

Estimating China's de-facto capital account convertibility

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Abstract

China's capital account convertibility is presently not well understood. A relatively closed de jure regime sits in contrast with a de facto regime that exhibits distinct signs of being quite open. This paper seeks to shed light on this issue by using an econometric model to predict the level of capital flows that would be expected if China had a fully open capital account. The results show that over 2001-2003, observed capital flows were around 85 percent of the predicted value, suggesting that China's capital account over a one year time horizon is already quite open. Short run convertibility would expectedly be less than this figure. Thus, the results carry the connotation that the cost of capital controls in terms of allocative inefficiency over the medium and long run is likely to have been modest while some unwarranted short run volatility has been avoided. Nonetheless, the results do not leave room for policy complacency. As China continues to implement its WTO commitments in addition to other arrangements such as the Common Economic Partnership Agreement with Hong Kong, short run convertibility is presently on the rise. This makes implementing policies that are prerequisites for full convertibility a matter of urgency.

JEL classifications – F36, F37

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1. Introduction

A key economic variable in China that is currently not well understood is the degree to which its capital account is convertible. Capital account convertibility refers to the freedom that private agents have in converting local financial assets into foreign financial assets and vice versa at market determined rates of exchange. On the one hand, it is known that China employs a complex system of capital controls. Based on classifications of capital account restrictiveness published by the International Monetary Fund (IMF) with respect to its member countries, China emerges as having one of the most closed regimes in the world. On the other hand, the view that capital account convertibility remains low appears incongruent with China's rising stature as both a host and source country of foreign direct investment (FDI) and numerous studies have pointed to non-trivial volumes of capital entering and leaving China through unofficial channels. During the Asian financial crisis, the evidence pointed to large volumes of 'capital flight', i.e., unofficial capital outflows (see Wu and Tang 2000). In more recent years, speculation of an impending RMB appreciation has prompted sizeable inflows of 'hot money', much of which is not recorded in official capital flow figures (see, amongst others, Eichengreen 2004). These observations suggest a cleavage may exist between China's *de jure* capital account regime, which in many ways remains closed, and its *de facto* regime, which could be largely open if official restrictions are either not enforced or can be easily circumvented. It cannot simply be inferred, however, that because there are unofficial capital flows China's capital account is actually highly convertible, since we do not know what volume of capital flows would be consistent with full convertibility. Just as the existence of capital controls cannot be taken to imply they are necessarily effective, nor does some proportion of total capital entering and leaving China through unofficial channels imply that capital controls no longer exert any substantial impact. The aim of this paper is to make a contribution toward finding out just how open China's capital account is.

Pinning down the degree of capital account convertibility is important for several reasons. First and most topically, it has implications for China's exchange rate policy. Since 1994 China has maintained a fixed exchange rate peg that appears to have served the country well with rapid economic growth being accompanied by macroeconomic stability. Yet the consensus now is that the *de facto* degree of capital account convertibility makes the peg increasingly costly to maintain and should be abandoned (see, amongst others, Goldstein and Lardy 2003; Roberst and Tyers 2003; Eichengreen 2004). This proposition is rooted in the 'irreconcilable trilemma' of international macroeconomics, which states that in an environment of highly mobile capital, maintaining a fixed exchange rate can result in large and destabilising fluctuations in the domestic money supply as the monetary authorities are forced to buy and sell the domestic currency at the fixed rate. In recent years the combination of a dollar peg and hot money inflows is said to have exposed China to inflationary risks as the domestic money supply rapidly expanded. However, the case for abandoning the peg is not as clear cut as many would like to suggest as while inflation did accelerate during 2004, the latest data point to a soft landing in 2005,¹ and money supply growth had also returned to the target range set by the monetary authorities.²

Secondly, the current degree of capital account openness could tell us much about the expected impact of the financial liberalization measures mandated in China's WTO accession agreement. This agreement was notable for the fact that it extended well beyond merchandise trade in including widespread concessions in services trade, particularly financial services. For example, by the end of 2006 foreign banks are to be given full national treatment throughout China. A much stated concern is that these policies represent such dramatic

¹ The CPI rose from -0.8 percent at the end of 2002 to 5.3 percent in July 2004 but then fell to 1.8 percent in April 2005.

² Broad money growth fell to 14.6 percent in March 2005, which was less than the $\leq 15\%$ target.

changes in the degree of capital account convertibility that their introduction will inevitably bring financial instability. Yet this concern could be overstated if China's capital account is already open in a *de facto* sense.

Thirdly, shedding light on the degree of capital account convertibility will also be instructive for determining whether China offers an example of how capital controls might be used to promote economic stability while still connecting to the global economy more generally. During the Asian financial crisis it was China's *de jure* regime that was routinely referred to as being the reason the country was able to avoid the fate suffered by its neighbours, and as such Yu (2000) argues that China provides a "case for capital controls". Other authors however subsequently questioned this assertion as estimates of capital flight at the time suggested a markedly different *de facto* regime being in place (Laurenceson and Chai 2003).

In section two of this paper, we examine the level of private capital flows and the correlation of these flows between China and the rest of the world in order to illustrate China's increasing integration with global financial markets and to gain some initial understanding regarding the degree of capital account openness. In section three we outline an econometric model that will be used to estimate a capital flow volume consistent with an open capital account. In section four, we present the estimation result and compare it with observed capital flows in order to make an evaluation of capital account convertibility. Section five concludes.

2. Private Capital Flows

According to the IMF, private capital flows can be categorized into FDI, foreign portfolio investment, and other foreign investment. Here we label the latter two types of investment together as non-FDI (NFDI). China, as well as many other countries, has applied different

policies toward FDI and NFDI. FDI, while certainly still regulated, has nonetheless been strongly encouraged by the Chinese authorities, especially at the local level (see Chai 1998). On the other hand, NFDI has been tightly regulated as well as controlled. For example, China's stock markets have been segmented into A and B markets, with foreigners only legally allowed to trade in the smaller B market. It was not until 2003 that the Qualified Foreign Institutional Investor scheme gave foreigners some access, albeit still very limited, to the much larger A market.

Given the differentiated treatment of FDI and NFDI in China, it is not surprising that their growth paths have been divergent. Figures 1 and 2 show gross (inflows plus outflows) FDI flows and gross NFDI flows of China and other countries grouped by income levels, over the period of 1977-2003; both items are expressed as a percentage of GDP. Table 1 shows the correlation of these flows between China and the country groups. In this paper we focus on gross capital flows because it is hard to make inferences regarding the openness of the capital account using net figures. For example, a country that has an entirely open capital account with roughly equal volumes of capital inflows and outflows will only be a small capital trader in net terms. From Figure 1, it can be seen that China's gross FDI surged dramatically in the early 1990s from 1.2 percent of GDP in 1990 to a peak of 6.6 percent in 1994. In recent years, it appears to have stabilized at around 4.5 percent. The level of FDI China now attracts is not dissimilar to the high income country average. China's FDI flows are most closely correlated with low income and lower middle income countries. This is not surprising given that China is a part of this group and, given its sizeable GDP, is likely to dominate the group. A positive and significant correlation also exists with respect to upper middle and high income countries, but not to the same magnitude.

Table 1. Correlation between Gross Private Capital Flows of FDI and Non-FDI

	World (FDI)	High income (FDI)	Upper middle income (FDI)	Lower middle income (FDI)	Low income (FDI)	China (FDI)	World (NFDI)	High income (NFDI)	Upper middle income (NFDI)	Lower middle income (NFDI)	Low income (NFDI)	China (NFDI)
World (FDI)	1											
High income (FDI)	1.00	1										
Upper middle income (FDI)	0.85	0.83	1									
Lower middle income (FDI)	0.87	0.84	0.92	1								
Low income (FDI)	0.78	0.75	0.92	0.95	1							
China (FDI)	0.48	0.44	0.65	0.81	0.79	1						
World (NFDI)	0.91	0.89	0.89	0.95	0.91	0.69	1					
High income (NFDI)	0.91	0.89	0.89	0.94	0.91	0.67	1.00	1				
Upper middle income (NFDI)	-0.33	-0.32	-0.26	-0.35	-0.40	-0.24	-0.27	-0.30	1			
Lower middle income (NFDI)	0.80	0.77	0.84	0.94	0.88	0.82	0.90	0.89	-0.31	1		
Low income (NFDI)	0.39	0.36	0.53	0.63	0.70	0.77	0.57	0.57	-0.41	0.65	1	
China (NFDI)	0.81	0.80	0.70	0.78	0.70	0.47	0.89	0.89	-0.24	0.85	0.33	1

Figure 1. Gross Private Capital Flows of FDI from 1977 to 2003

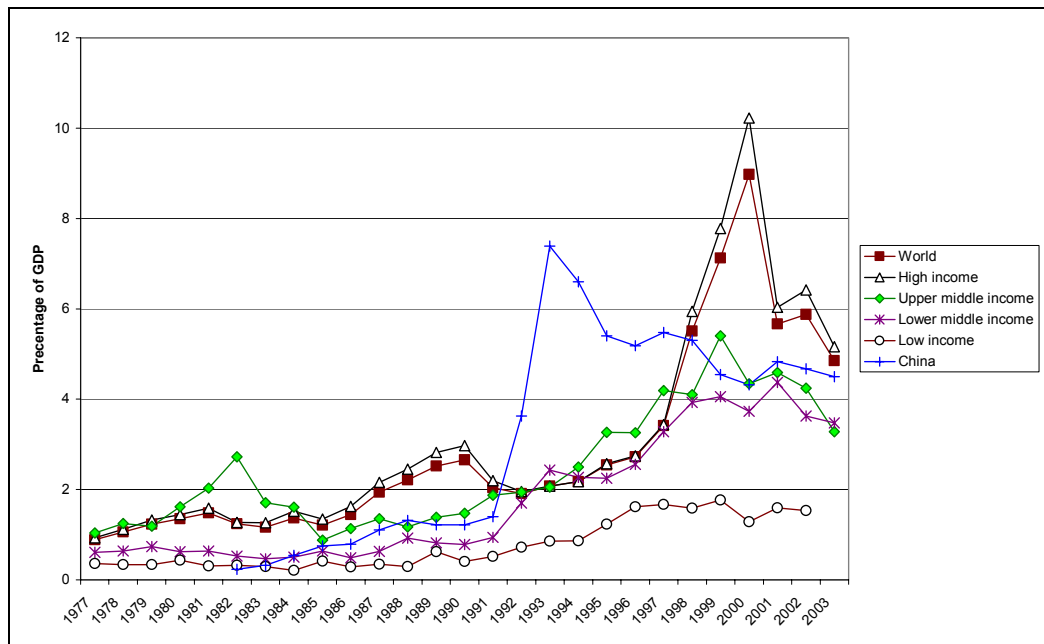
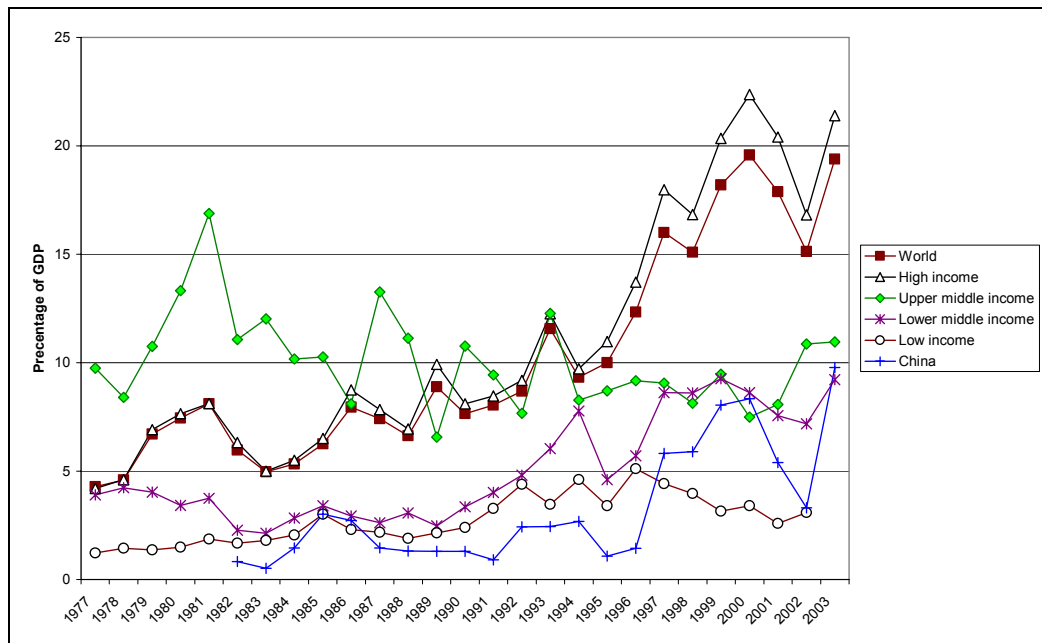


Figure 2. Gross Private Capital Flow of Non-FDI from 1977 to 2003



As for NFDI, gross flows have risen from less than 1 percent in the early 1980s to over 8 percent two decades later. The dip in China's NFDI in 2001 and 2002 seems to be synchronized with the world trend and that of high income countries. We suspect this was related to a series of events that simultaneously affected global financial markets, including the busting of the technology bubble in 2000, the September 11 event, the collapse of a number of large corporations in the US and other OECD countries and the wars in Afghanistan and Iraq. It is interesting to note that China's NFDI is particularly highly correlated with high income countries. Despite this impressive correlation, in contrast to the level of FDI, the gap between the level of China's NFDI and the high income country average has been widening from around 5 percent of GDP in the 1980s to 9 percent in the 1990s and to over 11 percent in the early 2000s.

A word of caution is in order here. The sizeable unofficial capital flows alluded to in section one imply that Figure 2 will understate actual (official plus unofficial) NFDI in the case of China. One common way of estimating actual NFDI, in net terms, is to make use of national income accounting relationships. Changes in foreign reserve holdings should be attributable to either the current account balance and / or net capital flows. As changes in foreign reserves, the current account balance and net FDI are deemed more easily accounted for than NFDI flows, actual net NFDI can then be estimated as a residual³ (Row 5, Table 2). Actual net NFDI can then be broken down into its official and unofficial components. Unofficial NFDI will be equal to actual net NFDI minus official net NFDI, the latter of which can be calculated as the difference between total net private capital flows and net FDI flows (Row 8, Table 2). The estimated data relating to unofficial net NFDI seems plausible. For most of the

³ While being a reasonable assertion, there are clearly problems that also occur in accurately measuring the current account surplus (e.g., the mis-invoicing of exports and imports) and the level of FDI (e.g., "round trip" capital of Chinese origin and NFDI entering the country in the guise of FDI in order to take advantage of the favourable policies extended to FDI) (Xiao 2004; Prasad and Wei 2005).

period, unofficial capital outflows exceeded unofficial inflows. This was particularly the case during the period of the Asian financial crisis when there were expectations of China devaluing the RMB. Since 2001 however this trend slowed and by 2003 when expectations of an impending RMB appreciation had reached fever-pitched levels, unofficial inflows exceeded outflows. Nonetheless, there is one problem associated with these estimates of unofficial NFDI – they are in net rather than in gross terms. We do not see this as a major weakness though. This is because, particularly in the context of developing countries, unofficial NFDI flows during a certain time period tend to be dominated by movements in one direction or another. For example, during the Asian financial crisis, few would argue with the contention that unofficial NFDI overwhelmingly moved abroad. Similarly, in 2003 unofficial NFDI was overwhelmingly moving into China. What this means is that the absolute value of the net figure represents a lower bound approximately equal to the real gross figure. As a result, if we add the absolute value of net unofficial NFDI to gross official NFDI, we conclude that actual gross NFDI for China has been averaging around 9.9 percent of GDP over the period of 1996-2003 (Row 12, Table 2). This figure exceeds the upper middle-income country group average over this period (9.2 percent) although it remains considerably short of the world average (16.7 percent) and certainly below the average of high-income countries (18.7 percent).

In summary, China's capital flows already show a connection with global financial markets in terms of correlation. A noticeable difference between FDI and NDFI however is that while the level of FDI has approached the world average, the level of NFDI has yet to keep up. This is consistent with what we know about the differential pace at which liberalization has preceded with respect to FDI on the one hand and NFDI on the other. As a consequence, the

Table 2. China's Capital Flows, 1996 – 2004

	1996	1997	1998	1999	2000	2001	2002	2003	2004
Total reserves, inc. gold (\$US billion)	108	143	150	158	169	219	295	457 ¹	619
Total reserve accumulation, inc. gold (\$US billion)	32	36	6	9	11	50	77	162	207
Current account surplus (\$US billion)	7	37	31	21	21	17	35	46	70
Net FDI (\$US billion) ²	38	42	41	37	37	37	47	47	61
Actual net NFDI (\$US billion)	-13	-43	-66	-49	-47	-4	-5	69	77
Total official net private capital flows (\$US billion)	49	58	42	37	41	41	47	60	
Official net NFDI (\$US billion)	11	16	1	-1	4	4	0	13	
Unofficial net NFDI (\$US billion)	-24	-59	-67	-48	-51	-8	-5	56	
GDP	821	903	954	999	1079	1176	1271	1412	1593
Official gross NFDI (% GDP)	1.4	5.8	5.9	8.0	8.3	5.4	3.3	9.8	
Unofficial net NFDI (% GDP)	-2.9	-6.5	-7.0	-4.8	-4.7	-0.7	-0.4	4.0	
Total actual = official gross NFDI plus absolute unofficial net NFDI (% GDP)	4.3	12.3	12.9	12.8	13.0	6.1	3.7	13.8	

Source – International Monetary Fund

Notes –

1. In 2003 the Chinese government used \$US45 billion from its foreign reserves to recapitalise two state banks. As a result, the 2003 figure for total reserves is the official value plus \$US 45 billion. The 2004 figure is simply the official estimate.

2. The FDI figure for 2004 it is *not* a net figure. It is simply inward FDI. The source is the National Bureau of Statistics. In previous years, outward FDI recorded in the national accounts has been very small.

real issue and challenge in determining the current degree of capital account convertibility in China lies in finding out what gross NFDI flows would be were there no capital controls in place. The next section explains the econometric model and data we use in an attempt to shed light on this question.

3. The Model and Data

In the last section, it was shown that even after adjusting for unofficial flows, the level of China's gross NFDI flows continues to lag behind that of the world average by a significant margin. Nonetheless, without controlling for other potentially relevant factors, this gap may not accurately reflect on the degree of capital account convertibility. To address this issue, we use data from countries with open capital accounts to estimate an econometric model that can satisfactorily explain NFDI flows in terms of a number of explanatory variables. Based on the observed values of these explanatory variables in the case of China, we then use this model to estimate a predicted or expected value for its NFDI were its capital account open. The ratio of this predicted value to the observed value of China's NFDI can then be used as a guide to the current degree of capital account convertibility.

Comparing a predicted value with an observed value is a commonly used technique to gauge the extent of market distortions and it is a method that has previously been used in the Chinese context. Chang and Shao (2004), for example, used it to make inferences regarding the extent to which the fixed RMB/\$US exchange rate deviated from the equilibrium value. Earlier, Wei (1995) estimated an FDI model and compared the expected value implied by this model with the observed volume of FDI going into China during the 1980s. Given that FDI flows were substantially liberalised during the 1990s, the real appeal now lies in applying this technique to NFDI data. There are other methods that can be used to determine the openness of the Chinese economy to international trade and investment flows. Cheung, Chinn and Fujii (2003) for example based their analysis on the international parity conditions. The logic here is that if countries have open capital accounts, then after making an appropriate allowance for expected exchange rate fluctuations, arbitrage should lead to synchronous movements in interest rates between them. Each method has advantages and disadvantages. A merit of the

technique we use is that it allows some quantitative assessment to be made regarding the degree of capital account convertibility. Capital accounts are not simply open or closed, certainly not in a *de facto* sense, and it is the degree of capital account convertibility that is important for policy-making. It does however need to be acknowledged that there are weaknesses with this approach. Most notably, the point estimate of any forecasting model will be subject to a standard error. This necessarily qualifies the confidence that can be placed in the point estimate, at least in a statistical sense. But such costs have to be balanced against those associated with using alternative techniques. Studies based on the international parity conditions generally offer limited insight into the degree of capital account convertibility and any results must also be qualified due to the fact that a representative, internationally comparable and market determined interest rate must be selected, which is not an easy task in view of China's fragmented and regulated financial markets. Restrictive assumptions must also be made regarding how exchange rate expectations are formed. The technique used in this paper holds certain advantages and ideally it would be complemented in the future by other research that draws on alternative methodologies.

The Model

The regression model estimated is a cross section model of the following general form:

$$NFDI_i = \alpha_0 + \mathbf{x}_i \boldsymbol{\alpha}_1 + \varepsilon_i \quad (1)$$

where i is a country index, \mathbf{x}_i a vector of explanatory variables, and ε_i an i.i.d. error term; and $NFDI$ is measured in the percentage of GDP.

The initial, general vector \mathbf{x}_i , which is later tested down to include a smaller subset of explanatory variables, includes:

- GDP (PPP, international currency): The inclusion of GDP is to examine if there is any size effect as NFDI is already expressed in percentage of GDP.
- GDP per capita (PPP, international currency): A richer country entails, as well as provides, more investment opportunities.
- Growth rate of GDP per capita: A faster growing country would expectedly attract more foreign capital.⁴
- Trade (percent GDP): Countries that are open to trade in goods and services also tend to be open to trade in capital, most obviously in trade-related finance.
- FDI (percent GDP): Dasgupta and Ratha (2000) show that FDI flows to developing countries are strongly associated with NFDI flows. This is not surprising given many driving factors of FDI and NFDI are in common, such as investment environments, market potential, etc.
- GOV: A governance index is included to capture the effects of the institutional environment on capital flows. We constructed this index using the principal components method. The underlying data series are from the World Bank, which every two years since 1996 has collected an extensive international data set on six aspects of governance include Voice and Accountability, Political Instability and Violence, Government Effectiveness, Regulatory Quality, Rule of Law and Control of Corruption (Kaufmann, Kraay and Mastruzzi 2005). As expected, data pertaining to the six aspects of governance are positively and highly correlated with one another to the extent that the first principal component extracted accounts for around 85 percent of the variance in the six underlying series. As a result, the first principal component is sufficient to construct our overall GOV index.

⁴ The growth rate of GDP has also been tested but it did not alter the result.

- Gross national saving rate and current account balance. These two variables are intended to capture a country's need to borrow from, or its ability to lend to, global financial markets.
- The squared terms of the explanatory variables are also included to allow for non-linearity. For instance, a fast growing economy will attract foreign capital inflows and therefore have a large gross capital flow figure. On the other hand, an economy that has a negative growth rate may experience large capital outflows and therefore also have a large gross capital flow figure.

Data

In view of the year-to-year volatility in NFDI, we use the three year average value over 2001-2003. For all variables in x_t , except GOV, the average values over 1998-2000 are used to mitigate year-to-year volatility and potential endogeneity problems with NFDI. As for GOV, data for 2002 are used as those for 2001 and 2003 are not available. Furthermore, the theoretical causality clearly runs in the direction of from GOV to NFDI and not vice versa; so endogeneity should not be a problem. Unless otherwise stated, the data are drawn from the World Bank's *World Development Indicators* database.

We estimate the above model using data from countries that have open capital accounts. To select these countries, we make use of the qualitative data that has been published annually by the IMF on each of its member countries (IMF various years). This source states whether capital controls exist across 13 different types of capital account transactions (e.g., transactions involving capital market securities, commercial credits, real estate transactions, personal capital movements, etc). If a country has no controls on at least 7 out of the 13 different capital account transaction types over the 2001-2003 period then we deem its capital

account to be open. In total, 66 out of 188 countries classified by the IMF satisfied this selection criterion. However, of these 66 countries, 13 of them do not have data on capital flows. Of the 53 that do, 10 are classified as offshore financial centres (OFCs) by the Bank for International Settlements (BIS). These include, amongst others, Bahrain, Panama, and Hong Kong.⁵ The average size of NFDI for this OFC group is 110 percent of GDP, compared to 17 percent for the remaining 43 countries. Econometric estimation results also indicate that the OFC countries behave very differently from non-OFC countries.⁶ (The results are reported in the Referee Appendix A at the end of the paper.) Considering that even if its capital account did become fully convertible, China is unlikely to become an OFC in the foreseeable future, we decide to focus on a sample that excludes the OFCs. We label this 43 country sample ‘the base sample’. Given that this sample size is not particularly large, we later modify the sample to examine how sensitive the results are with respect to the sample size.

Table 3 lists the base sample of countries plus China, and ranks them according to NFDI. The criterion of a ‘simple majority’ of 7 out of 13 is no doubt a somewhat arbitrary way of deciding which countries have an open capital account. While there may be little difference between a country that has controls on 6 types of capital controls versus another that has controls on 7, the vast majority of countries either accepted or rejected do not fall into this grey area. A cursory glance down the list of countries in Table 3 suggests that the countries selected are generally perceived as financially open. The above criterion is also made in order to strike a balance between ensuring the selected countries have a sufficient degree of

⁵ Belgium is not classified by BIS as an OFC, but its close neighbour Luxembourg is. However, the IMF BoP database does not have separate entry for Luxembourg except for the last few years. We suspect the data for Belgium is highly affected by its close ties with Luxembourg. In fact, Belgium has the second largest value for NFDI in the sample. Therefore, we treat Belgium as an OFC and exclude it from the sample.

⁶ Econometric estimation results indicate that an OFC dummy variable and its interaction terms with other variables are significant at standard significance levels. The result can be obtained from the authors on request.

Table 3. Selected Data for the Sample Countries plus China (ranking is based on NFDI)

Rank	Country	Income ^a	NFDI	FDI	GOV
1	Netherlands	OECD	60.9	27.1	3.8
2	Uruguay	UMI	51.0	1.1	1.5
3	United Kingdom	OECD	50.9	25.6	3.3
4	Portugal	OECD	38.6	26.2	2.7
5	Finland	OECD	34.3	26.1	4.1
6	Austria	OECD	32.5	4.7	3.3
7	Norway	OECD	24.4	9.0	3.6
8	Spain	OECD	24.2	10.8	2.6
9	Jamaica	LMI	24.1	6.9	0.0
10	Denmark	OECD	24.0	22.3	3.8
11	Sweden	OECD	24.0	24.8	3.7
12	Estonia	UMI	21.7	9.7	2.1
13	Latvia	UMI	21.1	5.8	1.4
14	Greece	OECD	20.1	1.3	1.8
15	Bosnia and Herzegovina	LMI	19.8	2.8	-1.4
16	Germany	OECD	19.7	9.7	3.2
17	Hungary	UMI	16.6	7.6	2.0
18	Chile	UMI	16.2	12.3	2.6
19	Guatemala	LMI	15.9	9.9	-1.0
20	France	OECD	15.6	11.1	2.6
21	Czech Republic	UMI	13.9	8.9	1.7
22	El Salvador	LMI	13.8	4.2	-0.3
23	Japan	OECD	13.7	0.9	2.3
24	Italy	OECD	13.3	1.6	2.0
25	Jordan	LMI	11.9	5.1	0.0
26	Ecuador	LMI	11.0	4.0	-1.4
27	Lithuania	UMI	9.7	5.9	1.6
28	Canada	OECD	9.4	11.3	3.5
29	Trinidad and Tobago	UMI	9.3	11.5	0.7
30	Israel	HI: nonOECD	8.5	4.7	1.0
31	Botswana	UMI	8.4	1.6	1.7
32	United States	OECD	8.1	5.4	2.7
33	Bolivia	LMI	7.8	10.7	-0.7
34	Armenia	LMI	7.6	7.9	-0.8
35	Paraguay	LMI	7.4	2.6	-1.9
36	China	LMI	6.2	4.7	-0.8
37	Kenya	LI	5.6	0.4	-1.6
38	Peru	LMI	5.0	3.4	-0.4
39	New Zealand	OECD	5.0	11.8	3.7
40	Guyana	LMI	4.4	7.4	-0.4
41	Nicaragua	LI	3.2	7.3	-0.7
42	Oman	UMI	3.0	0.4	1.2
43	Uganda	LI	1.9	2.8	-1.4
44	Yemen, Rep.	LI	1.3	2.8	-1.8

(a) HI: high income; UMI: upper middle income; LMI: lower middle income; LI: low income.

openness to allow the forecasting model to generate a meaningful estimate while at the same time also permitting sufficient diversity in terms of the explanatory variables. Later, we will examine the sensitivity of the results with respect to a change in the selection criterion.

Expectedly, the base sample has more high income countries than low and middle income countries (although these country groups are still represented) as the former group is typically more integrated with global financial markets. As we have seen in Figure 2, China's NFDI is highly correlated with that of high income countries. Therefore, the preponderance of high income countries in the full sample would in fact be a merit rather than a problem.

Table 3 provides the data for two explanatory variables, FDI and GOV. We only include these two variables here because, as will be shown in the next section, they turn out to be the only two that play a statistically significant role in terms of explaining NFDI flows.

4. Results

Estimation Model

The results for our preferred model are reported in the "Estimation model – Base sample" column in Table 4. It can be noted from the table that many of the explanatory variables comprising the vector \mathbf{x}_i do not feature in the model due to statistical insignificance.

Nevertheless, this parsimonious model yields an adjusted R^2 close to 0.5, which is not a small number for a cross section model that seeks to explain capital flows.

FDI and its squared terms are significant at 10 percent and 1 percent level respectively. This result supports the argument that there are common elements that motivate both FDI and NFDI. But it also suggests the relationship between the two is non-linear and, therefore,

cannot be described simply as the one of substitutes or complements. GOV is the only other variable that is significant at the standard 5 percent confidence level. The coefficient indicates that a one point increase in a country's governance performance as graded by the GOV index will raise NFDI flows by 2.24 percentage points. Within the base sample the standard derivation of GOV is equal to 1.81, suggesting that an increase of the index by one point is very feasible. This result highlights the fact that governance is a significant determinant of NFDI flows not only in statistical sense but also in economic sense.

Table 4. Estimation Results

	Estimation model	Predication model			
	Base sample	Base sample	Sample A	Sample B	Sample C
<i>Constant</i> ($NFDI_{CHN}$)	15.710*** (3.481)	9.371*** (2.236)	9.043*** (2.337)	9.737*** (1.915)	9.862*** (1.600)
<i>FDI</i>	-1.344* (0.734)	-1.344* (0.734)	-1.596** (0.766)	-1.395** (0.696)	-1.228** (0.572)
<i>FDI</i> ²	0.077*** (0.025)	0.077*** (0.025)	0.090*** (0.027)	0.078*** (0.024)	0.076*** (0.021)
<i>GOV</i>	2.242** (0.988)	2.242** (0.988)	2.318** (1.000)	2.270*** (0.894)	2.649*** (0.614)
<i>D*FDI_i</i>					0.523** (0.230)
R ²	0.530	0.530	0.577	0.521	0.526
Adjusted R ²	0.493	0.493	0.541	0.489	0.503
S.E. of regression	9.680	9.680	9.542	9.486	9.720
S.E. of $NFDI_{CHN}$		9.935	9.824	9.677	9.851
No. of observation	43	43	39	48	87
Predicted value / observed value		0.84	0.87	0.81	0.80

Figures in the brackets are standard errors. ***, ** and * denote significant at 1, 5 and 10 percent levels respectively. "D" is a dummy for the period 2000-2002.

Prediction Model

Based on the result in Table 4, the preferred model is

$$\widehat{NFDI}_i = \hat{\alpha}_0 + \hat{\alpha}_1 FDI_i + \hat{\alpha}_2 FDI_i^2 + \hat{\alpha}_3 GOV_i \quad (2)$$

where \widehat{NFDI}_i is the expected value of $NFDI_i$ given the particular values for the explanatory variables, and the values of the estimated coefficient, $\hat{\alpha}_j$'s, are given in the table.

If we insert the observed value of FDI (2001-2003 average) and GOV (2002) for China into (2), we obtain

$$\widehat{NFDI}_{CHN} = \hat{\alpha}_0 + \hat{\alpha}_1 FDI_{CHN} + \hat{\alpha}_2 FDI_{CHN}^2 + \hat{\alpha}_3 GOV_{CHN} \quad (3)$$

where the subscript ‘‘CHN’’ denotes China and \widehat{NFDI}_{CHN} is the predicted value of $NFDI_{CHN}$.

A drawback of obtaining the predicted value of $NFDI_{CHN}$ in this way is that it does not provide us with any information on the standard error of the point estimate. This problem can be circumvented by subtracting (3) from (2):

$$\begin{aligned} \widehat{NFDI}_i - \widehat{NFDI}_{CHN} &= \hat{\alpha}_1 (FDI_i - FDI_{CHN}) + \hat{\alpha}_2 (FDI_i^2 - FDI_{CHN}^2) \\ &+ \hat{\alpha}_3 (GOV_i - GOV_{CHN}) \end{aligned} \quad (4)$$

This implies that, if we run the following regression:

$$\begin{aligned} NFDI_i - \widehat{NFDI}_{CHN} &= \beta_0 + \alpha_1 (FDI_i - FDI_{CHN}) + \alpha_2 (FDI_i^2 - FDI_{CHN}^2) \\ &+ \alpha_3 (GOV_i - GOV_{CHN}) + e_i \end{aligned} \quad (5)$$

where e_i is an error term, the predicted value of $NFDI_{CHN}$ will be given by the estimated constant term, β_0 . The standard error of the prediction will be equal to $(\hat{\rho}^2 + \hat{\sigma}^2)^{1/2}$, where ρ^2 is the variance of the of β_0 and σ^2 the variance of the error in the population (Wooldridge 2000: p.200). It should be noted that, except the constant term, the estimated

coefficients for the prediction model (5) are exactly the same as those of the estimation model (2).

The result of the above prediction model is reported in the “Prediction model – Base sample” column of Table 4. The predicted value of $NFDI_{CHN}$ is equal to 9.37. The standard error of the predicted value is rather large at 9.94. A standard error of this magnitude is not uncommon in forecasting models with the reason lying in the large value of $\hat{\sigma}^2$. Since σ^2 comes from the error in the population, it does not change even with a much larger sample size.⁷ The other error component, ρ^2 , indeed is very small. Nonetheless, given the standard error in the prediction, it is warranted to examine its robustness in other ways. To this end, we estimate three other samples: A, B and C. The prediction results based on these other samples are also reported in Table 4.

Sensitivity Tests

Sample A is a sub-set of the base sample with a more restrictive selection criterion. To be qualified to enter this sample, countries must have no controls on at least 8 capital account transaction types (as opposed to 7 in the base sample). This reduces the sample size to 39. The predicted value for $NFDI_{CHN}$ remains in the vicinity of the original estimate, reducing only slightly to 9.0. Other coefficients also change only marginally. Sample B, on the other hand, represents a loosening of the selection criterion to 6 transaction types. This increases the sample size to 48. Again, the prediction value for $NFDI_{CHN}$ as well as other coefficients change only marginally.

⁷ Increase the sample size, however, will reduce the size of $\hat{\rho}^2$. Nonetheless, since $\hat{\rho}^2$ is already quite small compared to $\hat{\sigma}^2$ in our case and so further reducing it will not make any material difference to the prediction error.

If one wants to further expand the sample size, one way to do so would be to further loosen the selection criterion. We are reluctant to take this path because if the sample consists increasingly of countries with not particularly open capital accounts, the predicted value will be rendered meaningless. Instead, what we can do is to expand the sample size by extending the observation period. In the base sample, the value of NFDI is a three year average over 2001-2003. We extend the number of observations by including another set of three-year average values for NFDI over 2000-2002. The values for the explanatory variables are extended accordingly. The two sets of data are then combined together to form a pooled dataset of twice the size of the base sample.⁸ We label this ‘sample C’.

The result for sample C is reported in the last column of Table 4. Sample C has one more explanatory variable, $D * FDI$, where D is a dummy for the second period. The significance of the dummy indicates that the equilibrium value of NFDI as captured by the explanatory variables varies over time. This is not surprising as we can see from Figures 1 and 2 that both NFDI and FDI have evolved rapidly in recent years. On the other hand, the interaction term $D * GOV$ is not significant at standard levels and therefore dropped. This is also to be expected because institutional environments tend to change only very gradually.

Nevertheless, the finding does carry the implication that unless one has a model that can capture the time series dynamics of NFDI, using dated data to predict the current value of $NFDI_{CHN}$ could be misleading.⁹ Notwithstanding, it can be seen from Table 4 that the prediction and other coefficients continue to remain similar to those of the base sample.

⁸ The size of this sample is more than twice that of the base sample by one observation because during the period 2000-2002, one more country meets the selection criterion.

⁹ We have tried extending the time period back one more year to cover 1999-2001 and found that, once again, the interaction terms between the period dummies and FDI are significant. This further confirms that the equilibrium value of NFDI is time-varying. The results are available on request. (The result is reported in Referee Appendix B at the end of the paper.)

The results of estimations based on the three different sample suggest that the predicted value for $NFDI_{CHN}$ is fairly robust with respect to the sample selection criterion and sample size. Overall, the sensitivity test results have boosted our confidence in the base sample findings, even in the presence of a relatively large (and unavoidable) standard error associated with the point estimate.

Capital Account Openness

According to the base sample, the predicted value of $NFDI_{CHN}$ is equal to 9.4. The observed value of $NFDI_{CHN}$ over 2001-2003 is 6.2 (Row 10, Table 2). If we add the absolute value of the unofficial net NFDI flows estimated in section 2 (Row 11, Table 2) and recall that the absolute value of the net figure provides a minimum value for the gross figure, then actual NFDI averages at least 7.9 percent of GDP over 2001-2003 (Row 12, Table 2). Thus, the result implies that the actual observed value of NFDI in recent years has been about 85 percent that of which could be expected if China had an open capital account (last row, Table 4). The predicted values obtained from the alternative samples suggest a value plus or minus 5 percentage points around this figure. China's capital account, it appears, already displays a high degree of *de facto* convertibility.

This conclusion warrants explanation. The most obvious causal factor lies simply in China's growing integration with the rest of the world, particularly in terms of trade flows. According to WTO statistics, China's share of world merchandise trade had jumped to 6 percent in 2003 - up from 2.7 percent in 1995. This figure exceeded the share of other prominent trading nations such as Japan (5.8 percent) and followed only Germany (9.1 percent) and the U.S (17.2 percent). FDI inflows have strongly contributed to this export performance with foreign

invested enterprises accounting for 57 percent of China's total exports in 2004. Since NFDI sometimes goes hand in hand with trade flows (e.g., trade credits), more trade generally increases the scope for placing mis-invoices, which is one of the most common means to circumvent official capital controls. As a result, it is not surprising that despite the *de jure* regime of China's capital account remaining relatively closed, the *de facto* regime has become far more open. In this aspect, WTO entry in 2001 provided a further shot in the arm to China's integration with global financial markets.

Another factor that is no doubt prominent in explaining the high degree of capital account convertibility is the mainland's geographical, economic and social connection with Hong Kong SAR, which is a well established international financial center and is regarded as one of the most open economies. There has always been a porous border between the mainland and Hong Kong, particularly as Hong Kong serves as an entrepôt of both merchandise trade and capital for the mainland. This close economic tie has created conduits for capital to move in and out of China at a larger volume than the *de jure* regime would imply.

5. Conclusions and Policy implications

In interpreting our findings and drawing policy implications, it is important to note that the predicted value generated by the model and the actual observed value are derived from annual data. Thus, while our results suggest a high degree of capital account openness, they do refer to a one-year time horizon and do not comment specifically on the degree of short run convertibility. It is to be expected though that convertibility in the short run would be less than in the medium or long run. That is, despite the fact that unofficial channels for moving capital across the border clearly exist in China, one would not expect the volume of funds that could feasibly be moved in a matter of hours or days to be in the same vicinity as those

countries that have *de jure* open capital accounts. What the results suggest is that over a one year time horizon, with many short run fluctuations in capital movements being averaged out, the demand for moving capital in or out of China is already largely being met through official and unofficial means. This is an interesting finding because it means that a lower level of convertibility in the short run is not necessarily incompatible with higher degrees of convertibility in the longer term. It also has policy implications. Events such as the Asian financial crisis show that large, short-term capital movements can be devastating to an economy. On the other hand, a lesson that can be drawn from non-crisis periods is that integration into global financial markets is as an important step to ensure the efficient use of savings and to maximize investment opportunities. How to balance the cost of reversals in short term capital flows against the benefits of higher allocative efficiency from international connectedness becomes a key issue. The finding of this paper is that over a one-year time horizon, China's *de facto* capital account regime for NFDI is already about 85 percent open, implying that any distortion in allocative efficiency over the medium and long term has only been modest. If it is accepted that short run convertibility would be less than this figure, then it can also be concluded that the economy has to some extent been spared the potentially destabilizing effects of unwanted capital movements. Unfortunately, data limitations do not allow us to compute more detailed estimates of short run convertibility, which would allow a more accurate assessment of these issues to be made. Differences between short run and longer-run convertibility also go some way to explaining how the Chinese authorities have been able to achieve macroeconomic stability and a fixed exchange rate on the one hand and be increasingly open to international trade and investment flows on the other.

The results do not leave room for complacency in policy efforts though. The time period covered by the empirical analysis was 2001-2003. This period does not cover the introduction

of several recent policies that would be expected to impact on capital account convertibility. For example, while China joined the WTO in 2001 many of the commitments made are being implemented in staggered fashion. In the financial sector the full liberalization package is not due to be completed until 2006. Other initiatives such as the Closer Economic Partnership Arrangement between Hong Kong and the mainland, which began to take effect on January 1st 2004, offers Hong Kong firms numerous WTO-plus concessions with respect to their mainland dealings, as well as expanding the flow of tourists from the mainland into Hong Kong (and the capital they bring). Banks based in Hong Kong have been given permission to conduct RMB business for individuals covering areas such as deposits, remittances and exchange business. These types of liberalization measures mean that it can safely be concluded that overall convertibility, and particularly short-run convertibility, is on the rise. Our results suggest that the main impact of future liberalization will not so much be greater overall volumes of capital entering and leaving China on an annual basis but rather the volatility with which they do so on a shorter time horizon. This in turn implies a sense of urgency is needed with respect to adopting reforms that may be regarded as essential prerequisites for full capital account convertibility such as domestic financial liberalization and a best practice prudential framework for the financial sector. These tasks are much easier listed than enacted. Introducing interest rate liberalization, for example, is difficult in the absence of well-developed direct capital markets and when the major banks and their primary borrower group, the state-owned enterprises, continue to exhibit soft budget constraints. Current reforms, such as inviting foreign banks to take equity stakes in Chinese lenders and recapitalizing and publicly listing the big four state banks, are steps in the right direction but much more needs to be done. The case for introducing other policies, such as abandoning the pegged exchange rate is less clear cut. Mundell (2003), for example, argues that claims of highly mobile capital flows being the death of fixed exchange rates misses the key point. The

key issue is credibility. If the fixed rate is credible, then volatile and unwanted speculative capital flows will in fact be discouraged. Juxtaposed against countries such as Thailand during the Asian financial crisis, China's huge stock stockpile of foreign exchange reserves, moderate current account surpluses and current macroeconomic stability all point to credibility remaining high. One thing for certain is that the changing degree of capital account convertibility will be driving much of China's economic policy into the foreseeable future.

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