Fuller capital account opening in China and India: mind the gap[1]

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I. Introduction

The inevitably large influence of fast-growing China and India on global financial markets creates a global interest in their getting their capital account liberalisation right (Tseng and Cowen, 2006; Winters and Yusuf, 2007; Bussière and Mehl, 2008). Both economies have set further capital account opening as their medium-term policy goal (RBI, 2006; SAFE, 2008). An understanding of the challenges faced by policymakers requires robust assessments of the current degree of financial integration and possible directions of tensions across a range of key financial markets in the two largest emerging markets in the world.

This study first reviews quantity measures including the international balance sheet, gross balance of payments flows, as well as cross-border banking transactions. We confirm the findings of Lane and Schmukler (2007) and Ma and McCauley (2007) that their integration with the global financial markets has increased significantly over the past two decades but remains below those achieved by other major emerging Asian economies. From these data, it appears that China is in aggregate more integrated than India, though the Chinese domestic banking and securities markets are less open to cross-border flows.

In this paper, we argue that any inference that China has less to do in opening its capital account is unwarranted. We examine price data to assess the cross-border segmentation or integration of the four financial markets in the two economies: the foreign exchange market, the money market, the bond market, and the stock market. The core idea is that persistently big gaps in the onshore and offshore market prices of the same underlying asset suggest market segmentation and possible tensions when opening the capital account. Our methodologies to examine the cross-border gaps in the prices of these four financial markets mostly follow Otani and Tiwari (1981), Frankel (1992), Yevy Yeyati, Schmukler and Horen (2006), Peng, et al (2008), and Ma and McCauley (2007 and 2008), but we also innovate in measuring such as onshore-offshore bond yield gaps.

Price evidence from the four financial markets shows India to be more financially integrated with the rest of the world than China. First, the onshore-offshore price gaps of the four markets all indicate considerable impediments to cross-border arbitrage for both China and India. Second, individually, as measured by their respective onshore-offshore price gaps, the four Indian financial markets are all more integrated with the rest of the world than their Chinese counterparts. Third, while pricing signals from the fixed-income market (foreign exchange, money and bond markets) point to consistent inflow pressure on both China and India, the stock market price gaps suggest capital outflow pressure for China and inflow pressure for India. Fourth, pooling together the price evidence of the four financial markets, China's overall market price distortion is on balance larger than that of India. Finally, despite different domestic business cycles, the cross-border price differentials of China and India appear highly and positively correlated with each other, pointing to as yet unidentified global factors or forces behind the onshore-offshore price gaps in presence of capital controls.

Our findings suggest that if restrictions on capital outflows were to be lifted overnight, on balance, Chinese policymakers may face bigger challenges than their Indian counterparts in

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managing the expected market adjustments, as the Chinese domestic financial market has been rarely tested by volatile two-way portfolio flows. On the other hand, our price evidence indicates considerable market pressure for both economies. Thus challenges to their policymakers remain, and they may retain some safeguards to deal with the consequent risk of financial instability during the process of incremental capital account opening.

The paper is organised as follows. The next section provides a brief backdrop of the Chinese and Indian economies. Section III summarises the quantity measures of China's and India's exposure to external finance. Section IV lays out an analytical framework to assess international financial integration, before Section V presents price evidence from the four financial markets on potential market tensions in adjusting to capital account opening. The final section concludes by exploring policy implications for capital account opening.

II. Background

A few backdrops are useful for better understanding these two emerging markets before detailed analysis of quantity and price evidence. First, a noteworthy contrast between China and India concerns the current account balance, fiscal position and trend inflation. Over the past decade, China averages a fiscal shortfall of 1.5% of GDP, a current account surplus of 3.5% of GDP and a CPI inflation of 3.3%. By contrast, India has experienced on average a fiscal deficit of 4.5%, a current account deficit of 0.4% and a CPI inflation of 4.8%. Hence local interest rates and financing needs are higher for India than for China, with potential implications for cross-border flows and international investment positions.

Second, state ownership, though diminished, remains dominant in both the Chinese and Indian banking sectors. The share of India's public-sector banks in the aggregate banking assets has fallen from 90% in the early 1990s to below 75% by the late 2000s, while the Chinese state-controlled banks amounted to about 60%, down from above 80% in the early 1990s. For both markets, the banking sector has been important both as a channel for cross-border banking flows and as key players in the local foreign exchange, money and bond markets. Despite these similarities, two differences stand out. First, India has a smaller but more commercial banking sector than China. Second, government quota on bank lending is more binding in China than in India.

Third, policymakers in both China and India have taken an incremental and non-linear approach to opening their capital accounts, attaching premium to financial stability and discriminating against short-term debt flows in their capital account management. External borrowing, especially short-term, remains tightly controlled and monitored, except those related to current account transactions. Local debt markets have been largely closed to non-resident investors.

III. Quantity measures of financial integration

Quantities measuring the extent of involvement in and exposure to the international financial market may shed light on the potential challenges facing policymakers in opening up capital accounts. Three groups of quantity measures are reviewed in this paper: international investment positions (IIP), balance of payments (BoP), and BIS international banking statistics (Lane and Milesi-Ferretti (2003); Ma and McCauley (2007); Ma and Zhou (2008)). The three sets of data inform about the gross size, net balance as well as composition of external financial transactions for China and India but often produce mixed evidence on the degrees of cross-border market integration in these two economies.

Three noteworthy observations can be made from the quantity evidence. First, both China and India have become much more integrated into the global financial system over the past decade, but their levels of international financial integration generally remain below those seen in most of the East Asian economies. Second, while China appears more integrated

than India on the aggregate IIP and BoP measures, China's domestic banking and securities markets are less open to the more volatile cross-border flows. Finally, the net external positions of both China and India have improved considerably over the past decade. Overall, quantitative measures of financial integration point to a mixed picture.

1. International balance sheet

An economy's gross and net international positions as well as the external capital structure may shed light on the initial conditions for further capital account opening. The international financial integration of China and India, as measured by the sum of external assets and liabilities scaled by GDP, has been advancing rapidly over the past decade but still remains below those seen in most of the OECD and other Asian economies (Lane and Milesi-Ferretti, 2003; Lane and Schmukler 2007). Between 1996 and 2007, China's combined international assets and liabilities rose from 57% of GDP to 110%, compared to India's 45% to 70% (Graph 1). Thus, China's international balance sheet has expanded faster than India's. Nevertheless, when compared to other major markets, these levels are still relatively low.

In terms of net external positions, both China and India have substantially reversed their large net debtor positions a decade ago. Compared to a net debtor position of 10% of GDP in 1999, China first became a net creditor in 2004. By 2007, its net assets position exceeded 30% of GDP, as it became the second largest creditor globally in dollar terms after Japan (Ma and Zhou, 2008). India remained a net debtor of around 5% of GDP in 2007, down from a much bigger net liabilities position of 20% in 1999. Thus Indian policymakers face a more vulnerable net international position than their Chinese counterparts.

The compositions of their external balance sheets share similarities and differences. First, China's and India's balance sheets both feature "long debt, short equity" — a combination of a positive net debt position and a negative net equity position (Table 1). Restrictions on private outward equity investment, large reserve assets mostly in debt instruments, the long-held Chinese policy of favouring inward FDI, and fairly open Indian stock market have been some of the main factors shaping this pattern of net debt and equity positions. Second, the public sector remains by far the largest foreign asset holder in both economies. Take 2007 for example, official reserves make up 67% and 81% of the Chinese and Indian gross foreign assets, respectively. Third, India's more tradable and voluatile portfolio position exceeds more than one quarter of its total foreign liability, whereas it is only 11% for China.

One important implication is that upon further capital account opening, the size of the Chinese and Indian external balance sheets may expand significantly and their compositions may also shift markedly. The resultant increased cross-border exposure and changing pressures across markets may thus pose challenges to both their financial system and policymakers. Any mistake could lead to magnified consequences (Ma and Zhou, 2008). On the other hand, India has already been more exposed to liquidity risk associated with a relatively large portfolio position on its foreign liability.

2. Balance of payments flows

Another quantity measure for international financial integration is based on the balance of payments flow data. As a per cent of GDP, the sum of two-way cross-border flows under both the current and capital accounts have risen substantially for the two economies over the past twenty five years. But in contrast to the IIP-based stock measures, China and India are largely neck-to-neck on this flow measure of international financial integration, from less than 30% in 1982 to in 2007 almost 120% for India and 130% for China (Graph 2). On the other hand, India's gross flows under the current and capital accounts have been more evenly split, whereas China's current flows have far exceeded its capital flows. Thus on these BoP-based measures, India is no less integrated financially with the rest of the word than China, when compared to the evidence from their external balance sheets.

Division of the net capital flow into three groups of direct, portfolio and other investments reveals one striking difference between China and India. While India has increasingly relied on the net inflows of portfolio investment (largely equity) and other investment (loans, deposits, trade credit etc) for financing, China continues to see sizable FDI inflows and has to manage portfolio outflows (largely fixed-income investment) in face of a rising current account surplus (Graph 3). Therefore, the Indian policymakers and markets have been more open and experienced in handling the two-way flows of the relatively liquid and volatile portfolio investment in financing its current account shortfalls. Such patterns of capital flows may suggest potentially greater market tensions related to portfolio flows for China than for India, as both economies further open up their capital accounts.

3. BIS international banking statistics

A third quantity measure is the BIS international banking statistics. As part of the overall external debts, cross-border banking flows have been heavily managed in both China and India. First, external borrowing by banks in India are capped at 25% of the unimpaired Tier I capital or $10 million, whichever is higher,[2] while banks in China, local or foreign, are subjected to individual annual quota, which has been tightened lately. Second, the Indian authorities directly set interest rates on onshore dollar and rupee deposits of non-resident Indians (NRI), which used to be an important source of external funding for Indian banks. On the other hand, Chinese authorities allow and even welcome onshore bank dollar deposits held by residents. A direct consequence of tight controls over cross-border bank borrowings has been relatively small and often negative net claims on Chinese and Indian banks, in sharp contrast to the Korean case (Graph 4).

On balance, the BIS international banking statistics suggest a more open domestic banking market for India than for China, in terms of both cross-border transactions and participation in the local banking market by foreign banks. Consolidated gross cross-border bank claims on both economies rose sharply during the 2000s, from $50 billion to the tone of $250 billion, respectively (Graph 5). Yet, given that China's GDP and banking sector are three and six times of India's, respectively, the relative role of local and cross-border claims by foreign banks in the Indian domestic banking market is much bigger. Indeed, the absolute size of foreign banks' local funding gap in India far exceeds that in China (Graph 6), indicating a bigger foreign presence in India's local banking market.[3] Finally, cross-border claims on banks and non-banks appear more evenly split for China and mostly go direct to non-banks in India. One possible explanation is that corporate borrowing of foreign loans is more rule-based in India but subject tighter quota and often through designed banks in China.

IV. An analytical framework of onshore-offshore price gap

Ambiguity of the quantity measures points to the need for a direct test to market segmentation or integration on the basis of price measures. When cross-border arbitrage is substantially hampered by controls and restrictions, the gaps between onshore and offshore market prices of the same underlying financial assets are likely large and persistent. These price gaps for a range of the financial markets permit a test to the null hypothesis that, in the absence of effective capital controls, cross-border arbitrage should lead to a convergence of the onshore and offshore market prices of the same instrument.

[2] Such external borrowings exclude (i) overseas borrowings for financing exports (ii) subordinated debt placed by head offices of foreign banks with their branches in India as Tier II capital and (iii) capital funds raised/augmented by issue of hybrid bank capital instruments (Innovative Perpetual Debt Instrument and Debt Capital Instruments).

[3] The higher but more volatile ratio of local to international bank claims for India also reveals changing relative importance of local versus cross-border transactions of foreign banks. The ratio's sharp jump in the early 2000s was caused by surging inflows in the form of external commercial borrowing by non-banks and the subsequent fall was attributable to large advances by local operations of foreign banks in India.

To test this hypothesis across different financial markets, we first define the onshore-offshore price gaps consistently so that a positive value of the price gap indicates inflow pressure for that particular market. We examine the following four financial markets in turn: forward foreign exchange market, money market, bond market and stock market. Of the four market examined, three are fixed-income markets and one is equity market. Finally, we construct some composite indicators to pool together the price evidence from these four financial markets in China and India, respectively.

1. The foreign exchange forward market

First, for the foreign exchange markets, both China and India have moved far beyond the phases characterised by two-tier exchange rates. According to the BIS triennial foreign exchange market survey, the Indian foreign exchange market is generally deeper and more developed than its Chinese counterpart (Graph 7). Yet, both economies still uphold the real demand principle for foreign exchange hedging and impose document requirements. Moreover, substantial controls are still in place to manage the pace and forms of dollar inflows and outflows for the two economies.

Thus, local traders in the two economies may face onshore dollar yields in times considerably different from the dollar Libor prevailing offshore. As a response to official restrictions, offshore non-deliverable forward (NDF) markets develop beyond the reach of the domestic monetary authorities, where traders price off the international dollar Libor, while onshore forwards are priced off onshore dollar yields.[4] For both the Chinese renminbi (CNY) and the Indian Rupee (INR), their onshore forward and offshore NDF markets operate side by side, with limited cross-border arbitrage between these two markets, due in part to the restricted participation by domestic banks in the offshore NDF markets. Such restrictions may give rise to persistently large gaps between the forward premiums onshore and offshore for the home currency, scaled by the corresponding spot exchange rate.

$$\text{Forward premium gap} = (F - NDF)/S$$

where F is the onshore forward rate, NDF the offshore non-deliverable forward rate, and S the spot rate. On the one hand, the forward premium gap would converge to zero with sufficient cross-border arbitrage. On the one hand, a persistently positive value of the forward premium gap would indicate underlying appreciation and inflow pressure under non-trivial capital controls. We not only test the hypothesis that the gap is zero but also examine the evolution of the gap over time, looking at both the 3- and 12-month forward contracts.

2. The money market

Second, we examine the onshore and offshore money market yield gap on the home currency. With ample cross-border arbitrage, the onshore money market yield (r) and offshore yield (i) on the home currency should broadly similar and very close. Yet, binding capital controls may deny access by foreign investors to CNY or INR placements hence the yields they face offshore may differ substantially and persistently from the money market yields prevailing onshore. Whereas the forward premium gap stresses the differential onshore and offshore dollar yields, the money yield gap focuses on the home currency money market.

We define the onshore-offshore yield gap as the onshore yield less offshore yield on the home currency (r-i). A positive yield gap suggests market pressure for inflow and currency appreciation. The null of a zero yield gap is the covered interest parity and the assumption that in the absence of capital controls, cross-border arbitrage will ensure the convergence of the onshore-offshore yields on the same currency. The approach to the hypothesis testing

[4] For a more detailed discussion of the Asian NDF markets, see Ma et al (2004) and Debelle et al (2006). Also, see Misra and Behera (2006) for a study on the Indian rupee NDF market and Ma and McCauley (2007) for the Chinese renminbi NDF market.

follows those by Ontani and Tiwari (1981), Frankel (1992), and Ma and McCauley (2008). To construct a measure of the offshore yields (i) on the CNY or INR, which is not directly observable. We follow the methodology in Ma, et al (2004) to estimate the NDF-implied offshore yields. 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 the covered interest parity

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

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. However, when capital controls bind, non-residents may not have full access to onshore credit or placements, giving rising to NDFs.

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

where i is the NDF-implied yield on the home currency offshore. By definition, i is not constrained by the zero lower bound and could be substantially negative. When the onshore-offshore yield gap (r-i) differs significantly from zero, markets on the same currency is segmented. Furthermore, both the size and sign of the yield gap could also inform about the degree and direction of market pressures on the home currency.

We look at both the 3-month and 12-month maturities of the onshore-offshore yield gap for both the CNY and INR. Because of liquidity mismatch, offshore yields are quoted by banks but most onshore yields are measured by official papers, giving rise to possible mismatch in credit risk.[5] However, since the onshore yields tend to be higher than offshore yields during the period concerned, any difference in the credit risk profiles of obligors would at least not favour our finding of significantly positive yield gaps.

3. The bond market

Bonds or debt securities beyond 12-month tenor can behave and be regulated quite differently from the shorter-end money market. Access to the domestic bond markets by foreign investors has been heavily restricted hitherto in both economies. In case of China, foreign investors have no access to China's dominant inter-bank bond market, with the only exception of the Asian Bond Fund II (ABF2). Qualified foreign institutional investors officially have had access to the stock exchange bond markets since 2002 but for some "technical difficulties" had been barred from participating in this tiny market until September 2007.[6] The combined holding by foreign banks and investors of local bonds is no more than 1% of China's domestic bonds outstanding. In India's case, the Reserve Bank of India (RBI) caps the holdings of local-currency government and corporate bonds by foreign institutional investors (FII), currently at $3.2 billion and $1.5 billion, respectively, or just a combined total of less than 1.2% of the domestic bond market of some $400 billion.

We measure the onshore and offshore bond yield gap as the onshore government bond yield less the offshore non-deliverable cross-currency swap rate (NDS). Again, a positive onshore-offshore bond yield gap indicates inflow pressure in the bond market. We focus on the three-year tenor in constructing the onshore-offshore bond yield gap, mainly because of a better matching between onshore and offshore market liquidity. The onshore bond yields for both China and India are measured by the yields on the local-currency government bonds, due to very illiquid onshore corporate bond markets in the two economies (BIS, 2006). Similar to the case of the money market, given that the onshore bond yields tend to exceed the offshore bond yield in the period investigated, our estimates should understate the actual onshore-

[5] Onshore yields are estimated by the one-year PBC bills for China and 3-month and 12-month T-bill rates for India. For a more detailed discussion of liquidity and credit matching, see Ma and McCauley (2007).

[6] The bond trading volume of the Shanghai Stock Exchange averages 5% of China's inter-bank bond market. For the ABF2, see Ma and Remolona (2005). For a more general discussion of the Asian local-currency bond markets, see McCauley and Jiang (2004).

offshore bond yield gap due to possible credit risk mismatch between the onshore official issuers and offshore private issuers and thus work against our findings of non-zero bond yield gaps.

4. The stock market

In contrast to the three fixed-income markets discussed above, both China and India seem to cautiously welcome equity portfolio inflows, albeit still in a managed manner (BIS, 2003). There are two basic routes to funnel equity portfolio inflows — one is to let foreign equity investors directly into the domestic stock markets, and the other is to raise proceeds through overseas listing of domestic companies. For the first route, China caps the inflows via the Qualified Foreign Institutional Investor (QFII) scheme, while the Indian authorities impose neither quota nor minimum investment period on inflows by registered Foreign Institutional Investor (FII).[7] 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 opted to leverage Hong Kong's superior regulatory and market infrastructure and have most of its blue chip companies first listed there ("H-shares").[8] Some of these H-share companies subsequently have been also listed on the Shanghai Stock Exchange ("A-share") as well as in New York as ADRs. Under the second route, Chinese policymakers ensure that the proceeds from overseas listing can be repatriated back onshore in at a managed pace and that foreign portfolio investors cannot collectively effect a net outflow in such equity portfolio investment.

These M, A, H and ADR shares of a same cross-listed Chinese or Indian company enjoy the identical rights and benefits but trade at different prices onshore and offshore. According to the law of one price, with unimpeded cross-border arbitrage, the share price premium/discount should converge near zero, after allowing for frictions such as tax, currency risks, different trading zones and liquidity (Yevy Yeyati, et al, 2006). On the other hand, if there are restrictions on equity portfolio flows, fungibility and/or foreign ownership, such price differentials could be persistently large. Thus a test of market integration is a test to the null hypothesis that the cross market premium is zero. In addition, we also estimate the direction of premium and the speed of price convergence across markets.

We define cross-market stock price premium/discount as the logarithm of the ratio of *overseas to local market prices*. A positive value indicates an overseas market premium and thus an inflow pressure on the local stock market. In particular, we estimate the H-A share price premium for the Chinese companies dual-listed in Shanghai and Hong Kong. For Chinese companies triple-listed in New York as well, we test their H-A, DAR-A and ADR-H share price premium. Finally, we estimate the ADR-M share price premium of the Indian companies dual-listed in New York and Mumbai. The appendix details the data description. Our estimations mostly follow the approach in Peng, Miao and Chow (2007), using the following equation.

$$\Delta q_{i,t} = \alpha + \beta q_{i,t-1} + \Sigma \phi_n \Delta q_{i,t-n} + \varepsilon_{i,t}$$

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.[9] 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

[7] The quota for China's QFII scheme is about $10 billion as of end 2007. The P-note scheme, whereby registered FII can provide access for non-registered FII to gain exposure to the Indian local stock market, was the only way to sell Indian stocks short but frozen from April 2008.

[8] For a more systemic discussion of Hong Kong's role as an international financial centre for China, see McCauley and Chan (2008).

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

$q_{i,t}$ is non-stationary, implying persistent or explosive price divergence. On the other hand, ß < 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+ ß). Therefore, while α = 0 and ß < 0 can be interpreted as long-term price equalisation, α ≠ 0 and ß < 0 represent a case of non-explosive but persistent cross-market share price premium.

V. Price evidence on financial integration

For each of the four financial markets examined, we first report the summary statistics of the concerned market before presenting additional results on econometric testing of the null hypothesis that the gap between the onshore and offshore prices on the same asset is zero. After discussing the four markets individually, we pool their price evidence together by constructing two composite indicators — one for the three fixed-income markets and ther other for all four markets. The period studied starts whenever data available up to June 2008. Before going into details, note that the t- and F-test statistics reject the hypothesis of equal means between the Chinese and Indian price gap for each of the instruments selected (Table 2). This is an indication that for each of the instruments studied, both market segmentation and direction of pressure may differ meaningfully between China and India.

1. The foreign exchange forward market

The onshore-offshore forward premium gap for the CNY is on average much bigger than its INR counterpart and converges slower for both the 3-month and 12-month maturities (Table 3 and Graph 8). The forward premium gap for the CNY averages ten times or more than that of the INR. Even if we take the mean of the absolute values for the gap, which serves as an indicator of pure segmentation regardless of direction of the market pressure, the CNY forward premium gap is still larger than that of the INR. All formal test statistics also reject the null hypothesis of the equality of the average gaps between China and India. The forward premium gap has been mostly positive for the CNY since 2002, suggesting consistent appreciation and inflow pressures on the CNY. In contrast, the INR came mostly under depreciation pressure before 2002 and since then, its forward premium gap has been around zero. Finally, the correlation between the 12-month CNY and INR forward gaps is high, reaching 64% for the period considered.

Our econometric estimations also confirm a larger and more persistent CNY forward premium gap (Table 4 and 5). First, the forward premium gaps are statistically significant for both the CNY and INR. Second, the gap for the CNY is estimated to be twice that of the INR. Finally, at least two structural breaks for both currencies have been confirmed during the sample period. The estimated CNY forward premium gap first narrowed but since late 2006 have widened again considerably. In contrast, the INR forward premium gap has narrowed over time. Overall, the price evidence on the foreign exchange forward market shows that policymakers in both economies may face market pressures from increased capital inflows when opening their capital accounts, more so for China.

2. The money market

Four observations characterise the evolution of the CNY and INR money-market yield gaps during the 2000s (Table 6 and Graph 9). First, the estimated money yield gaps for both the CNY and INR, measured in absolute value, are sizable both statistically and economically, averaging 200 to 300 bps. Second, the CNY yield gap averages much larger (at least five times) than the INR counterpart in the 2000s, for both the 3- and 12-month tenors. Third, while both the CNY and INR came mostly under depreciation pressure prior 2002, afterwards, the market pressure mostly swung to appreciation for the CNY but became more

balanced for the INR.[10] As the INR yield gap started converging to zero from mid 2007, the onshore-offshore yield gap for the CNY widened sharply in response to tightened controls on inflows. Finally, the yield gaps between the Chinese and Indian money markets have been highly correlated, at 83% for the 12-month tenor and suggesting possible global shocks impacting both economies.

Our regressions confirm such observations (Table 7 and 8). In particular, the estimated yield gap is statistically significant for both the CNY and INR. Also, the onshore-offshore CNY yield gap is found to be much wider than its INR counterpart. Finally, while two structural breaks are identified for both the CNY and INR, there are clear signs of more consistent convergence for the INR yield gap and marked divergence for the CNY yield gap in times. The bottom line is that compared to the CNY, tensions with the INR money market appears less and easing over time.

3. The bond market

The onshore-offshore bond yield gap has been significant for both economies but China's average bond yield gap is at least twice as large as that of India during 2003-08 (Table 9 and Graph 10). Therefore, price evidence on the bond market seems to suggest strong inflow pressure on the bond market in response to a more open capital account for both China and India, more so the former than the latter. Moreover, the correlation between onshore and offshore bond yields has been highly positive for India but negative for China. In other words, market segmentation is more pronounced in China than in India. Nevertheless, the correlation between the onshore-offshore yield gaps between the two economies is 83% for the period considered, identical to that observed for the money market.

Furthermore, a comparison of the money and bond markets in the same economy suggests that the money and bond yield gaps are positive and even more highly correlated, at 97% and 88% for China and India, respectively. One main difference, though, between the money market and bond market is that while the onshore-offshore money yield gap suggests alternating inflow and outflow pressures in the Chinese and Indian money markets over time, the bond yield gap indicates persistent pressure for greater inflows into the local bond markets for both economies. One interpretation is that restrictions on inflows into both the Chinese and Indian bond markets have been tighter than their money market counterparts.

4. The stock market

Our evidence on the onshore-offshore stock price gaps suggests persistently large and on average opposite market pressures for China and India. First, for the dual-listed Indian companies, their shares traded in New York command a significant price premium over those traded in Mumbai (Graph 11). By contrast, the New York (or Hong Kong) share prices of the multiple-listed Chinese companies have been at a steep discount to those in Shanghai. For the period of 2000-07, the stock prices of Chinese companies traded in Shanghai command an average 40% premium over those traded in either Hong Kong or New York (Table 10). In contrast, New York enjoys a premium of 17% on average over Mumbai for the dual-listed Indian companies.[11] Such price differentials are remarkably large when benchmarked to those for the Chinese companies listed in both Hong Kong and New York — their share price premiums average less than one percent.

[10] The reversal in the measured onshore/offshore yield gap for the both CNY and INR in 2004 coincided with rapid improvements in the net external positions of the two economies. In 2002, China first became a net creditor in twenty years, as India's net liabilities position halved to 8% in 2003/04 from 16% in 2000/01.

[11] Much remains to be explored as to why the cross-market stock price premiums for the dual-listed Indian companies have been so persistently large until recently. The qualification and registration required for FIIs do not seem to be a sufficient impediment for such an observed onshore-offshore price gaps for India. Other possible restrictions may include limited fungibiilty, foreign exchange rate risk and foreign ownership ceiling. For an incomplete discussion of this subject, see RBI (2003); Hansda and Ray (2002 and 2003).

Second, the cross-market price gaps for Indian companies on average are about half of their Chinese counterparts and more importantly, show faster and more consistent convergence. The estimated speed (half life) of convergence to the New York prices averages 1 day for Hong Kong, 31 days for Mumbai, and 112 days for Shanghai (Table 11).[12] The small New-York-Hong Kong premium and their fast speech of convergence suggest highly efficient cross-market arbitrage for Hong Kong. Cross-border arbitrage has been surprisingly hampered for the Indian equity market and virtually absent for the Chinese equity market.

All in all, our price evidence on the stock markets points to a striking contrast between Shanghai and Mumbai. While Shanghai enjoys bigger, more persistent but also quite volatile stock price premium over New York, Mumbai witnesses a much smaller and converging stock price discount of its cross-listed companies relative to their New York prices. Also, as market pressure for increased equity portfolio inflows into India is consistent with the price evidence on its three fixed-income markets, the pressure on greater equity portfolio outflows for China is cross cutting with the tensions in the above three fixed-income markets. Thus the evidence on cross-borer stock price gaps suggests that direction of pressure can differ across various financial markets. Finally, the correlation between the stock price gaps for the two economies have been lower than those observed for the fixed-income market counterparts, at 40%.

5. Summing up the price evidence

So far, we have examined the onshore-offshore price gaps in the four financial markets individually. Our price evidence suggests that for each of the four markets individually, China is financially less integrated with the rest of the world than India because of more limited cross-border arbitrage. How could we To facilitate an overall assessment, we construct two composite indictors combining the price evidence on the four financial markets.

One simple way is to first focus on the combined price evidence from the forward, money and bond markets. These three fixed-income markets share the same direction of market pressure for both China and India most of the time; and their price gaps tend to be positively and highly correlated. Therefore, we construct a “fixed-income market price gap” indicator summing up the onshore-offshore price gaps for the five fixed-income instruments in the three markets. Each market received an equal weight, and within each market, all instruments are given the same weight. Since tensions in these markets may move in opposite directions occasionally, we measure the fixed-income indicator for both normal and absolute values of the price gaps. The absolute-value indicator gauges the degrees of cross-border arbitrage regardless of directions of market pressure.

The Chinese and Indian fixed-income market indicators suggest stronger overall inflow pressure on China than on India during 2004-08 (Graph 12). While China’s fixed-income price indictor has always been positive, suggesting persistent inflow pressure, the Indian indictor is negative for about one third of the time, more often hovering around the zero line. The Chinese price gap narrowed and converged to the Indian gap during 2005-06 but has since diverged sharply. On average, China’s summary fixed-income price gap is ten times larger than that of India as a measure of inflow pressure and four times larger in absolute terms, consistent with the price evidence from the three fixed-income markets individually.

Finally, a summary onshore-offshore price gap indicator is also constructed by combining the price evidence of all four financial markets — the stock market and the three fixed-income markets.[13] On average, the summary price gap indicator in normal value points to inflow

[12] Peng et al (2008) estimate a half-life convergence of some 40 days for A-H dual-listed Chinese companies. The difference could be caused by different estimation periods.

[13] In choosing the weight on the stock market, note that the stock price gap is taken as a ratio of price levels (in logarithm) instead of yield difference and thus the scale is much larger than those of the fixed-income price gaps. On average, the price gaps for the fixed-income instruments range between 10 and 360 basis points, while those for the stock markets range between 1,500 and 5,500 basis points. As a practical

pressures of similar scales on both China and India, simply due to the offsetting influence from the Chinese equity markets. In particular, while India's stock price gap is consistent with its fixed-income markets pointing mostly to inflow pressure, China's stock market has been cross-cutting with its fixed-income markets (Graph 13). Because of this offsetting pressure, China's summary price gap indicator is only one third of its own fixed-income price gap. In contrast, India's summary indicator is four times of its fixed-income price gap. Thus, China and India's normal-value indicators converge to each other. On the other hand, the absolute-value measure of the summary indicator suggests that China's price gap for the four markets combined is almost three times that of India on average (Graph #). In other words, our overall price evidence suggests that on balance, India is more financial integrated with the rest of the world than China is.

We also notice that the summary price gap indicators of China and India have been highly and positively correlated for the period considered. The same can be said of the Chinese and Indian fixed-income price gap indicators. Their correlations both exceed 70%, despite quite different domestic business cycles in these two large emerging economies. Much of the correlation in the two summary indicators has been driven by the fixed-income markets, given a much lower correlation of 40% between the Chinese and Indian stock price gaps. These high correlations could be the result of some global factors and/or similar local policy response taken to mitigate the impact of such external shocks on the domestic economies. Much remains to be explored in their interactions.

VI. Implications and conclusion

As two large and rapidly growing emerging markets, both China and India aim for a more open capital account over the medium term. Understanding the initial conditions, required adjustments and potential challenges in capital account opening will help better prepare policymakers in the two economies for the possible challenges ahead. A central question is how financially integrated China and India have been with the rest of the world.

To this end, we examine and compare both the quantity and price evidence on cross-border financial integration between China and India. Our quantity evidence comprises international investment position, balance of payments and BIS international banking statistics. Our price evidence is based on the onshore-offshore price gaps of the same underlying assets in the four financial markets: forward market, money market, bond market and stock market.

The quantity evidence gives rise to a mixed picture. While China is better endowed with current account surplus, creditor position and bigger external balance sheet, India is more open to portfolio flows to finance its current account shortfalls, as its financial markets have been better prepared to cope with the two-way capital flow volatility. Thus, Indian policymakers and markets have been more experienced with the inevitable risks and vulnerability of swings in portfolio flows than their Chinese counterparts who feel more comfortable with the stability associated largely illiquid inward direct investment. The harder part of the task still awaits China.

Our price evidence suggests that on average, impediments to cross-border financial arbitrage remain considerable for both economies, but much more so for China than for India. This is consistent with the quantity findings of an Indian system more open to portfolio flows. Price evidence on all of the four financial markets individually as well as from composite indicators indicates consistent inflow pressure on average for India but cross-cutting tensions on China's stock market faces outflow pressure, cross-cutting its three fixed-income markets. On balance, the Indian financial markets are more integrated with the world. In other words, Indian policymakers may face less tensions and thus the related adjustments when opening the capital account. China's task of coping with market tensions could be greater upon opening up its domestic financial markets to the more volatile portfolio flows.

solution, we give the stock market one tenth of the weight assigned to each fixed-income market.

Finally, our quantity and price evidence indicates still considerable market pressure when opening the Chinese and Indian capital accounts. Thus policymakers in both China and India should anticipate the possible challenges of managing the adjustments associated with increased capital flows. For instance, the global shock of structurally high food prices and the Engel's Law can keep inflation in the emerging markets higher than in the mature economies. Thus resultant domestic higher interest rates would complicates policymaking, both because of potential carry trade and debates over targeting headline or core CPI inflation, adding inflow pressure on their domestic bond markets. Therefore, policymakers in both economies may not ease their policy of limiting debt portfolio inflows any time soon and instead may prefer to retain some discretion in managing the pace of debt portfolio inflows for some time.

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Appendix

Stock share prices data

The cross-market share price premium is defined as the log of the ratio of overseas to local prices expressed in US dollars. The price premium is adjusted for the number of shares that each ADR share is equivalent to. To minimise the trading hour gaps, the daily data on stock share prices of cross-listed Chinese and Indian companies will be the local Asian closing and New York ADR opening of the same day. Data for regression covers 1999 and June 2008 and is an unbalanced panel because of the number of the cross-listed companies increases over time.

The price premium is calculated as the average of the price premium of each individual company weighted by its current market capitalisation. Current market capitalisation is the sum of a company's market capitalisation in both local (A shares) and overseas (H shares) markets. For India shares, only the local market capitalisation is used.

Table 1: Net international investment positions of China and India in 2007				
	China		**India**	
	USD billions	*% of GDP*	USD billions	*% of GDP*
Net equity	-740.9	*-22.8*	-167.0	*-15.2*
Net FDI	-634.8	*-19.5*	-69.3	*-6.3*
Net portfolio equity	-106.1	*-3.3*	-97.6	*-8.9*
Net debt	1,763.0	*54.2*	114.0	*10.4*
Net private debt	228.1	*7.0*	-195.8	*-17.8*
Reserves	1,534.9	*47.2*	309.7	*28.2*
Net overall position	1,022.1	*31.4*	-53.0	*-4.8*
Sources: IMF; authors' calculations.				Table number

Table 2: Test on equality of means between China and India, by instrument		
	t-test	**Anova F-test**
Forward premium gap, 3-month	12.485	155.881
Forward premium gap, 12-month	18.455	340.581
NDF Yield gap, 3-month	16.209	262.736
NDF Yield gap, 12-month	13.842	191.606
Bond yield gap, 3-year	8.054	64.872
Stock price gap, ADR-A vs ADR-M	-33.234	1104.499
Stock price gap, H-A vs ADR-M	-33.686	1134.745

Note: Weekly data. Sample period is from 9 April 2004 to 27 June 2008. 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: HKMA; Bloomberg; CEIC; authors' estimations.

Table 3: Onshore less offshore foreign exchange forward premiums

As a percent of the spot

	CNY		INR	
	3-month	12-month	3-month	12-month
Maximum	3.44	6.40	1.85	2.83
Minimum	-0.75	-0.47	-5.43	-6.00
Average	0.50	1.55	0.02	0.10
Average of absolute value	55	188	40	100
Annualised volatility	690	2024	812	2080
Onshore/offshore correlation	1.00	0.98	1.00	0.99

Note: Daily data. Forward premium gap is calculated as the difference between onshore forward and offshore non-deliverable forward scaled by the spot rate. For the CNY, sample period is between April 7, 2003 and June 30, 2008. For the INR, sample period is between February 1, 1999 and June 30, 2008.

Sources: Bloomberg; CEIC; authors' calculations. Table number

Table 4: 12-month forward premium gap for the CNY

Y = The absolute value of the 12-month forward premium gap

(1)	$Y = 1.896$ $(0.174)^{***}$	$Adj\text{-}R^2 = 0.00$ DW = 0.132
(2)	$Y = 2.582D_1 + 0.631D_2 + 1.947D_3$ $(0.266)^{***}$ $(0.081)^{***}$ $(0.177)^{***}$	$Adj\text{-}R^2 = 0.387$; DW = 0.217 Wald Test: F(2,270) = 42.269
(3)	$Y = 2.630 – 0.005T$ $(0.364)^{***}$ $(0.002)^{***}$	$Adj\text{-}R^2 = 0.112$ DW = 0.149
(4)	$Y = 3.072D_1 + 1.884D_2 + 3.828D_3 – 0.008T$ $(0.430)^{***}$ $(0.663)^{***}$ $(1.005)^{***}$ $(0.004)^{*}$	$Adj\text{-}R^2 = 0.420$; DW = 0.231 Wald Test: F(2,269) = 39.144

Note: (1) Weekly data. The sample period is between 11 April, 2003 and 27 June, 2008. D_1 represents period between 11 April, 2003 and 15 July, 2005; D_2 represents period between 22 July, 2005 and 3 November, 2006; D_3 represents period between 10 November, 2006 and 27 June, 2008. (2) The Wald Test statistics are for the joint null hypothesis that dummies for all three sub-periods are equal. (3) Standard errors in the parentheses. *** indicates 1% significance; ** indicates 5% significance; * indicates 10% significance.

Sources: Bloomberg; CEIC; authors' calculations. Table number

Table 5: 12-month forward premium gap for the INR

Y = The absolute value of the 12-month forward premium gap

(1)	$Y = 1.004$ $(0.104)^{***}$	$Adj\text{-}R^2 = 0.000$ DW = 0.252
(2)	$Y = 1.737D_1 + 0.412D_2 + 0.562D_3$ $(0.182)^{***}$ $(0.054)^{***}$ $(0.074)^{***}$	$Adj\text{-}R^2 = 0.353$; DW = 0.391 Wald Test: F(2,488) = 24.483
(3)	$Y = 1.851 - 0.003T$ $(0.239)^{***}$ $(0.001)^{***}$	$Adj\text{-}R^2 = 0.223$ DW = 0.325
(4)	$Y = 1.669D_1 + 0.231D_2 + 0.284D_3 + 0.001T$ $(0.260)^{***}$ (0.404) (0.623) (0.001)	$Adj\text{-}R^2 = 0.353$; DW = 0.392 Wald Test: F(2,487) = 24.375

Note: (1) Weekly data. The sample period is between 5 February, 1999 and 27 June, 2008. D_1 represents period between 5 February, 1999 and 13 December, 2002; D_2 represents period between 20 December, 2002 and 15 July, 2005; D_3 represents period between 22 July, 2005 and 27 June, 2008. (2) The Wald Test statistics are for the joint null hypothesis that dummies for all three sub-periods are equal. (3) Standard errors in the parentheses. *** indicates 1% significance; ** indicates 5% significance; * indicates 10% significance.

Sources: Bloomberg; CEIC; authors' calculations. Table number

Table 6: Onshore less offshore money market yields

In basis points

	CNY		INR	
	3-month	12-month	3-month	12-month
Maximum	1928.11	1273.06	610.04	425.90
Minimum	-1091.98	14.77	-983.63	-714.81
Average	434.91	362.25	8.03	70.95
Average of absolute value	360.60	363.22	244.83	200.72
Annualised volatility	6954.10	4569.00	4521.05	3920.61
Onshore/offshore correlation	0.42	-0.60	0.83	0.88

Note: (1) Yield gap is calculated as the difference between onshore home currency interest rate and yield implied by the offshore non-deliverable forward. The onshore CNY rates are 3-month CHIBOR and 12-month PBC bill auction yield. The onshore INR rates are 91-day T-bill rate and 364-day government bond yield. (2) Weekly data. For the 12-month CNY yield gap, the sample period is between April 2, 2004 and June 27, 2008. For the 3-month CNY and both 3-month and 12-month INR yield gaps, the sample period is between February 5, 1999 and June 27, 2008.

Sources: Bloomberg; CEIC; authors' calculations. Table number

Table 7: The 12-month onshore/offshore yield gap for the CNY

Y = The absolute value of the 12-month onshore/offshore yield gap

(1)	$Y = 363.217$ $(41.884)^{***}$	$Adj\text{-}R^2 = 0.000$ $DW = 0.026$
(2)	$Y = 397.936D_1 + 88.566D_2 + 552.932D_3$ $(24.821)^{***}$ $(9.360)^{***}$ $(75.020)^{***}$	$Adj\text{-}R^2 = 0.463$; $DW = 0.069$ Wald Test: $F(2,219) = 82.293$
(3)	$Y = 162.507 + 1.800T$ $(71.201)^{**}$ $(0.669)^{***}$	$Adj\text{-}R^2 = 0.163$ $DW = 0.031$
(4)	$Y = 219.381D_1 - 441.923D_2 - 376.071D_3 + 5.175T$ $(54.979)^{***}$ $(136.377)^{***}$ $(214.552)^{*}$ $(1.296)^{***}$	$Adj\text{-}R^2 = 0.622$; $DW = 0.116$ Wald Test: $F(2,218) = 39.610$

Note: (1) Weekly data. The sample period is between 2 April, 2004 and 27 June, 2008. D_1 is the dummy for the period between 2 April, 2004 and 15 July, 2005; D_2 is the dummy for the period between 22 July, 2005 and 3 November, 2006; D_3 is the dummy for the period between 10 November, 2006 and 27 June, 2008. (2) The Wald Test statistics are for the joint null hypothesis that the dummies for all the three sub-periods are equal. (3) Standard errors in parenthesis. *** indicates 1% significance; ** indicates 5% significance; * indicates 10% significance.

Sources: Bloomberg; CEIC; authors' calculations. Table number

Table 8: The 12-month onshore/offshore yield gap for the INR

Y = The absolute value of the 12-month onshore/offshore yield gap

(1)	$Y = 200.716$ $(15.805)^{***}$	$Adj\text{-}R^2 = 0.000$ $DW = 0.136$
(2)	$Y = 301.063D_1 + 166.247D_2 + 99.308D_3$ $(23.292)^{***}$ $(19.104)^{***}$ $(19.380)^{***}$	$Adj\text{-}R^2 = 0.332$; $DW = 0.206$ Wald Test: $F(2,488) = 22.415$
(3)	$Y = 338.632 - 0.561T$ $(32.395)^{***}$ $(0.112)^{***}$	$Adj\text{-}R^2 = 0.273$ $DW = 0.187$
(4)	$Y = 289.018D_1 + 134.206D_2 + 50.119D_3 + 0.119T$ $(41.295)^{***}$ $(81.241)^{*}$ (115.930) (0.293)	$Adj\text{-}R^2 = 0.332$; $DW = 0.207$ Wald Test: $F(2,487) = 4.292$

Note: (1) Weekly data. The sample period is between 5 February, 1999 and 27 June, 2008. D_1 is the dummy for the period between 5 February, 1999 and 13 December, 2002; D_2 is the dummy for the period between 20 December, 2002 and 15 July, 2005; D_3 is the dummy for the period between 22 July, 2005 and 27 June, 2008. (2) The Wald Test statistics are for the joint null hypothesis that the dummies for all three sub-periods are equal. (3) Standard errors in parenthesis. *** indicates 1% significance; ** indicates 5% significance; * indicates 10% significance.

Sources: Bloomberg; CEIC; authors' calculations. Table number

Table 9: Onshore less offshore bond yields for the CNY and INR

In basis points

	CNY	INR
Maximum	809.0	363.1
Minimum	-60.0	-74.3
Average	228.0	111.5
Average of absolute value	233.4	114.2
Onshore/offshore correlation	-46.7	79.5

Note: Weekly data. Bond premium is calculated as the difference between three-year onshore government bond yield and three-year offshore non-deliverable swaps rate. Sample period is between March 28, 2003 and June 27, 2008.

Sources: Bloomberg; authors' calculations. Table number

Table 10: Premium of overseas shares prices to local share prices

In per cent

	Simple average	**Weighted average**
H-A, 40 dual-listed companies	–54.0	–43.8
H-A, 9 triple-listed companies	–48.7	–43.9
ADR-A. 9 triple-listed companies	–48.5	–43.9
ADR-H, 9 triple-listed companies	–0.1	–0.1
ADR-Indian, 11 dual-listed companies	12.5	16.9

Note: Daily average. Price gap is calculated as the log difference between overseas share price and local share price. The sample period is between 19 April 2000 and 30 June 2008. For ADR-Indian the sample starts on 30 May 2000.

Sources: HKMA; Bloomberg; authors' calculations. Table number

Table 11: Stock share price premium and convergence of cross-listed companies					
	H-A premium **40 dual-listed companies**	**H-A premium** **9 triple-listed companies**	**ADR-A premium** **9 triple-listed companies**	**ADR-H premium** **9 triple-listed companies**	**ADR-India premium** **11 dual-listed companies**
	(1)	(2)	(3)	(4)	(5)
α	–0.286***	–0.440***	–0.431***	–0.075***	0.224***
	(0.036)	(0.092)	(0.096)	(0.014)	(0.033)
β	–0.003***	–0.005***	–0.006***	–0.513***	–0.022***
	(0.000)	(0.001)	(0.001)	(0.011)	(0.002)
ϕ_1	–0.030***	–0.026**	–0.061***	–0.183***	–0.255***
	(0.005)	(0.011)	(0.012)	(0.010)	(0.009)
ϕ_2	–0.052***	–0.045***	–0.048***	–0.079***	–0.159***
	(0.005)	(0.010)	(0.011)	(0.009)	(0.008)
Half-life (days)	260.0	128.1	112.8	1.0	30.9
Adjusted R^2	0.005	0.005	0.009	0.337	0.088
DW statistics	1.997	1.977	1.983	2.036	2.059
# of observations	45,008	7,857	7,358	13,718	12,970

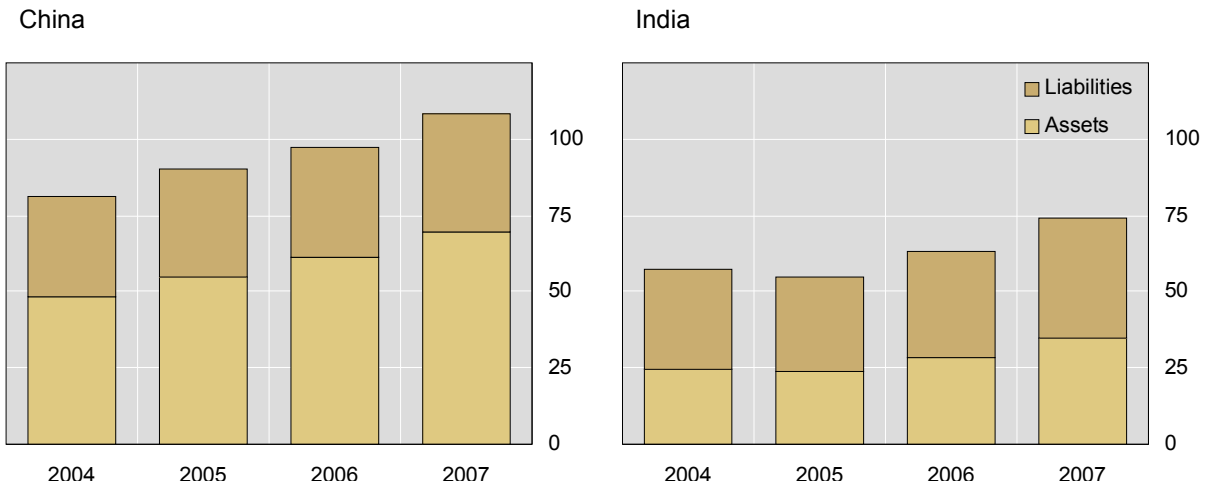
Note: The estimation equation is $\Delta q_{i,t} = \alpha_i + ß q_{i,t-1} + \Sigma \phi_n \Delta q_{i,t-n} + \varepsilon_{i,t}$, where $q_{i,t}$ is the logarithm of the overseas-local share price differential for the cross-listed companies, Δ is the first difference operator, and n stands for lags to 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, 2008. Standard errors are shown in parenthesis. *** indicates 1% significance; ** indicates 5% significance; * indicates 10% significance.

Sources: HKMA; Bloomberg; authors' estimations. Table number

Graph 1: International investment positions

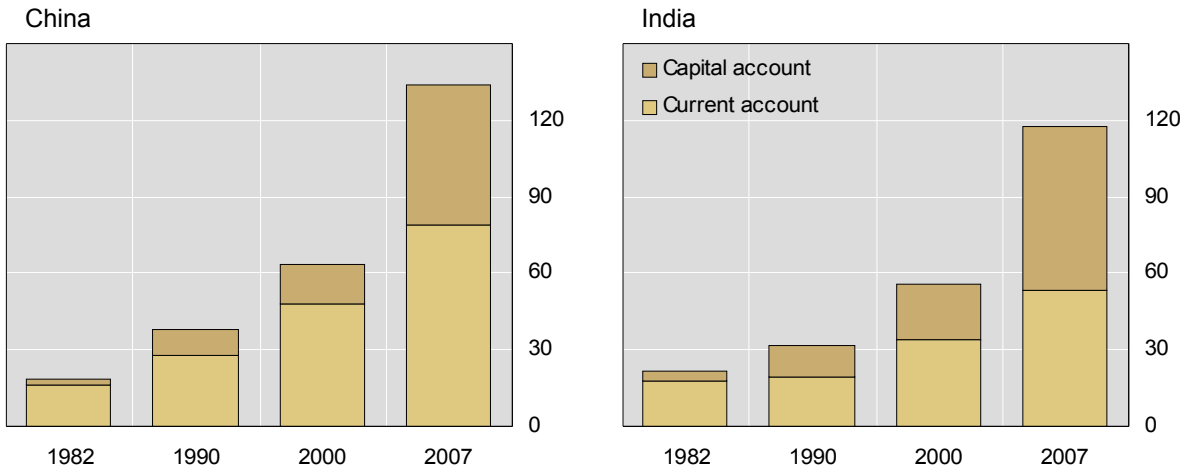
As per cent of GDP



Sources: IMF, *International Finance Statistics*; authors' calculations.

Graph 2: Gross balance of payments flows

As per cent of GDP

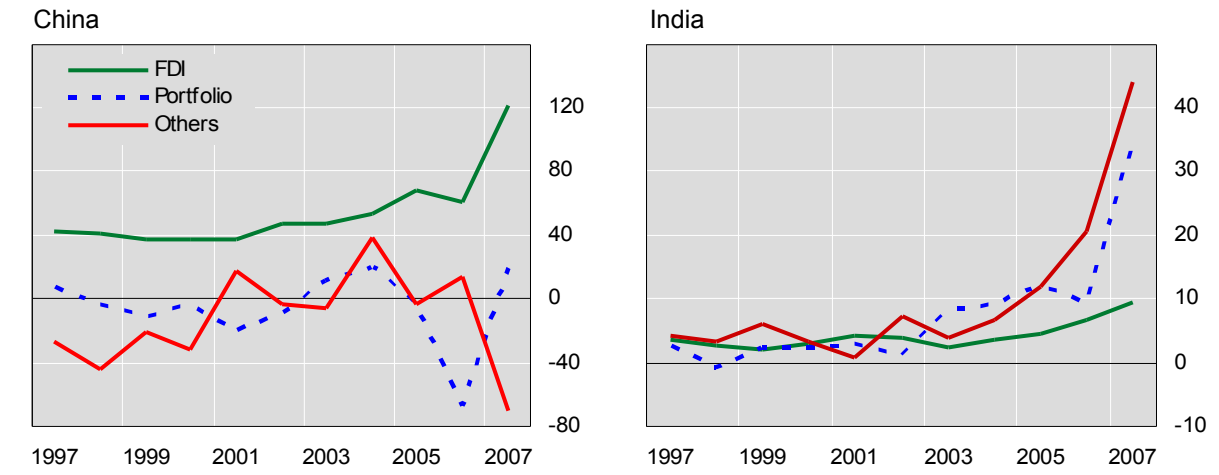


Note: Sum of credit and debit flows.

Sources: CEIC; authors' calculations.

Graph 3: Net FDI, portfolio and other investment flows

In billions of US dollars

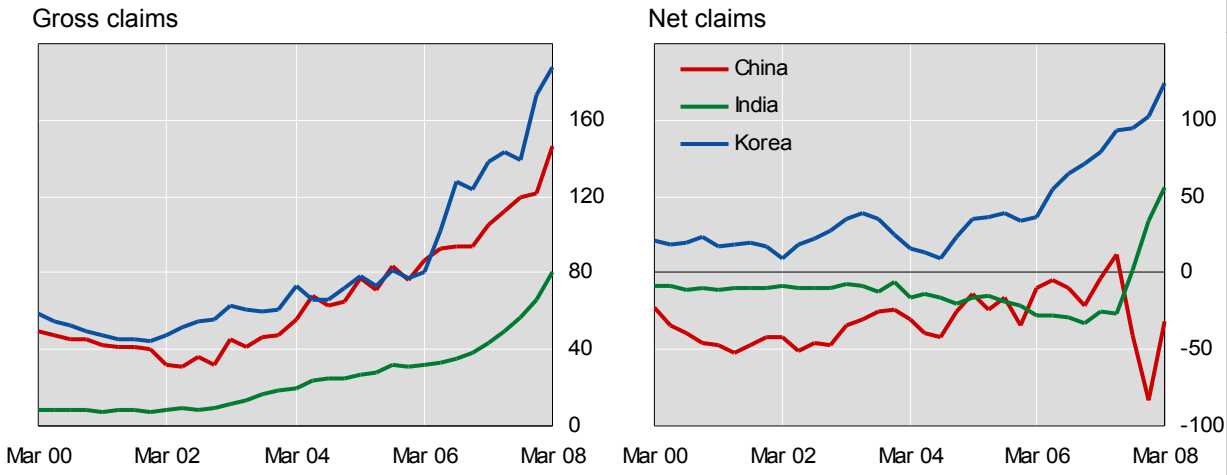


Source: CEIC.

Graph number

Graph 4: Interbank claims vis-à-vis selected Asian economies

In billions of US dollars

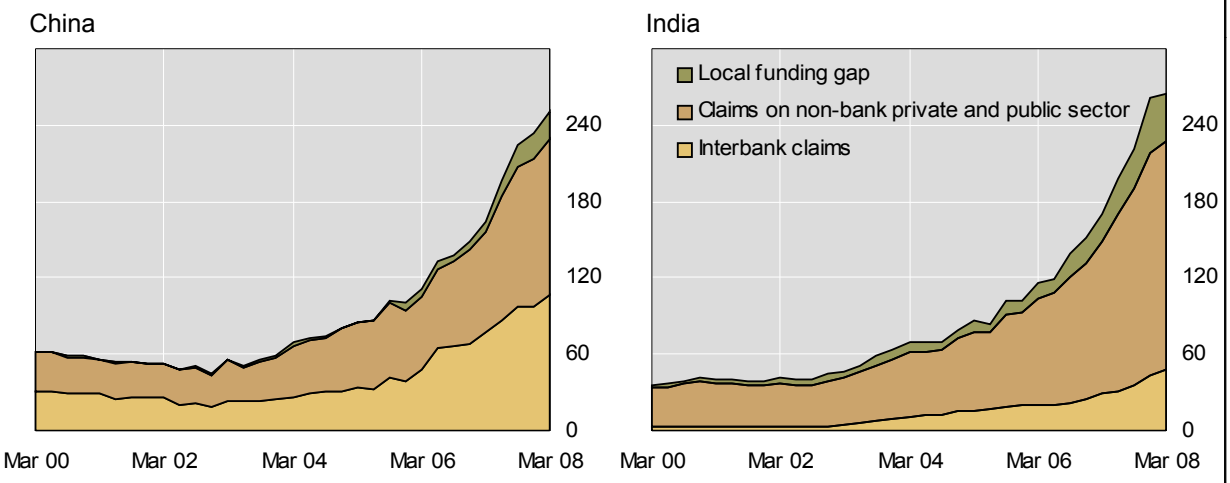


Sources: BIS; authors' calculations.

Graph number

Graph 5: Consolidated claims vis-à-vis China and India

In billions of US dollars

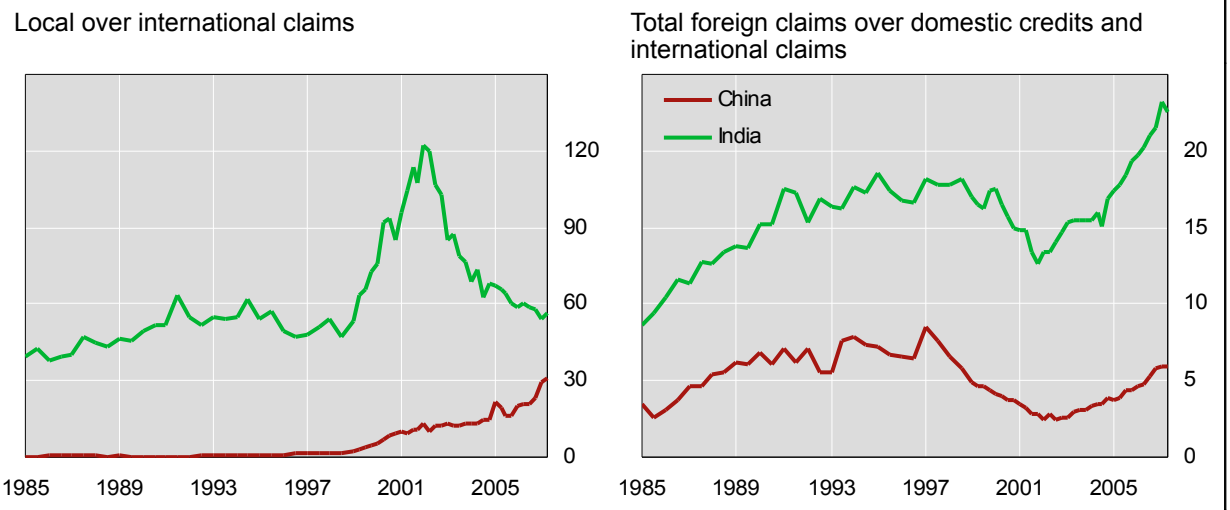


Sources: BIS; authors' calculations.

Graph number

Graph 6: Foreign bank presence and cross-border bank flows

In per cent

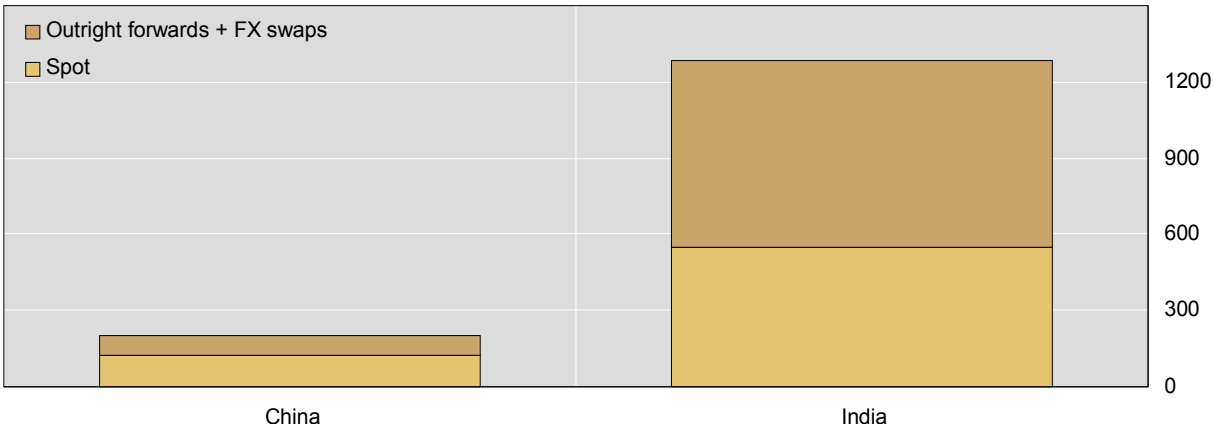


Sources: IMF *IFS*; BIS.

Graph number

Graph 7: Local currency turnover

As a percent of goods and services trade flow



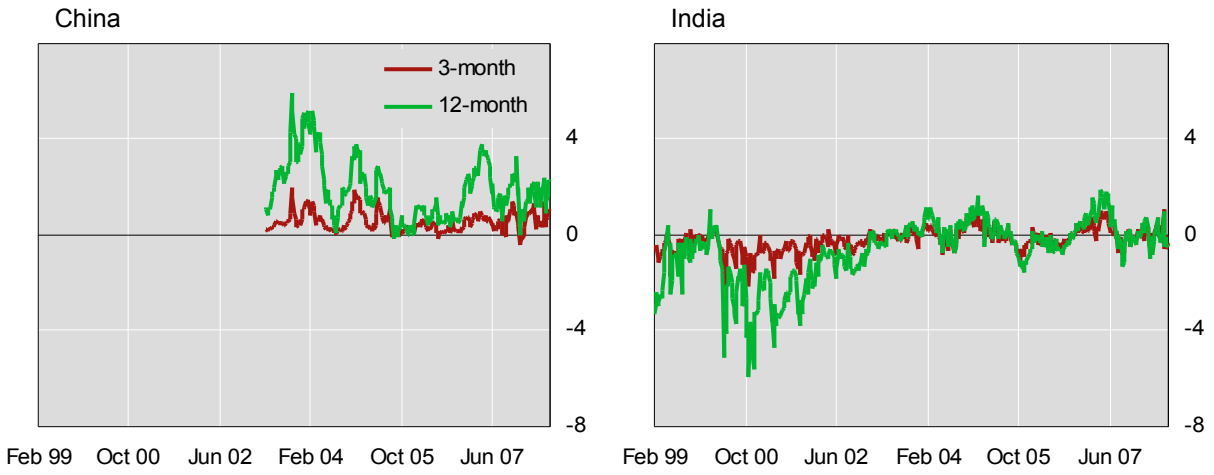
Note: Local currency turnover is in April 2007 and annualised. Trade in goods and services are in 2006.

Sources: IMF, *International Financial Statistics*; BIS, *Triennial Central Bank Survey (2007)*; authors' calculations.

Graph number

Graph 8: Onshore foreign exchange forward less offshore NDF

As a percent of spot price

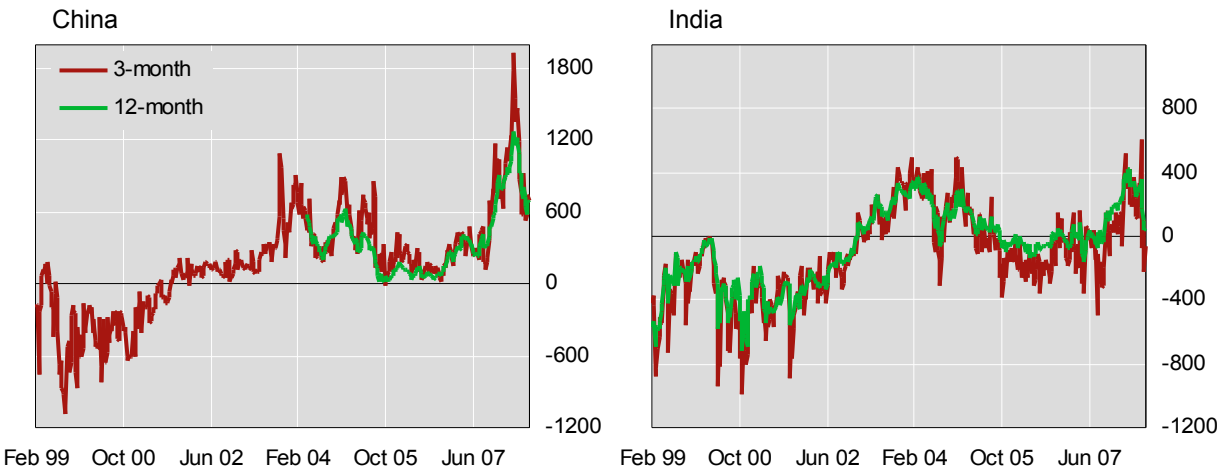


Sources: Bloomberg; CEIC; BIS calculations.

Graph number

Graph 9: Onshore money market yield less offshore NDF-implied yield

In basis points

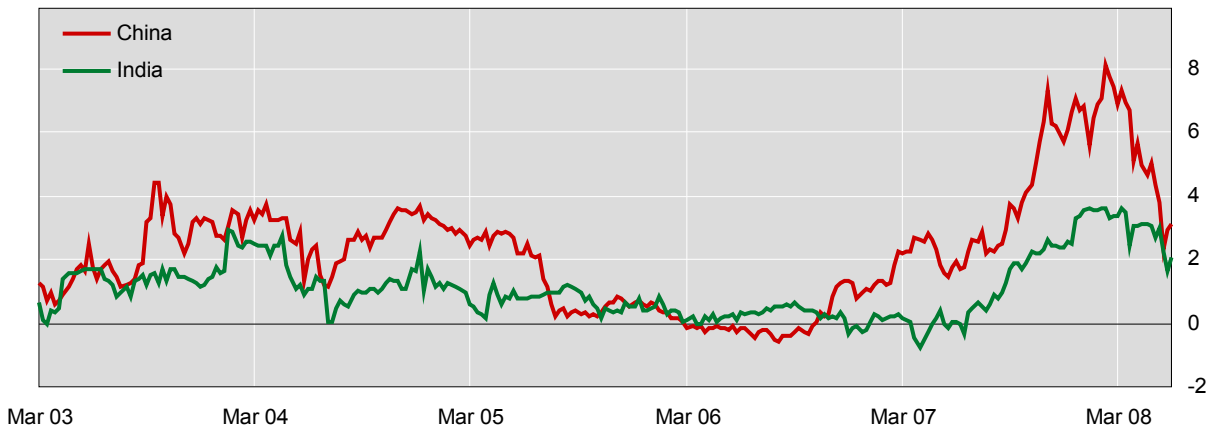


Note: Weekly data. For China: 3-month (12-month) NDF, three-month Chibor (one-year PBOC bill auction yield), and 3-month (12-month) Libor. For India: 3-month (12-month) NDF, 91-day (364-day) treasury bill implicit yield, and 3-month (12-month) Libor.

Sources: Bloomberg; CEIC; BIS calculations. Graph number

Graph 10: Domestic government bonds less non-deliverable cross-currency swaps

In per cent

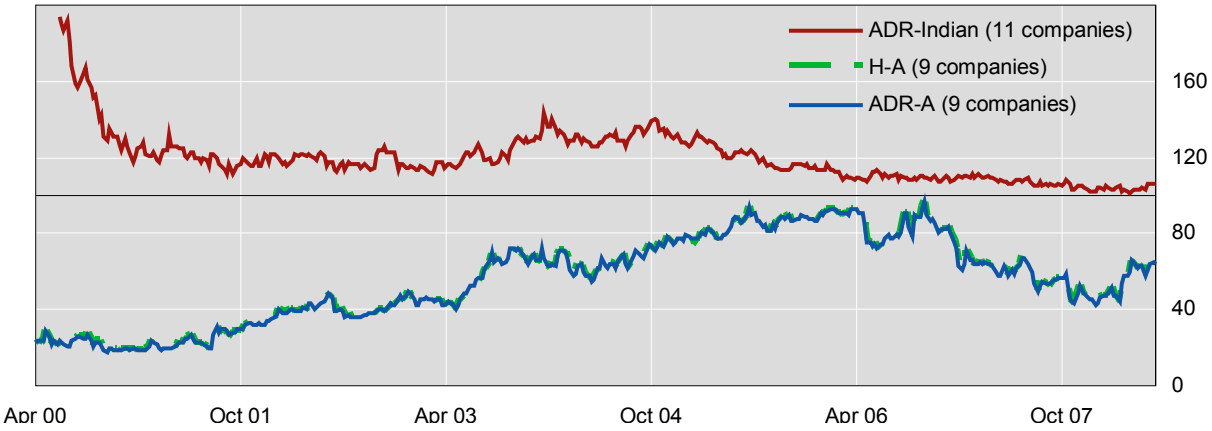


Note: three-year maturity.

Sources: Bloomberg. Graph number

Graph 11: Ratios of overseas share prices to equivalent local share prices

In per cent



Note: Weekly average; weighted by market capitalisation.

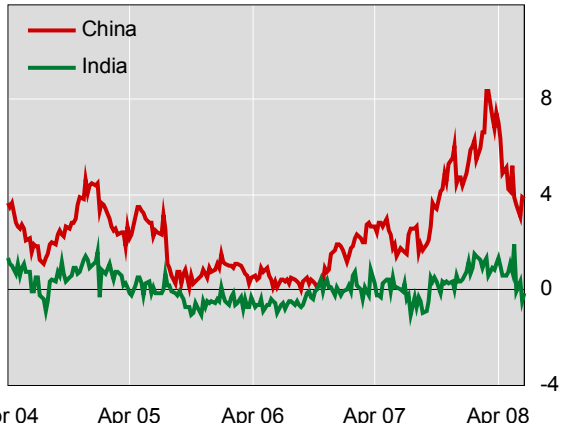
Sources: HKMA; Bloomberg; authors' calculations.

Graph number

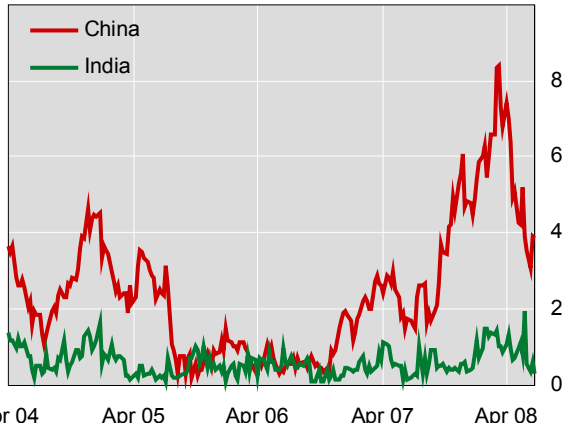
Graph 12: Onshore-offshore fixed-income price gap indicator

In percentage points[1]

Normal



Absolute value



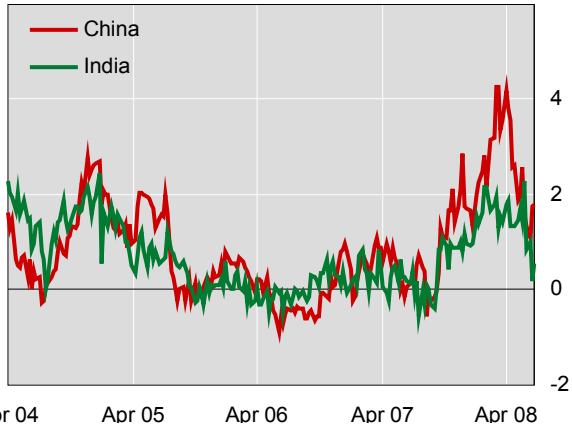
Note: Weekly data. Sample period is from 9 April 2004 to 27 June 2008. [1] Weighted average of the price gaps of all five instruments considered. The three fixed-income markets receive equal weights, and within each market, all instruments receive the same weight.

Sources: Bloomberg; authors' calculations. Graph number

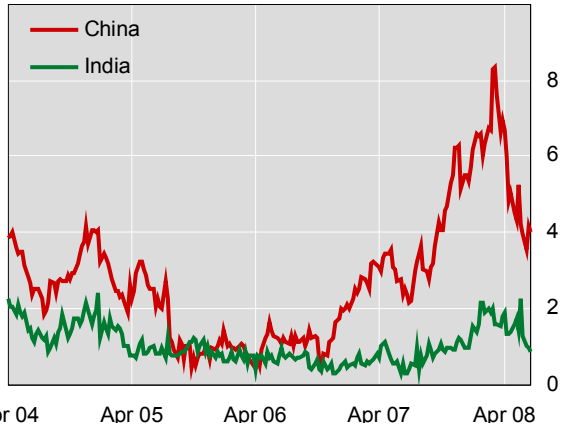
Graph 13: Summary onshore-offshore price gap indicator

In percentage points[1]

Normal



Absolute value



Note: Weekly data. Sample period is from 9 April 2004 to 27 June 2008. [1] Weighted average of the price gaps of all instruments considered (seven for China and six for India). Within each fixed-income or stock market, all instruments receive the equal weight of 50%. But the weight on the stock market is one tenth of that on a fixed-income market.

Sources: HKMA; Bloomberg; CEIC; authors' calculations. Graph number