)	(0.001)	(0.009)	(0.002)
φ_1	-0.020***	-0.012	-0.051***	-0.179***	-0.293***
	(0.004)	(0.008)	(0.009)	(0.009)	(0.007)
φ_2	-0.048***	-0.037***	-0.038***	-0.089***	-0.174***
	(0.003)	(0.008)	(0.008)	(0.007)	(0.007)
Half-life (days)	233.1	128.3	114.0	0.9	48.6
Adjusted R^2	0.004	0.004	0.007	0.359	0.101
DW statistics	2.001	1.988	1.998	2.010	2.023
# of observations	77,025	14,881	14,006	20,712	17,806

Note: The estimation equation is $\Delta q_{i,t} = \alpha_i + \beta q_{i,t-1} + \Sigma\, \varphi_n\, \Delta q_{i,t-n} + \varepsilon_{i,t}$, where $q_{i,t}$ is the logarithm of the overseas-local share price differential for the cross-listed companies, Δ is the first difference operator, and n stands for lags to be determined by Campbell and Perron (1991)'s top-down t-test approach.

Daily panel data of Asian closings and New York opening of the same day. The sample period is between March 15, 1999 and June 30, 2012. Standard errors are shown in parenthesis. *** indicates 1% significance.

Sources: Bloomberg; authors' estimations.

Table 4 highlights three key empirical findings. First, the statistical evidence confirms a persistently large share price premium for Chinese firms and discounts for Indian firms, that is, $\alpha = 0$ is rejected. Clearly, limits to capital flows bind for both economies.[14] Second, the

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[13] n stands for the number of lags to be determined by the Campbell and Perron (1991)'s top-down t-test.

[14] The estimated α indicate that Chinese equities on average trade 26-38% in Hong Kong than in Shanghai, and Indian equities trade at an absolutely smaller 10% premium in New York over Mumbai.

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absolute size of the cross-market share price premium is much larger for Chinese companies than Indian companies. Relative to the ADR-H benchmark, the ADR-M premium is two-to-one while the H-A premium four to six times. Third, the speed of convergence is faster between New York and Mumbai than between Hong Kong and Shanghai. Against the estimated half-life of less than one day for the ADR-H benchmark, the convergence speed is 50 days for the ADR-M premium of Indian firms and ranges from 100 to 200 days for the H-A or ADR-A premium of Chinese firms. In short, capital controls bind but appear to weaken over time for both China and India, while India is more open financially than China.

4. Feldstein-Horioka analysis of saving and investment

To assess the effective, macroeconomic openness of the two economies, we regress changes in investment as a share of GDP on changes in savings as a share of GDP for China and India. The idea is that with capital mobility, domestic investment and saving can diverge persistently and thus in the limit should be unrelated (Feldstein and Horioka, 1980). On this measure, the Chinese economy emerges as the more open economy.
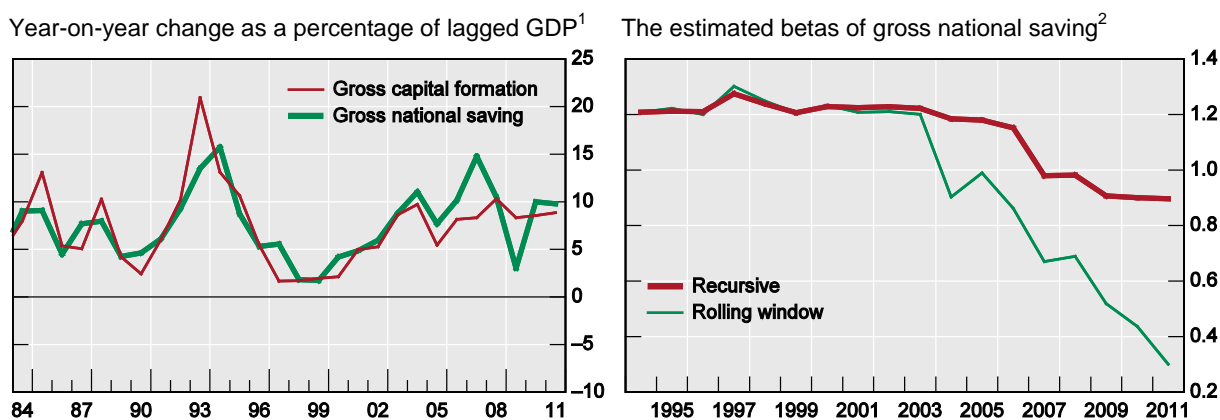
We estimate a simple variant on Feldstein (1983, p 136):

$$(\Delta I_t)/GDP_{t-1} = \alpha + \text{ß}\,(\Delta S_t)/GDP_{t-1} \qquad\qquad (5)$$

where I, S and GDP are investment, saving and gross domestic output, and Δ is the first difference operator.[15] The data for 1984-2011 are plotted in Graph 7, left-hand panel, with the Chinese data imposing the relatively short sample period for the annual data.

Graph 7a

Feldstein-Horioka time-series regression: annual data for China

Year-on-year change as a percentage of lagged GDP[1]   The estimated betas of gross national saving[2]

[1] $(\Delta I_t)/GDP_{t-1}$ and $(\Delta S_t)/GDP_{t-1}$, where I stands for gross capital formation and S as gross national saving.   [2] The regression equation is $(\Delta I_t)/GDP_{t-1} = \alpha + \text{ß}\,(\Delta S_t)/GDP_{t-1} + \varepsilon_t$. Recursive regressions, with 1984 as the starting year and the ending year corresponding to that indicated by the x-axis. Regressions of rolling 10-year windows, with ending year corresponding to the x-axis. The F-statistics, log likelihood ratio and Wald statistics all confirm a break point around 2000. The nulls that ß equals to unity for subsample of 1984-2000 and zero for the subsample of 2001-2011 are both accepted.

Sources: CEIC; authors' own estimates.

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[15] We also followed the formulation of Feldstein (1983) and ran the regression of $\Delta(I_t/GDP_t) = \alpha + \text{ß}\,\Delta(S_t/GDP_t) + \varepsilon_t$. China's recursive parameter rises to about 0.7 in the mid-2000s before falling to about 0.3 and India's rises from about 0.6 to 0.75. The rolling parameter falls in the case of China from near 1.0 in 2006 to -0.2 in 2011 and rises in the case of India to a plateau over 0.8 in the 2000s. Thus the results based on the change in the investment and savings rate go further in the same direction as those reported in the text.

As reported in Ma, McCauley and Lam (2012), the Chinese economy emerges from this analysis as one that is increasingly open. The recursively estimated parameter for China suggests a fall from the more than one-to-one association of investment and savings to about 0.9. What is more, a ten-year rolling regression's last reading, incorporating data from 2001-11, suggests that the change in China's investment reflects less than half of the change in China's savings (Graph 7a, right-hand panel).

Consistent with Bordoloi and John (2011), we find that saving and investment are more tightly linked in India than in China. Examining data for 1950-2009 for India and 1978-2009 for China, their error-correction analysis yields a long-term parameter of 0.89 for India and 0.80 for China. Moreover, also consistent with these authors, we find some evidence of a rise in the Indian saving coefficient from about 0.8 to over 0.9, in contrast to the previously mentioned decline in the Chinese one (Graph 7b).[16] All-in-all, our analysis and related work done by others suggest that on this particular measure, China's economy is effectively more open than that of India.

Graph 7b

Feldstein-Horioka time-series regression: annual data for India[1]

Year-on-year change as a percentage of lagged GDP[2]   The estimated betas of gross national saving[3]
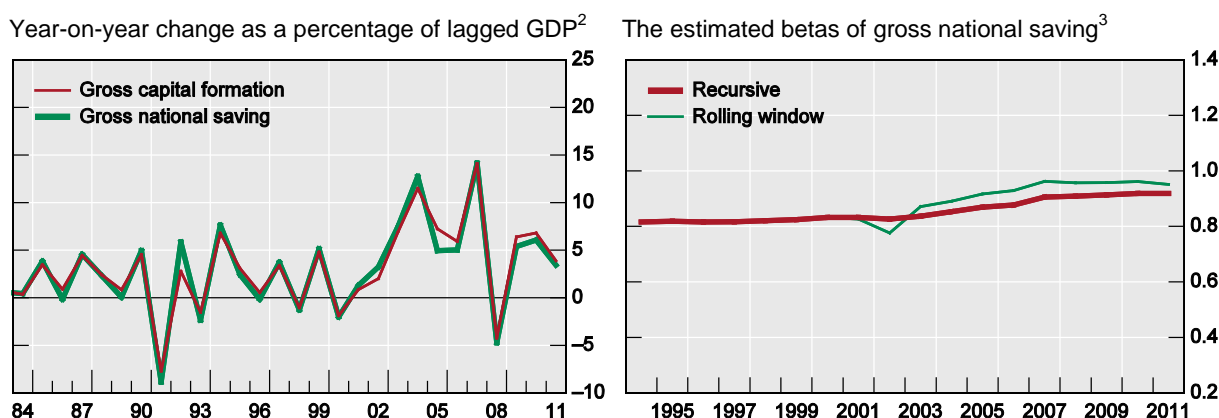
[1] Fiscal year ending March of each year.   [2] $(\Delta I_t)/GDP_{t-1}$ and $(\Delta S_t)/GDP_{t-1}$, where I stands for gross capital formation and S as gross national saving.   [2] The regression equation is $(\Delta I_t)/GDP_{t-1} = \alpha + \beta\ (\Delta S_t)/GDP_{t-1} + \varepsilon_t$. Recursive regressions, with 1984 as the starting year and the ending year corresponding to that indicated by the x-axis. Regressions of rolling 10-year windows, with ending year corresponding to the x-axis.

Sources: World Bank; CEIC; authors' own estimates.

But this interpretation of the the Feldstein-Horioka result requires care for at least two reasons. First, common shocks can drive co-movements in saving and investment or the two can directly interact with each other. Second, emerging economies running big deficits may face a risk of a sudden reversal of capital flows, amounting to a more binding international financial constraint than that faced by economies running surpluses.

In particular, a policy aiming at maintaining the current account deficit below a certain threshhold can produce observations equivalent to those produced by weak international financial integration.[17] And there is plenty of evidence that Indian policy views the current

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[16]   Also in a recursive setting, Bordoloi and John (2011) find that the Chinese coefficient rises before it declines. Their and our finding regarding a rising Indian coefficient contrasts with the finding of Khundrakpan and Ranjan (2010), who find that the Indian economy became more open on the Feldstein-Horioka measure after the liberalisation that began in 1991.

[17]   As was pointed out by Fieleke (1982), Tobin (1983), Summers (1988) and Bayoumi (1990).

Is China or India more financially open?

account as a constraint. The Tarapore Report (Reserve Bank of India, 2006) starts the relevant section, "Since the 1990-91 crisis, during which a CAD [current account deficit] of 3 per cent turned out to be unsustainable, …." It concludes, "should the CAD/GDP ratio rise substantially over 3 per cent there would be a need for policy action".[18] In effect, India's policy seeks to limit the erosion of its current account.

By contrast, policy in China in 2008-09 reinforced the erosion of its surplus. Then, falling exports meant a decline the current account surplus and the government investment programme actually accentuated that decline. Thus, while policy in India has arguably sought to limit current account deficits, the external accounts have not much constrained policy in China.

The contrast of policy in the two countries sounds the familiar theme of constraints in the international financial system binding deficit countries more than surplus countries. While financial integration in principle is unrelated to the sign of the current account, in practice integration with a surplus may be deemed less risky than integration with a deficit. All that said, the Feldstein-Horioka analysis suggests that China is more financially open than India.

5. Generalised Lane-Milesi-Feretti: external positions or flows

Another set of measures is based on either gross external assets/liabilities or gross cross-border flows, relative to domestic output. As noted at the start, the Lane-Milesi-Feretti (2003, 2007) measures of gross external positions show China more open than India (Graph 1, right-hand side). The difference is in the range of 40% of GDP and has tended to widen over the years of available data.

Graph 8

International investment positions

As a percentage of GDP
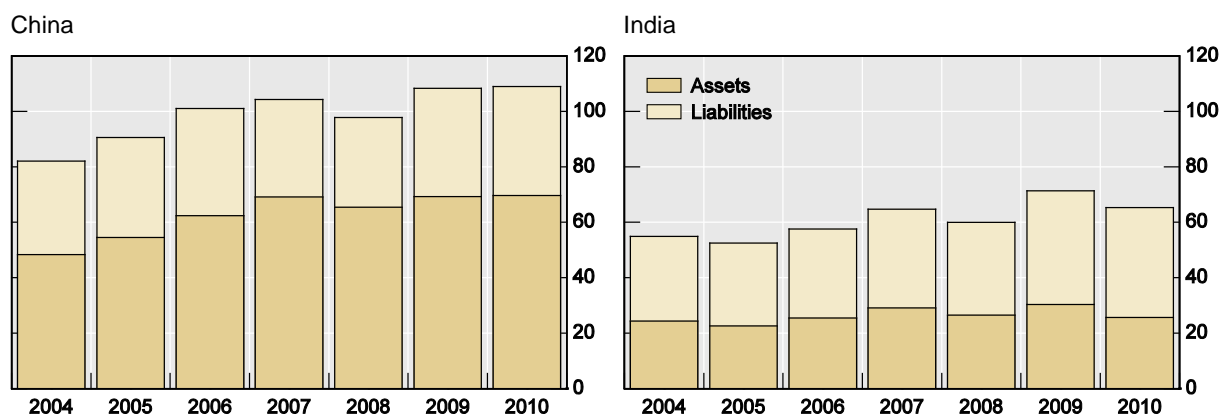
Sources: IMF *IFS*; IMF *WEO*.

Again, this result merits some qualification. If one does a thought experiment in which gross assets or liabilities are only as large as needed to support the respective net asset positions, at the limit China's economy needs a 16% of GDP greater gross position just to sustain its 30% net international investment position as compared to India's net international liability of

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[18] The strongly positive reaction to the news that the Indian authorities had bought gold from the IMF in 2009 served as a reminder of the trauma of India's pledging its gold in that crisis.

14% (Table 5). A similar but stronger point can be made about international positions excluding official foreign exchange reserves. More than 30 percentage points of the difference favouring China arises from China's much larger official reserves. That is, the difference in the gross non-official reserve external positions between China and India is only about 10% of GDP. In this light, the gross external liabilities relative to GDP are quite similar for the two economies (Graph 8).

Table 5: Net international investment positions of China and India in 2010				
	China		India	
	USD billions	% of GDP	USD billions	% of GDP
Net equity	−1308.7	−22.1	−241.1	−15.1
Net FDI	−1165.6	−19.7	−104.5	−6.5
Net portfolio equity	−143.1	−2.4	−136.6	−8.6
Net debt	3099.4	52.3	18.1	1.1
Net private debt	185.2	3.1	−279.6	−17.5
Reserves	2914.2	49.1	297.7	18.6
Net overall position	1790.6	30.2	−223.0	−14.0
Source: IMF *IFS*.				

The flow version of this measure, recently consulted by Patnaik and Shah (2012), suggests that the Chinese and Indian economies are running neck and neck in the intensity of their cross-border interactions with the rest of the world. That is, in the ratio of recorded current and capital account flows to GDP, China has long led India, but the latter nosed ahead after the global financial crisis (Graph 9, left-hand panel). In the short term, China's big domestic demand boost increased China's denominator even as faltering external trade reduced the numerator. Over time, higher turnover of India's private sector liabilities as compared to China's public sector assets—that is, capital account transactions—leaves the two countries closer on the flow measure than on the Lane-Milesi-Ferretti stock measure (Graph 9, right-hand panel).

Graph 9

Gross balance of payment flows[1]

As a percentage of GDP
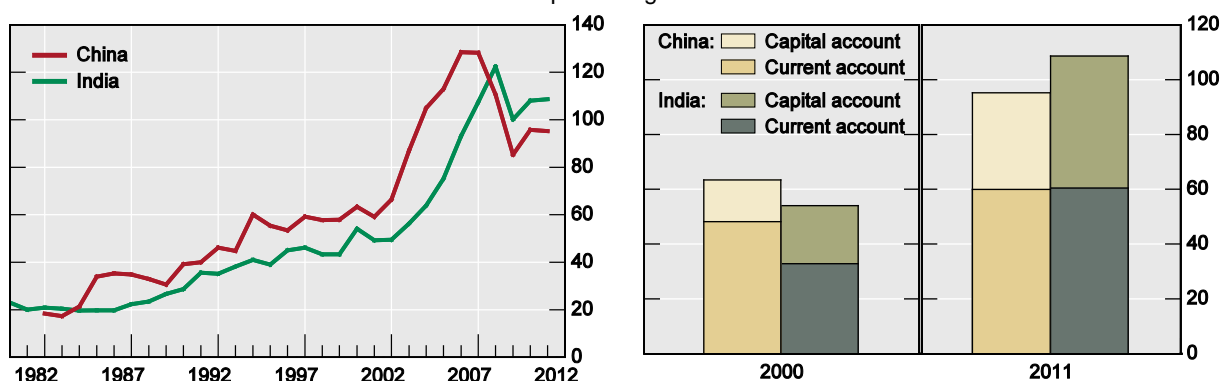
[1] Sum of credit and debit flows of current account and capital account.

Sources: IMF *WEO*; CEIC.

All in all, this aggregate measure in its stock and flow version has tended to suggest that China is more financially open. Yet the gap is not so big, the evidence has turned more mixed recently and subject to other possible interpretations. However, both the flow and stock measures seem to support the Lane-Milesi-Feretti assessment that both China and India become more engaged in global finance over the years.

6. Consolidated measures of banking and bond market integration

Whereas the last section used data that treat the nation or territory and residence therein as the unit of analysis, BIS data permit the multinational bank to be taken as the unit of analysis. This consolidated perspective offers a great advantage because bank strategies have long since gone beyond international lending from home office or selected offshore banking centres, such as Hong Kong or Singapore.

Today's global banks pursue a multinational strategy with footprints in individual markets that focus on building up a deposit base in local currency in order to fund local mortgages, consumer credit and corporate loans (McCauley et al, 2012). Before the crisis, analysis tended to emphasise the advantages that local banking markets could derive from foreign bank presence (CGFS, 2004). Since the crisis, analysis has focused more on the possibility that foreign banks could impose a credit crunch on emerging markets as they respond to weakness in their North Atlantic operations.

In any case, the credit share of BIS-reporting banks in a given country measures openness in an important way.[19] The question is not, how big are the liabilities of banks in China or India to non-residents, but how big is the foreign bank footprint in China or India? Symmetrically, we ask how big is the footprint of Chinese and Indian banks in global banking markets and of Chinese and Indian borrowers in global bond markets.

6.1 Foreign bank share of bank credit to Chinese and Indian nonbanks

The foreign bank share of overall bank credit combines BIS reporting banks' international (cross-border) claims on non-banks plus their locally booked claims in the numerator. Note that this numerator includes two credit stocks that are not captured in balance of payments statistics or the international investment position: foreign currency credit funded with local foreign currency deposits as well as the local currency credit that is key to the multinational bank model. The denominator is the sum of domestic credit (depository institutions' claims on nonbanks) and BIS reporting banks' cross-border claims on non-banks.[20]

Graph 10 shows the foreign bank presence in the Chinese and Indian banking markets. For all three main components—cross-border claims, local currency claims on local residents and other international claims (mostly foreign currency claims on local residents)—foreign banks have carved out a larger banking market share in India than in China. By this measure, India is five times more open than China. Even with China's much larger domestic banking sector relative to GDP, the contrast would remain if we denominate foreign bank credit with GDP.

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[19] A parallel measure for direct foreign investment in general would measure the assets, value added or employment of foreign-owned firms in a given economy, rather than the cross-border positions as compiled by UNCTAD and discussed by Quinn et al (2011).

[20] The definition of McCauley et al (2002, p 46) mixes the consolidated data on international claims on non-banks (Table 9A, columns G, H and L) with the locational data (Table 6B) as well as domestic credit (from the IFS). See also McGuire and Tarashev (2005a,b, 2008)).

Graph 10

Foreign bank share of bank credit[1]

In per cent
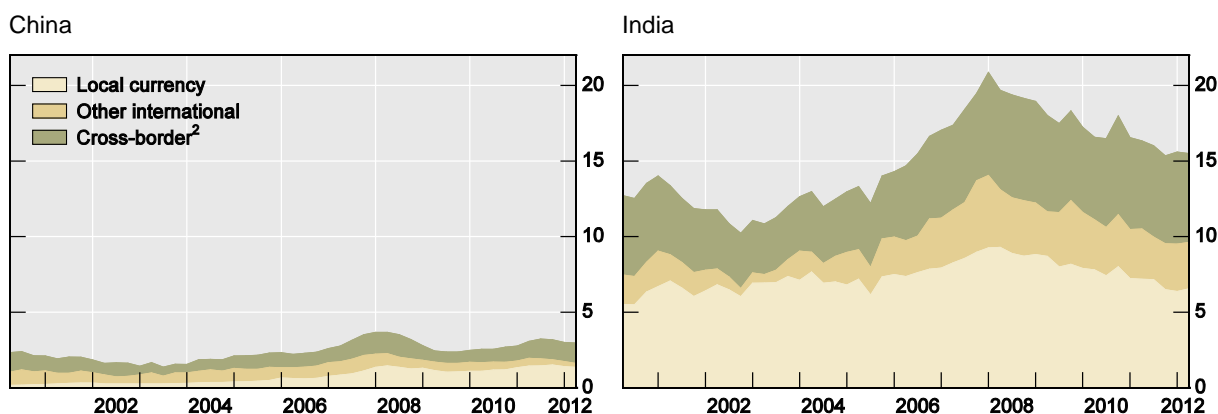
China | India

[1] Foreign bank claims on non-banks in domestic and foreign currency as a percentage of domestic credit and cross-border claims on non-banks. [2] External claims of all reporting banks vis-à-vis the non-bank sector of China/ India.

Sources: IMF *IFS*; BIS *International Banking Statistics*.

In terms of ranking within the G20, China ranks 20, while India ranks 16. China has one of the lowest foreign bank shares of major countries in the world, with the share fluctuating between 1 percent and 4 percent. In the G20, only Japan has a foreign bank share in single digits. China's share did rise from over 1 percent to not quite 4 percent after it joined the WTO, but has since fallen back to 2-3 percent. Meanwhile, India's share has been and remains in double digits. It rose from around 10 percent in the 1990s to a peak near 20 percent before the crisis, and has since fallen to about 15 percent.

6.2   Domestic banks' participation in global markets

The obverse of foreign bank participation in the Chinese and Indian banking markets is Chinese and Indian banks' participation in overseas markets. At such an early stage of their financial development, one would expect the foreign bank participation in domestic markets to provide a more telling measure of openness, but for symmetry we measure the footprint that Chinese and Indian banks have planted in the rest of the world.

While the Reserve Bank of India reports international banking data to the BIS, the operations of Chinese banks outside the mainland pose a measurement challenge. For China, we have estimated the foreign claims of Chinese banks by summing People's Bank of China data on the cross-border assets of domestic banks in China and data on claims of the offices of Chinese banks outside the mainland from the annual reports of the major Chinese banks.[21]

Graph 12, left-hand panel, shows that Chinese banks have extended much more credit to residents of other economies (including importantly Hong Kong residents) than have Indian banks. Taking a global perspective, the middle panel shows that Chinese banks have a rising share of all the foreign bank claims reported to the BIS, whereas the Indian share is low and hardly rising. The right-hand panel shows that, as a consequence of unbalanced growth, Chinese banks' rising share of global credit is not even keeping up with the pace of domestic

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[21]   These annual reports give not assets but only loans, so the data are not strictly comparable. In addition, their Chinese data on the foreign assets of domestic banks in China presumably include claims on affiliated banks, so there is probably some double counting to balance to some extent the absent non-loan claims of Chinese banks booked outside the mainland.

lending. Moreover, on this measure, Chinese and Indian banks both have a single-digit and stable-to-falling weight on foreign claims. Viewed from their respective domestic perspectives, Chinese and Indian banks are similarly engaged in overseas markets.

Chinese and Indian banks' foreign claims   Graph 11

In billions of US dollars	As a share of global credit	As a share of domestic lending
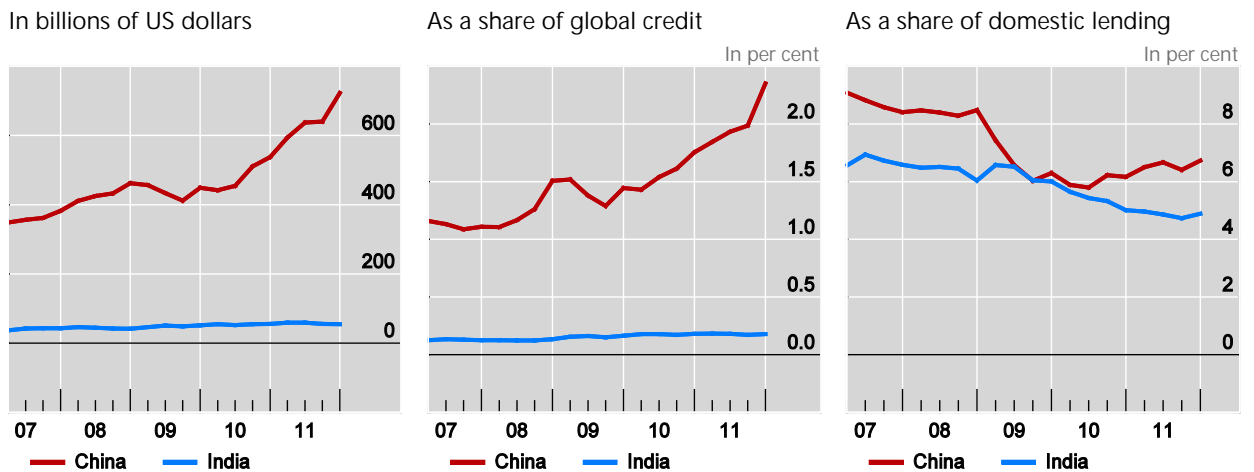
Sources: People's Bank of China, Chinese banks' annual report (Industrial & Commercial Bank of China, China Construction Bank, Bank of China, Agricultural Bank of China, Bank of Communications, China Merchants Bank, China CITIC Bank, Shanghai Pudong Development Bank), BIS International Banking Statistics, IMF-IFS, authors' calculations.
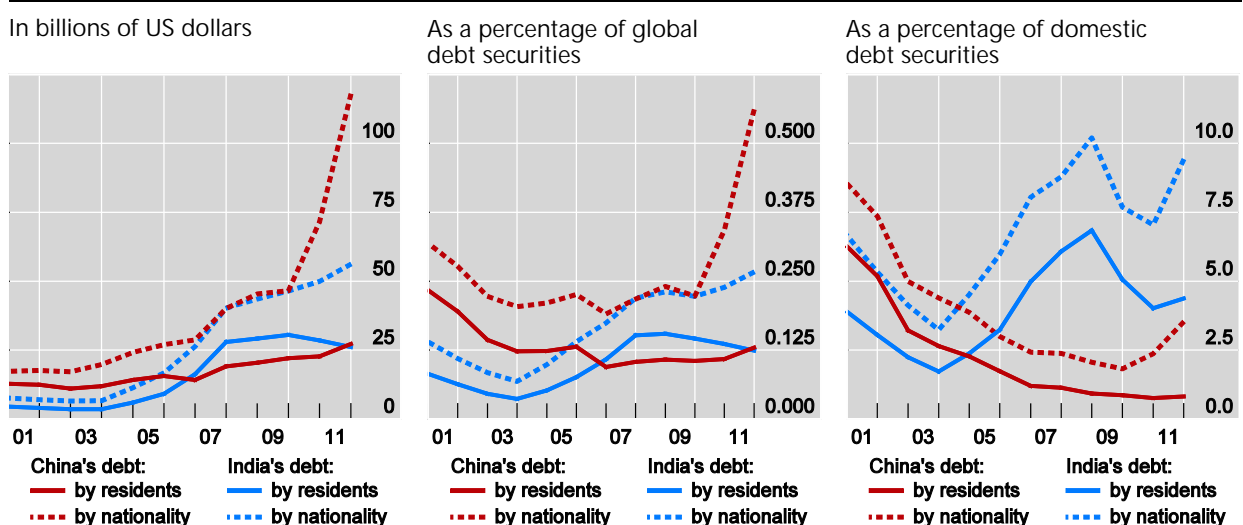
6.3   International debt securities of Chinese and Indian borrowers

If Chinese banks have gone global more than Indian banks, Indian firms are more dependent on international debt markets than their Chinese firms. Drawing on the BIS international securities data base, the left-hand panel of Graph 12 shows that the outstanding amount of bonds issued by Chinese residents or Chinese nationals (ie including issues of offshore affiliates of Chinese firms and banks) tends to exceed that of Indian residents or nationals. And the middle panel likewise shows that Chinese issuers represent a larger share of global international debt issues outstanding.

International debt securities of China and India

By residence and nationality   Graph 12

In billions of US dollars	As a percentage of global debt securities	As a percentage of domestic debt securities

Source: Dealogic; Euroclear; Thomson Reuters; Xtrakter Ltd; BIS.

However the right-hand panel shows that Indian borrowers are more internationalised in the sense that their international debt securities represent a larger share of the domestic bond market. According to Subramanian (2009), Indian firms borrowed heavily in the 2000s in international debt markets to fund acquisitions in advanced economies.

Similar to Feldstein/Horioka saving coefficient, however, policy may figure importantly in the difference. India's need for external financing of its current account deficits conditions policy toward external debt. By contrast, China's greater acceptance of foreign direct investment outside of banking—much of it taking the form of inter-affiliate loans—and its current account surpluses condition a more cautious policy toward external borrowing. In addition, relatively high Indian rupee interest rates leave multinational firms based in India to fund offshore acquisitions with offshore dollar and euro borrowing.

7.   Internationalisation of the domestic currency

How much used is the domestic currency in international transactions? This is quite a different question from how big are a country's external assets and liabilities. After all, an economy's fixed income assets and liabilities might all be denominated in foreign currency so a country can score high on the Lane-Milesi-Ferretti measure but low on currency internationalisation.

Following Cohen (1971) and Kenen (1983), international use of a currency can be thought of along the lines of the archetypal uses of money. As a medium of exchange, a currency can be used to invoice international trade or as a vehicle currency in trading currencies. As a store of value, a currency can be used to denominate deposits or bonds. As a unit of account, a currency can be used to denominate trade or financial instruments.
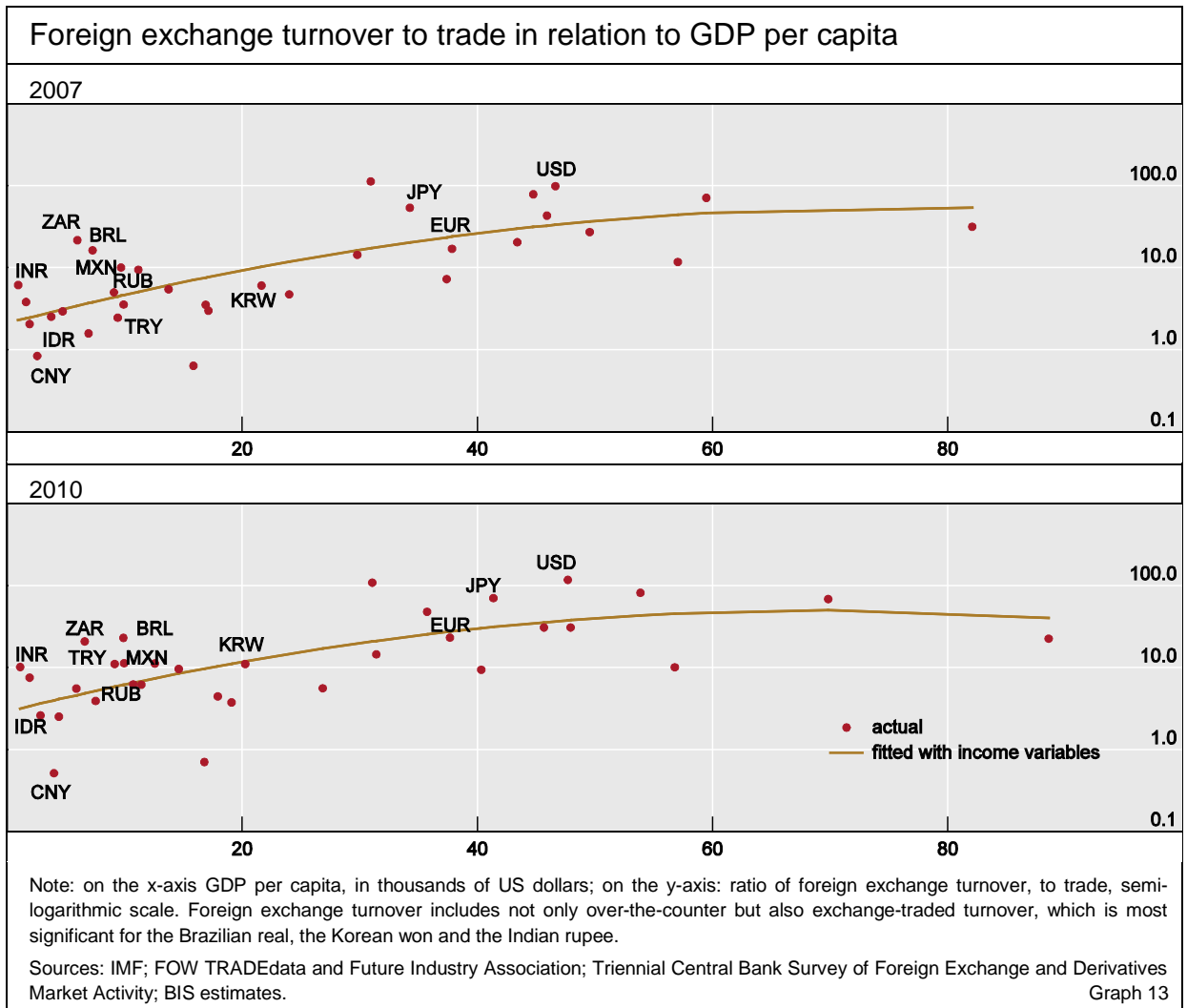
Following McCauley (2010), we compare China and India on three measures of currency internationalisation.[22] The first, derived from the BIS triennial central bank survey of foreign exchange turnover, is the ratio of currency trading to the economy's international trade. Since much of the trading in the renminbi and the rupee is settled in dollars, this measure straddles the medium of exchange (deliverable) and unit of account (non-deliverable). The second and third measure relate mostly to the store of value function. The second is the stock of international bank deposits, either offshore or cross-border, in the domestic currency. The third is the stock of international bonds in the domestic currency. Our findings may surprise.

7.1   Foreign exchange financialisation and internationalisation

McCauley and Scatigna (2011) have shown that reported renminbi turnover is in the neighbourhood of the economy's trade while reported turnover of the rupee is almost ten times the country's trade. Given the tendency of this ratio to rise with GDP per capital (in Kuznets curve fashion), renminbi currency trading is an outlier on the down side, while rupee currency trading is an outlier on the up side (Graph 13). Clearly trading in the rupee is more financial than that of the renminbi, but is it more international as well?

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[22]   Admittedly, we do not compare the use of the two currencies to denominate trade, and it is fair to say that with about a tenth of China's trade denominated in renminbi, China is way ahead on this measure. But recent analysis of this phenomenon raises the possibility that it is as related to cross-border differences in exchange rates as to the convenience of importers and exporters (Garber, 2011, and McCauley, 2011). Another, possibly more important measure of currency internationalisation might be its influence on the values of other currencies (Subramanian, 2012).

Foreign exchange turnover to trade in relation to GDP per capita

2007

2010

Note: on the x-axis GDP per capita, in thousands of US dollars; on the y-axis: ratio of foreign exchange turnover, to trade, semi-logarithmic scale. Foreign exchange turnover includes not only over-the-counter but also exchange-traded turnover, which is most significant for the Brazilian real, the Korean won and the Indian rupee.

Sources: IMF; FOW TRADEdata and Future Industry Association; Triennial Central Bank Survey of Foreign Exchange and Derivatives Market Activity; BIS estimates.   Graph 13

It is true that, as a proportion of renminbi trading, trading between non-residents is quite large (Graph 14). However, since the trading volume in the rupee is so much larger than that of the renminbi in relation to the respective country's trade (Graph 13), renminbi transactions involving a non-resident represent a smaller multiple of China's trade than do rupee transactions involving a non-resident.

Graph 14

Geography of turnover in renminbi and rupee in April 2010

Indian rupee[1]   Chinese renminbi

[1] Futures are traded onshore between residents.

Sources: IMF; FOW TRADEdata; Futures Industry Association; Triennial Central Bank Survey of Foreign Exchange and Derivatives Market Activity; authors' estimates.

7.2 International banking in domestic currency

Here we juxtapose two stocks of international bank deposits. Since 2004, the Chinese authorities have allowed an offshore renminbi deposit market to grow, initially in Hong Kong (the CNH market) and now across the Taiwan Strait, in Singapore and in London. For some time, the Indian authorities have allowed Indian citizens resident outside of India to make deposits denominated in rupee in banks in India.

In both cases, the growth of such deposits responds to policy. In Graph 15, left-hand panel, renminbi deposits in Hong Kong stopped growing when the renminbi was stabilised against the US dollar, then took off as trade denominated in renminbi was permitted amid expectations of renminbi appreciation, only to decline late in 2011 as renminbi dollar trading led to a sense of two-way risk.[23] For its part, when the rupee came under pressure last December, the Reserve Bank of India permitted Indian banks to raise the return on such deposits from one percent over US dollar Libor to levels prevailing domestically. A step up and a subsequently more rapid rise of the rupee deposits is evident.[24]

Graph 15, right-hand panel shows that offshore renminbi remain a tiny stock in relation to onshore M2, while non-resident Indian rupee deposits amount to something like a sixth of Indian M2. True, outside of Hong Kong, Lau (2012, p 8) estimates that deposits in London, Singapore and Taipei sum to about a third of those in Hong Kong. But even if one doubles the international deposits in renminbi by including not only these but a generous estimate of non-resident deposits with banks in China, the basic assessment would likely still stand.

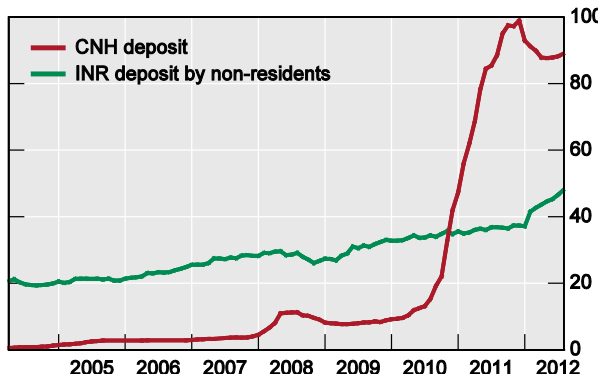[23] See Garber, 2011 and he and McCauley, 2012.

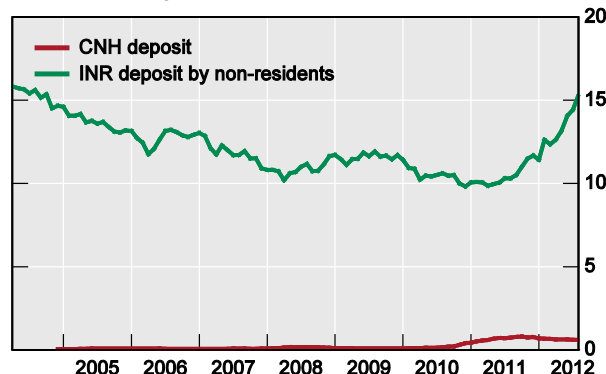[24] See Kaul, 2000, Gordon and Gupta, 2004 and Khan, 2012.

Graph 15

RMB deposits in Hong Kong banks and non-resident INR deposits in Indian banks

In billions of US dollars equivalent

As a percentage of M2

Source: Hong Kong Monetary Authority; Reserve Bank of India; authors' calculations.

7.3   International bonds in the domestic currency.

The offshore renminbi debt market has enjoyed rapid growth since China embarked several years ago on the gradual internationalisation of the renminbi. Whereas the offshore renminbi deposits have remained very small in relation to onshore deposits, as we have just seen, the offshore renminbi bond market shows more dynamism in relation to the domestic bond market (Graph 16). While offshore bonds denominated in renminbi have enjoyed official blessing—especially necessary for issuers planning to repatriate the renminbi to the mainland—offshore rupee issues remain the domain of strictly arbitrage issuers. That is, the typical issuer of rupee offshore debt looks to match the obligation with a cross-currency swap, not to raise rupee to repatriate to India.
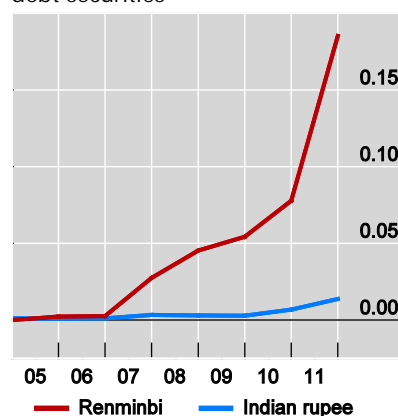
International debt securities outstanding denominated in renminbi and Indian rupee
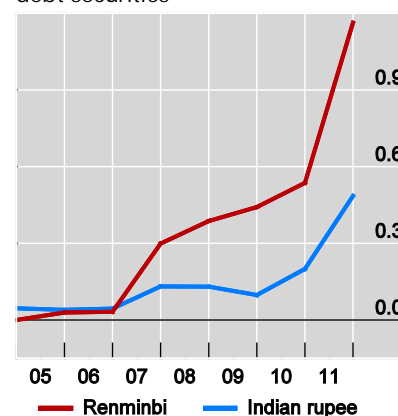
Graph 16

In billions of US dollars
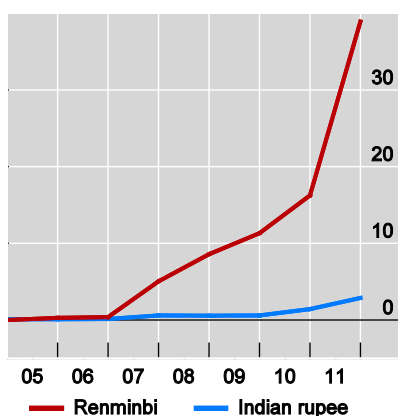
As a percentage of global debt securities

As a percentage of domestic debt securities

Source: Dealogic; Euroclear; Thomson Reuters; Xtrakter Ltd; BIS

So while non-resident rupee deposits are relatively larger than the offshore renminbi market, the officially sanctioned offshore renminbi bond market is relatively larger than its unsanctioned rupee counterpart.

Putting together our three measures of currency internationalisation, the picture is mixed. There is at least an argument, however, that the unheralded rupee internationalisation has proceeded as far or even farther than the much discussed renminbi internationalisation.

8. Combining the measures

Stepping back, the evidence does not speak with one voice on the comparison of China and India. Our four price-base measures, covering both currency, money, bond and equity markets, all suggest the greater integration of India in the global financial system. Table 6 confirms that the averages of Chinese and Indian on/offshore price gaps are statistically different. Moreover, these measures offer consistent overall assessments about cross-border arbitrage even when we exclude the most turbulent months when global financial markets were dislocated. In addition, our consolidated foreign bank share measure also identifies the Indian economy as more integrated. and our measures of also favour India.

Table 6: Test of equality of means between China and India, by instrument				
	t-test	Anova F-test	Correlation coefficient	
	Full sample	Full sample	Full sample	Excl. crisis
Forward premium gap, 3-month	8.790	77.256	0.60	0.41
Forward premium gap, 12-month	8.790	77.256	0.67	0.57
NDF Yield gap, 3-month	17.477	305.440	0.61	0.57
NDF Yield gap, 12-month	13.643	186.120	0.70	0.68
Bond yield gap, 3-year	3.463	11.994	0.55	0.58
Stock price gap, ADR-A vs. ADR-M	-53.043	2813.565	0.14	0.13
Stock price gap, H-A vs. ADR-M	-53.013	2810.388	0.14	0.13

Weekly data. Full sample period is from 5 April 2004 to 25 June 2012 while the period of September to December 2008 is excluded for the sample excluding crisis. Results of the Satterthwaite-Welch t-test and the Welch F-test that allow for different variances between subgroups are equivalent to those of the standard t-test and ANOVA F-test and are therefore not reported in the table.

Sources: Bloomberg; CEIC; authors' estimations.

However, the other financial aggregates strike us as sending mixed messages. Regarding currency internationalisation, the foreign exchange market points to India as more integrated, but the offshore renminbi market has in its short existence outgrown its virtual rupee counterpart. The Lane-Milesi-Ferretti measure identifies China as more integrated, but its flow version shows the two economies transacting in relatively parallel fashion with the rest of the world.

Only the Feldstein-Horioka coefficient clearly identifies China as the more open economy. But this finding may reflect less integration per se than asymmetric market and policy responses to current account deficits and surpluses. On balance, we conclude that India is more financially open than China.

9.   Conclusion

The Chinn-Ito index suggests that China and India restrict capital flows to a similar extent, while the Lane-Milesi-Ferretti measure of international investment positions identifies China as the more open economy. In this paper, we challenge aspects of both measures.

We examine six de facto measures of international financial integration, and none supports Chinn-Ito and only one or two fully supports the conclusion derived from Lane-Milesi-Ferretti. These six measures are on/offshore yields gaps for fixed-income and currency markets, cross-market share price premium or discount, the Feldstein/Horioka saving coefficient, the stock and flow versions of the Lane-Milesi-Ferretti measure, the consolidated BIS measures of banking and securities markets and indicators of currency internationalisation. The latter two introduce new dimensions into the debate.

In three of the six dimensions, the Indian economy appears to be more open financially. Generally, the measures show both economies becoming more financially open over time, with the equity prices tending to converge and the Lane-Milesi-Ferretti measures both pointing this conclusion. Nevertheless, policy continues to segment onshore and offshore markets in both cases. Policymakers in each country face challenges in further financial integration.

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