China's capital account convertibility and financial stability

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Abstract
Capital account convertibility in China is on the rise. Some see the process as a means of circumventing domestic financial sector inefficiency while others view it as potentially exposing China to financial crises. In considering these different viewpoints, this paper attempts to quantify the impact that opening the capital account will have on the volume of China's international capital flows. It is found that were China to fully open its capital account, gross non-FDI capital flows are predicted to rise by around 4.6 percent of GDP. While an increase of this magnitude would present a prudential challenge for China's monetary authorities, it does not appear to be large enough to seriously call into question financial sector stability, either in China or abroad.

JEL classifications – F30, F47

Keyword: Capital account convertibility, China.

James Laurenceson
The School of Economics
The University of Queensland
Brisbane Queensland 4072
Australia
Ph – (+617) 3365 6085
j.laurenceson@economics.uq.edu.au

Kam Ki Tang*
The School of Economics
The University of Queensland
Brisbane Queensland 4072
Australia
Ph – (+617) 3365 9796
kk.tang@uq.edu.au

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* Corresponding author.

1.   INTRODUCTION

Capital account convertibility in China is on the rise. 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. Some aspects of China's capital account liberalization have even been placed on a set timetable. WTO entry in 2001, for example, committed China to extending national treatment to foreign banks within five years. This would, in a radical departure from historical practice, allow foreign banks to compete freely with domestic financial institutions in providing RMB denominated financial services to Chinese firms and individuals. In addition, the Common Economic Partnership Agreement (CEPA) signed by China and Hong Kong SAR that came into effect on 1 January 2004 offers Hong Kong firms numerous WTO-plus concessions ahead of China's WTO schedule, as well as increasing the flow of tourists (and the capital they bring) from the mainland into Hong Kong. Another notable policy that impacts on the degree of capital account convertibility is the Qualified Foreign Institutional Investor (QFII) scheme introduced in 2003, which for the first time allowed foreigners to engage in portfolio investment in China's A share market. In July 2005, the authorities announced an intention to raise the QFII quota from $US 4 billion to $US 10 billion, more than doubling the amount that global money managers could invest in RMB denominated securities. Capital account liberalization has also taken on an outward looking orientation with the gradual implementation of the "go abroad" strategy. This strategy provides recorded blessing and sometimes the financial wherewithal for Chinese companies to expand their operations overseas via direct and portfolio investment.[1]

As in other countries, rising capital account convertibility presents China with immense opportunities and challenges. Chief amongst these is the question of what impact it will have on investment efficiency and financial sector stability. Some see capital account liberalization making a positive impact in both respects (see, for example, Dorn 2003). This view holds that despite its overall economic success, China still maintains an underdeveloped financial sector, where the lending decisions of the dominant state-

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[1] It has been reported that the volume of transactions involving a Chinese buyer and an international target jumped from $2 billion-3 billion in previous years to almost $23 billion for 2005 (The Economist 2005).

owned banks are based more on government prerogatives than the productivity of capital. By opening up the capital account, those borrowers who have been starved of capital under the administrative rationing system, such as private sector firms, will have better access to credit, and the increased participation of foreign financial institutions could also press domestic financial institutions to undertake much needed reform.

Yet if capital account liberalization involved nothing but an upside scenario, the pragmatic approach displayed by the Chinese authorities toward economic reform thus far means that the process would have been far more advanced than it currently is. The Asian financial crisis in the late 1990s had a dramatic influence on policy making in China. For one, the experience of China's neighbors amply demonstrated that without first establishing a highly competent prudential framework, liberalizing the capital account needs not improve investment efficiency or financial sector stability. This is because financial markets and institutions are extremely vulnerable to market failure, particularly those pertaining to imperfect information and moral hazard (Stiglitz 1994). Secondly, while China may have escaped the full impact of the crisis due to its relatively closed capital account, the event still managed to claim the country's second largest non-bank financial institution, the Guangdong International Trust and Investment Company (GITIC). The experience of GITIC mirrored that of many financial institutions throughout the region. GITIC grew rapidly on the back of aggressive borrowing from overseas as its close association with the provincial-level government secured ample lending from foreign financial institutions who assumed the default risk was essentially zero. Much of GITIC's foreign borrowing was used to fund speculative investments, especially in the property markets. At the time of its ultimate collapse, GITIC has registered foreign currency borrowings of $US1.2 billion. After liquidation proceedings has been completed, it was found that the company had also flouted prudential requirements that foreign borrowings be registered and GITIC's total foreign debts, which came from over 130 foreign banks, actually doubled the registered amount (Xinhua News Agency 2003). The fact that banks dominate China's financial system meant that the collapse of GITIC was not of a sufficient scale to place the system at any real risk. The lesson that it provided however was clear.

As real as the downside scenario of capital account liberalization may be, the trepidation over it has been greatly exacerbated by the fact that the existing literature provides little guidance to stakeholders regarding what the magnitude of the capital flow response might be. Yet the magnitude of the capital flow response compared with the size of other economic variables such as the current volume of international capital flows, the rate of gross capital formation and the existing stockpile of foreign exchange reserves is a key issue. For example, if it can be shown that the capital flows response is likely to be small relative to the above variables, then concerns that rising capital account convertibility might significantly and negatively impact on China's investment efficiency and the stability of its financial system and those overseas can be greatly obviated.

The purpose of this paper is to shed light on the above question. In particular, we consider the impact that rising capital account convertibility will have on the volume of China's gross (i.e., inflows plus outflows) non-foreign direct investment flows, namely foreign portfolio investment and other foreign investment (e.g., bank loans) (FPOI). The reason for focusing on FPOI is because these types of capital flows have the greatest scope to respond to capital account liberalization in the future. Table 1 shows that while China's gross foreign direct investment (FDI) as a percentage of GDP had caught up to the world average by the early 1990s, FPOI actually began to lag even further behind during the 1990s and early 2000s. This outcome is not surprising as liberalization policies in the past have strongly favored FDI over FPOI (Laurenceson & Chai 2003). Another reason is that most of the concerns relating to rising capital account convertibility are related to FPOI. While direct investment typically involves a long-term commitment to the host country, portfolio investment and banks loans are far more vulnerable to serving speculative ends and more subject to abrupt reversal. The reason for focusing on gross flows rather than inflows or outflows is simply data availability. Still, given that inflows or outflows must necessarily be less than the gross value, by focusing on the gross figure we can effectively establish an upper bound against which other relevant variables can be compared.

Table 1. Gross Private Capital Flows of FDI from 1981 to 2003

		1981-85	1986-90	1991-95	1996-00	2001-03
FDI						
	China	0.46	1.13	4.88	4.97	4.67
	World	1.30	2.15	2.15	5.55	5.46
	High income country	1.40	2.40	2.19	6.03	5.87
	Upper middle income country	1.79	1.31	2.33	4.26	4.04
	Lower middle income country	0.55	0.73	1.92	3.51	3.83
	Low income country	0.31	0.39	0.84	1.59	1.57
FPOI						
	China	1.45	1.62	1.91	5.91	6.16
	World	6.13	7.71	9.52	16.24	17.46
	High income country	6.29	8.31	10.12	18.25	19.54
	Upper middle income country	12.08	9.96	9.27	8.66	9.96
	Lower middle income country	2.88	2.89	5.45	8.16	7.99
	Low income country	2.08	2.18	3.83	4.01	2.83

To consider the capital flow response we construct an econometric model that can satisfactorily explain FPOI in terms of a number of explanatory variables, including a variable that represents a sliding scale of capital account openness. Based on the observed values of these explanatory variables for China, we can then use this model to estimate not only an expected value for what China's FPOI would be if the capital account were fully opened but also that at various degrees of openness. While there are many studies looking at the impact of China's deepening engagement in the international trade of goods and services, very few examine the same issue on the financial side of globalization. McKibbin and Tang (1998) is a noticeable exception. They use a computable dynamic general equilibrium model to simulate the effect of a decline in the wedge between the return on investing in Chinese assets and assets in the rest of the world. While that is a novel method in analyzing the structural change of the economy following an opening of the capital account, the fact that the model was not calibrated to China data[2] means that the numerical findings are largely suggestive. In contrast, our regression-based method makes use of the most recent data for China (as well as those for

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[2] Except the risk premium data.

90 other countries) and can therefore provide some quantitative results that are instrumental to the current debate. Also, our econometric analysis takes into account both economic and institutional factors, the latter of which is measured by a comprehensive index of governance recently developed by the World Bank. This institutional factor, which has not been considered in previous studies, is found to be crucial in determining the capital flow response.

The structure of this paper is as follows. Section two first defines a method to account for unrecorded FPOI flows. This is important as the existence of unofficial channels through which capital can cross borders means that a country's actual degree of openness might be far higher than its *de jure* regime and recorded data suggest. How capital account openness can be measured is also discussed. Section three outlines the econometric model used to investigate the determinants of FPOI. Section four presents the estimation results and discusses the findings. Section five concludes.

2. UNRECORDED CAPITAL FLOWS AND CAPITAL ACCOUNT OPENNESS

Numerous studies have pointed to non-trivial volumes of capital entering and leaving China through unofficial channels (Eichengreen 2004; Wu & Tang 2000). During the Asian financial crisis, the evidence pointed to a surge in capital flight, i.e., unrecorded capital outflows. Since 2001, speculation of an impending RMB appreciation meant that capital flight has given way to inflows of hot money. What these unrecorded capital flows imply is that the recorded data relating to FPOI might substantially underestimate actual FPOI (AFPOI) and that *de facto* capital account convertibility is higher than the *de jure* regime would imply. In terms of our econometric analysis, such flows must be accounted for otherwise the model's predictions would tend to overstate the expected capital flow response to liberalization.

Table 2 explains how we account for unrecorded FPOI flows. First, we make use of a common technique that draws on balance of payments statistics accounting identities to come up with an estimate of AFPOI, in *net* terms. Genuine errors and omission aside,

changes in a country's foreign reserve holdings should be attributable to either the current account balance and / or net capital inflows. As changes in reserve holdings, the current account balance and FDI are usually deemed more easily accounted for than FPOI, net AFPOI can then be estimated as a residual[3] (Row 5, Table 2). Net AFPOI can then be broken down into recorded and unrecorded components. Unrecorded net FPOI is equal to net AFPOI minus recorded net FPOI, 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 estimates of unrecorded net FPOI seem plausible. For most of the period, the estimated figures suggest that unrecorded FPOI outflows exceeded unrecorded 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 this tendency had slowed and by 2003, when expectations of an impending RMB revaluation had reached fever-pitched levels, unrecorded inflows exceeded unrecorded outflows.

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[3] Many other authors, such as Prasad and Wei (2005), also use this methodology. 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 FPOI entering the country in the guise of FDI in order to take advantage of the favourable policies extended to FDI) (Prasad & Wei 2005; Xiao 2004).

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 FPOI ($US billion)	*-13*	*-43*	*-66*	*-49*	*-47*	*-4*	*-5*	*69*	*77*
Total recorded net private capital flows ($US billion)	49	58	42	37	41	41	47	60	
Recorded net FPOI ($US billion)	11	16	1	-1	4	4	0	13	
Unrecorded net FPOI ($US billion)	*-24*	*-59*	*-67*	*-48*	*-51*	*-8*	*-5*	*56*	
GDP	821	903	954	999	1079	1176	1271	1412	1593
Recorded gross FPOI (% GDP)	1.4	5.8	5.9	8.0	8.3	5.4	3.3	9.8	
Unrecorded net FPOI (% GDP)	-2.9	-6.5	-7.0	-4.8	-4.7	-0.7	-0.4	4.0	
Total actual = recorded gross FPOI plus absolute unrecorded net FPOI (% 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 recapitalize two state banks. As a result, the 2003 figure for total reserves is the recorded value plus $US 45 billion. The 2004 figure is simply the recorded 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.

There is one problem associated with this method of estimating unrecorded FPOI – the data are in *net* rather than *gross* form. Fortunately, this is not a major weakness because, particularly in the context of developing countries, unrecorded FPOI flows during a certain period tend to be dominated by movements in one direction or another. For example, during the Asian financial crisis, unrecorded FPOI for China was much more likely to move abroad than the other way around. Similarly, in 2003 unrecorded FPOI was overwhelmingly moving into China. What this means is that the absolute value of the

net figure for unrecorded FPOI represents a lower bound estimation of the real gross figure. Thus, if we add the absolute value of the estimated net unrecorded FPOI to gross recorded FPOI, we can arrive at a reasonable approximation for AFPOI. Also, by calculating net AFPOI as a residual of other balance of payments variables, genuine net errors and omissions are also included. This will to some extent counteract any underestimation of gross AFPOI that results from adding net unrecorded FPOI to the recorded gross figures.

Using the above method, it can be estimated that AFPOI for China has been averaging around 9.9 percent of GDP over the period of 1996-2003 (Row 12, Table 2). This compares with an average recorded FPOI figure of 6.0 percent (Row 12, Table 10). Thus, the estimates imply that unofficial channels for moving capital across the border have raised China's FPOI flows by more than one half. Nonetheless, the estimated AFPOI figure remains considerably short of the world average and certainly below the average of high-income countries (Table 1). Therefore, it can be concluded that even after accounting for unrecorded capital flows, the potential for FPOI to respond to increases in capital account convertibility in the future remains considerable.

Similar adjustments can also be made for other countries. Table 3 compares recorded FPOI figures with AFPOI figures for all 90 countries in our dataset. The figures presented are average values from the post Asian financial crisis period of 1999-2003, which is the time period covered by our later econometric analysis. For 22 mostly OECD countries no adjustment was undertaken. The reason for this is that the World Bank does not report net private capital flow data for these countries, which is needed to calculate unrecorded FPOI. This is not a particularly significant problem as these countries tend to have relatively few capital controls and so recorded data for FPOI will be close to the actual figure. The average ratio of estimated AFPOI to recorded FPOI across the other 68 countries for which adjustments were made is 1.77, the median value is 1.44 and the range is 1.16 (Latvia) - 5.1 (Madagascar) As is the case with China, there is also a sharp rise in this ratio for other countries during years of financial turbulence. For example, in the case of Argentina, the ratio rose from 1.03 in 2001 to 1.45 in 2002, the year the

country was beset by a financial crisis. Likewise in Turkey the ratio rose from 1.05 in 2000 to 1.41 in 2001. Somewhat paradoxically, while a large share of unrecorded capital flows implies that capital controls are being circumvented, the fact that it is much more pronounced during times of financial crises suggests that they continue to bite in terms of making unofficial channels relatively costly to use during non-crisis periods.

Table 3. Selected data from sample countries

Sample country	FPOI	AFPOI	KAO	Sample country	FPOI	AFPOI	KAO
Albania	4.00	9.53	1	Japan	14.36		10.2
Argentina	15.94	20.44	4.4	Jordan	13.55	16.79	9.8
Armenia	8.87	15.82	11	Kazakhstan	14.51	27.42	1
Australia	15.38		3.8	Kenya	6.42	8.83	7
Austria	36.69		9	Korea, Rep.	8.21		1.6
Azerbaijan	3.88	10.45	3	Kuwait	30.28		6
Bangladesh	2.50	3.04	0.6	Kyrgyz Republic	8.29	18.19	6
Belarus	3.24	6.12	1.8	Latvia	20.54	23.82	8.8
Bolivia	6.44	11.66	9	Lithuania	10.43	15.24	8.6
Bosnia and Herzegovina	18.49	46.53	8.4	Macedonia, FYR	11.96	16.35	3
Brazil	6.17	7.23	2.2	Madagascar	1.32	6.75	0
Bulgaria	9.37	13.13	4.2	Mexico	4.11	5.81	2.6
Burundi	4.85	8.41	1	Moldova	18.09	21.64	0
Cambodia	6.90	8.83	4.2	Morocco	2.81	4.30	1.4
Canada	10.60		11	Mozambique	9.50	23.31	0
Cape Verde	8.11	17.18	1.8	Nepal	6.47	9.87	0.8
Chile	16.25	41.84	4.2	Netherlands	61.56		12
China	6.97	9.34	1.2	New Zealand	9.58		11
Colombia	8.32	11.55	0.6	Nicaragua	4.71	19.23	10
Congo, Rep.	22.27	33.23	0	Norway	22.38		8.4
Cote d'Ivoire	6.36	7.56	0	Pakistan	2.57	3.41	1
Croatia	20.50	26.76	1.2	Paraguay	6.86	9.33	11.2
Czech Republic	14.16	17.35	7.6	Peru	5.20	6.45	11
Denmark	21.91		11	Philippines	45.93	54.74	1
Dominican Republic	8.22	13.33	5.6	Poland	7.19	8.84	1.8
Ecuador	13.50	20.47	8	Portugal	37.11		8.8
Egypt, Arab Rep.	6.19	8.61	6.4	Romania	5.66	8.01	3.2
El Salvador	11.60	15.87	10.8	Russian Federation	10.54	20.06	1.6
Estonia	19.39	25.22	8.2	Saudi Arabia	12.19	20.06	3
Finland	38.23		8	Sierra Leone	4.07	16.08	2
France	16.67		9.6	Slovenia	11.52		5.4
Georgia	2.41	5.40	0	South Africa	10.91	14.69	1
Germany	22.60		12	Spain	26.03		8.6
Ghana	3.18	8.95	3	Sri Lanka	3.58	5.59	0
Greece	17.14		10.2	Sudan	1.74	3.37	7.6
Guatemala	15.48	21.41	9.6	Sweden	31.33		7
Guyana	4.07	12.37	9	Thailand	9.41	13.92	1.8
Haiti	2.34	3.01	2	Tunisia	4.72	6.15	1
Honduras	4.18	7.26	5.4	Turkey	8.31	11.31	3
Hungary	17.60	21.47	7.6	Uganda	1.70	5.61	11
Iceland	33.94		5.2	Ukraine	10.61	14.26	1.4
Indonesia	4.16	6.51	2	United Kingdom	55.14		11
Israel	9.08		7.8	United States	8.72		9
Italy	17.89		10.6	Uruguay	34.25	41.71	9.8
Jamaica	17.41	20.30	6.8	Venezuela, RB	9.15	16.73	7.4
				Yemen, Rep.	1.27	3.36	9

How capital account openness might be measured is also a key issue that needs to be addressed before moving on to the econometric analysis. We make use of the IMF's

Annual Report on Exchange Rate Arrangements and Restrictions, which since 1996 has provided an annual qualitative assessment of the restrictions used by its member countries on 13 different types of capital account transactions. These include - transactions involving capital market securities, money market instruments, collective investment securities, derivatives and other instruments, commercial credits, financial credits, guarantees / sureties / financial back-up facilities, direct investment, liquidation of direct investment, real estate transactions, personal capital movements, provisions specific to commercial banks and other credit institutions and provisions specific to institutional investors. The IMF's qualitative assessments can be codified by assigning a value of 1 if there is no restriction on a particular transaction type. As a result, a country that has no capital controls would receive a capital account openness score of 13. Conversely, a country with controls over all transaction types would receive a score of 0. We label the capital account openness variable as 'KAO'. Measuring capital account openness based on the IMF's qualitative data is not without its limitations. For example, even within each transaction category there might be many different types of capital controls that could be employed. The IMF's data effectively considers that a country with a single control in the area of particular transaction type is as closed as a country with numerous controls. The IMF data also does not comment on how strongly a particular type of control is enforced. Nonetheless, the IMF data does still offer a unique international dataset at a reasonable level of disaggregation and remains the preferred choice for many studies seeking to measure capital account openness (e.g., Miniane 2004; Obstfeld, Shambaugh & Taylor 2005)

The KAO values for China and all other countries in our sample are given in Table 3. The mean value of KAO for countries in which an adjustment for unrecorded capital flows was made is 4.5. This compares with 8.5 for those higher-income countries in which no adjustment was made. This observation is important for two reasons. Firstly, as it is known that higher income countries tend to have more open capital accounts, it is pleasing to see that whatever the limitations the IMF data may have, it does nonetheless account for differences in openness across countries reasonably well. Secondly, it also provides a justification for our earlier contention that in those mostly high-income

countries, for which net private capital flow data was unavailable, the recorded FPOI data should be a close approximation to the actual figure since these countries tend to have few capital controls.

In Figure 1, we plot the distribution of KAO for 190 IMF member countries in 1999 and 2003 respectively. It can be seen that over the five year period, there was a small shift toward greater openness around the globe. Nevertheless, there is a distinct bipolar pattern in both distributions in that about 50 percent of the countries had KAO scores equal to or smaller than 2, and over 25 percent had KAO scores equal to or greater than 9. One interpretation of this bipolar distribution is that a medium degree of capital account openness is difficult to maintain in practice rather than being less preferable in principal. A probable reason is that once a country has removed capital controls on certain transaction types then it would be hard to prevent capital destined for other transaction types from entering or leaving the country in disguised forms.

**Figure 1. The distribution of KAO of IMF member countries in 1999 and 2003.**
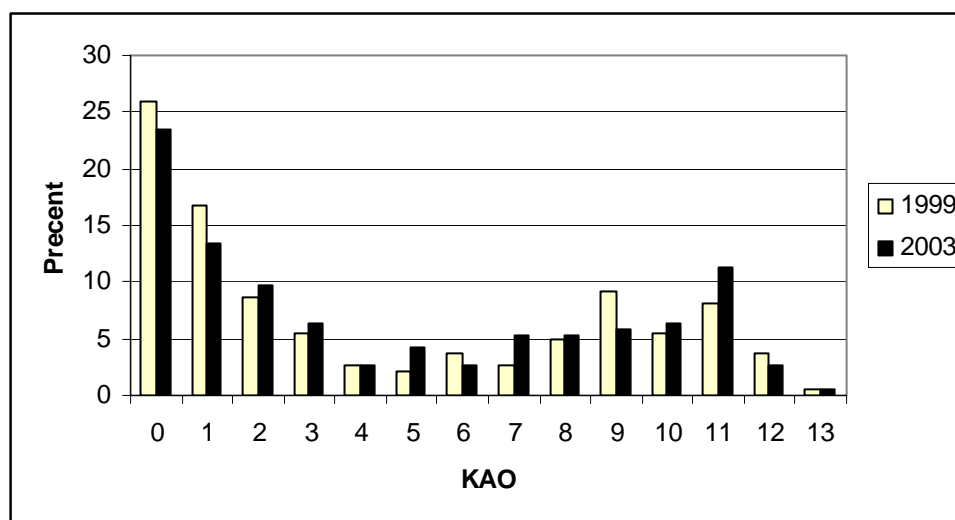
There are 185 countries in 1999 and 187 countries in 2003.

Figures 2 and 3 are scatter plots of KAO against FPOI and AFPOI, respectively. From Figure 2 it can be seen that FPOI seems to be positively related to KAO in general, though there is a widening dispersion of FPOI as KAO increases. Figure 3 shares a

similar pattern with Figure 2; however, the magnitude of AFPOI is evidently greater than the corresponding value of FPOI at the lower end of KAO, while there is little change at the higher end of KAO. This is expected because much fewer adjustments for unrecorded capital flows were made to the data for countries at the higher end of KAO. Furthermore, a comparison of the two figures indicate that unrecorded channels for capital flows are far from as effective as recorded ones, otherwise, the scatter plot between AFPOI and KAO would have a random rather than a (rough) upward sloping pattern. Beyond these general observations, however, we cannot draw more inference on a causal relationship between these two variables without controlling for other factors. To that end, we turn to our econometric analysis.

Figure 2. Correlation between FPOI and KAO
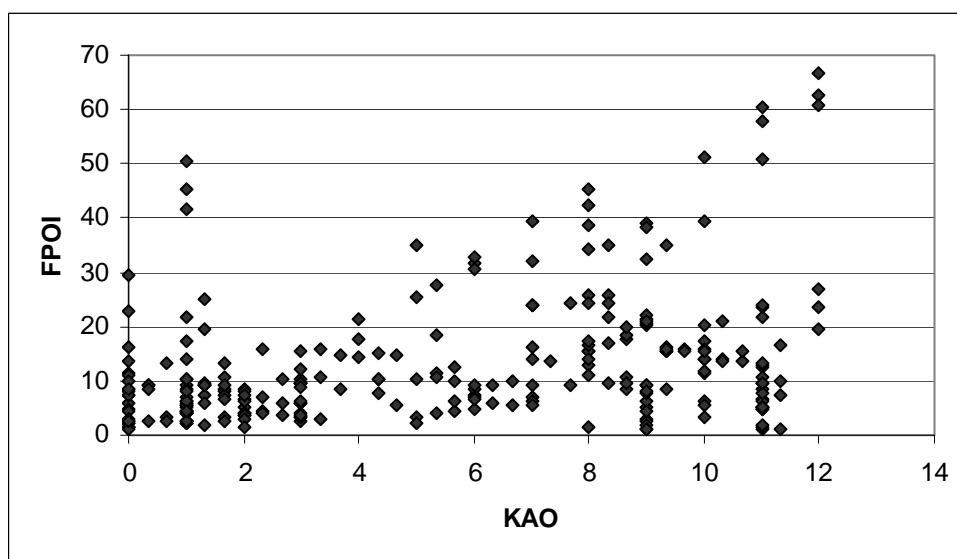
Figure 3. Correlation between AFPOI and KAO
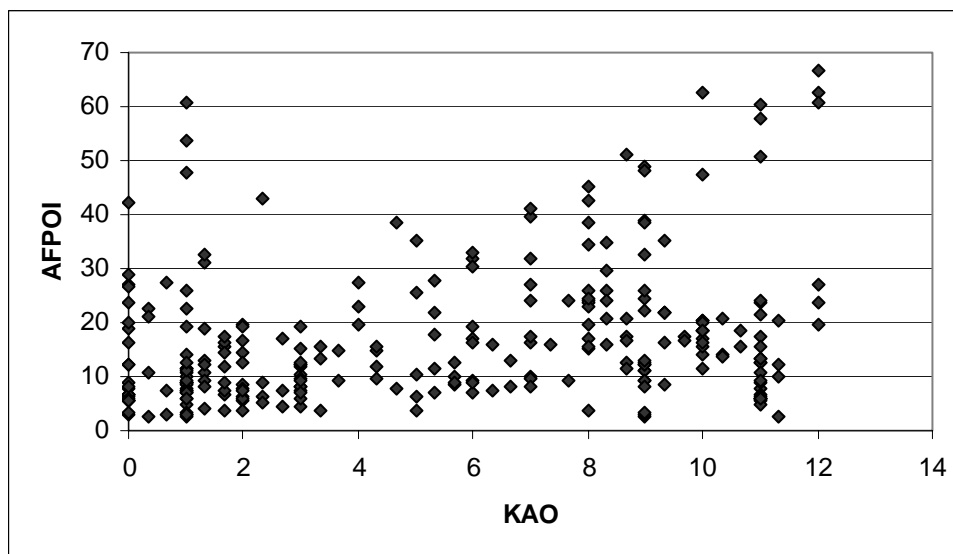
3.   THE MODEL AND DATA

The process of China opening up its capital account can be represented by increases in KAO from its current value of 1 up to the upper bound of 13. To examine the impact of such changes on China's AFPOI, we first need to estimate an econometric model that can satisfactorily explain AFPOI in terms of a number of explanatory variables, including KAO. The specification of the model and data are explained below.

The Model

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

$$AFPOI_i = \alpha_0 + \alpha_1 KAO_i + \boldsymbol{\alpha}_2 \mathbf{x}_i + \varepsilon_i \tag{1}$$

where i is a country index, KAO a measure of capital account openness, $\mathbf{x}_i$ a vector of other explanatory variables, and ε_i an i.i.d. error term; and AFPOI is measured as a percentage of GDP.

The vector $\mathbf{x}_i$ includes:

- **GDP**: measured in PPP, constant international currency. The inclusion of GDP is to examine if there is any size effect as AFPOI is already expressed in percentage of GDP.

- **GDPC**: GDP per capita measured in PPP, international currency. A richer country entails, as well as provides, more investment opportunities.

- **GPDCG**: Growth rate of GDP per capita. A faster growing country would expectedly attract more foreign capital.

- **OPEN**: Trade openness measured by the ratio of total trade value to 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**: Gross foreign direct investment as a percentage of GDP. Dasgupta and Ratha (2000) show that FDI flows to developing countries are strongly associated with FPOI flows. This is not surprising given many driving factors of FDI and FPOI are in common, such as investment environments and market potential.

- **GOV**: An index of governance. The 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 & Mastruzzi 2005). 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.

- **SAVE**: Gross national saving rate. This and the next variable are intended to capture a country's need to borrow from, or its ability to lend to, global financial markets.

- *CAB*: Current account balance as a percentage of GDP.

- Higher power 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.

- Interaction terms between explanatory variables, regional dummies, period dummies and a financial crisis dummy are also included.

Data

The data for AFPOI cover the post Asian financial crisis period of 1999-2003. In view of the year-to-year volatility in AFPOI, three year average values are used. Therefore, three periods of data are used, corresponding to the moving average of 1999-2001 (period 1), 2000-2002 (period 2), and 2001-2003 (period 3). Three year average values of KAO of the same period are used as well. For all variables in $\mathbf{x}_i$, except GOV, lagged three year average values are used to mitigate year-to-year volatility and potential endogeneity problems with AFPOI. That is, the three periods of data for $\mathbf{x}_i$ are 1996-1998 (period 1), 1997-1999 (period 2), and 1998-2000 (period 3).[4] For GOV, the contemporaneous causality clearly runs in the direction of GOV to AFPOI and not vice versa as institutional sittings are slow to adjust; so endogeneity should not be a problem in this cross sectional model. Since data for GOV are only available for every two years, data from 2000 (period 1), the average of 2000 and 2002 (period 2), and 2002 (period 3) are used respectively. Data for these periods are pooled together to form a cross section data set of 273 observations for 91 countries. (Results of estimations using data of various sub-periods are reported in the Appendix for Referee.) We do not explore the possibility of using a panel data set with a longer time frame because the purpose of the paper is to examine the impact of China opening up the capital account in its contemporary condition rather than to explain the time series characteristics of capital movements.

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[4] The three year average is chosen because it is a good balance between having a sufficient length to average out year-to-year volatility on the one hand, and avoiding the lag between the explained and explanatory variables being too long on the other.

Also, the data for KAO and GOV are available only from 1996 onward, and we prefer to exclude the Asian financial crisis period; as a consequence, only data from 1999 onward are considered. Except KAO and GOV, the data are drawn from the *World Development Indicators* database.

4. EMPIRICAL RESULTS

The results for the estimations are reported in Table 4. The t-statistics are heteroskedasticity consistent based on the correction suggested by White (1980). Model 1 includes all regional dummies, two period dummies and a financial crisis dummy. The financial crisis dummy is set to 1 for countries that experienced a financial crisis during the sample period, including Argentina, Turkey and Brazil. All non-dummy variables are significant at 5 percent or lower level. However, amongst all the dummies, only 8 regional dummies are significant at standard levels. The insignificant dummies are thus dropped and the results for the subsequent, more parsimonious Model 2 are also reported in Table 4. The omission of the insignificant dummies has little impact on the remaining variables in terms of sign, coefficient value or significance. Model 2 is thus considered the final model and the following discussion is based on its results.

Table 4. Regression Result

Non-dummy explanatory variables	Model 1		Model 2	
	Coefficient	p value	Coefficient	p value
SAVE	-0.412	0.000	-0.407	0.000
OPEN	0.128	0.000	0.130	0.000
GDPC	0.001	0.002	0.001	0.001
GDPC^2	0.000	0.001	0.000	0.001
GOV*ABS(GOV)	0.639	0.009	0.604	0.006
GDPCG*ABS(GDPCG)	0.021	0.000	0.020	0.000
KAO	-3.116	0.074	-3.110	0.044
KAO^2	0.709	0.044	0.713	0.024
KAO^3	-0.036	0.058	-0.036	0.033
KAO*GOV*OPEN	0.006	0.000	0.006	0.000
KAO*GOV*CAB	0.035	0.007	0.035	0.004
KAO*GOV*SAVE	-0.023	0.005	-0.024	0.004
KAO*GOV*FDI	0.017	0.008	0.018	0.005
KAO^2*OPEN	-0.001	0.037	-0.001	0.029
Dummies				
Southeast and East Asia	15.975	0.003	16.133	0.000
South and Central Asia	9.542	0.002	9.709	0.000
Eastern Europe	7.199	0.033	7.378	0.003
Western Europe	13.133	0.001	13.343	0.000
North America	0.209	0.958		
Latin America	14.732	0.000	14.838	0.000
Africa	8.273	0.003	8.443	0.000
Middle East	9.513	0.036	9.518	0.019
Caribbean	10.579	0.007	10.641	0.002
Oceania	-0.954	0.865		
Financial crisis	-0.452	0.879		
Period 2	0.581	0.656		
Period 3	0.768	0.600		
R-squared	0.546		0.546	
Adjusted R-squared	0.498		0.508	

An outstanding feature of the results in Table 4 is that AFPOI is a highly non-linear function of the explanatory variables, with a number of interaction terms and higher power terms being significant. The use of the absolute value in the quadratic terms of GOV and GDPCG is to preserve their signs. Due to the existence of interaction terms, the marginal effects of many variables on AFPOI are conditional on the values of other variables. Nevertheless, higher level and growth rate of per capita GDP will have unambiguously positive, though small, impacts on AFPOI flows. Also, the magnitude of the coefficients suggest that the effects of national saving rate (SAVE), quality of

governance (GOV), and capital account openness (KAO) on AFPOI flows are likely to be large.

The IMF's measure of capital account openness, KAO, and the World Bank's measure of governance, GOV, are not only significant on their own, but also significant in interaction with many other variables. Also prominent is that all interaction terms of KAO and GOV involve variables that are related to intertemporal substitution. For instance, savings and FDI are related to the intertemporal substitution of consumption between countries. Trade openness itself does not necessarily imply intertemporal substitution if the current account is largely in balance; however, the co-existence of interaction terms of trade openness and current account balance point to the role of trade in facilitating the intertemporal substitution of consumption and thus capital flows between countries. This finding also reveals the important role played by the private sector in determining capital flows. This is because while governments have some influence on intertemporal substitution via items such as the government spending and taxation, by and large FDI flows, trade flows and household savings are driven by the decisions of the private sector, even in a country with a large state sector like China. The implication is that as the private sector continues to increase its share in the Chinese economy, it will be increasingly difficult for the authorities to use a top-down approach to managing capital flows for any given degree of capital account openness. The recent episode of hot money inflows fueling property inflation is a case in point.

The non-linearity of the estimated AFPOI function and the significance of several interaction terms related to institutional and intertemporal factors are clearly indicative of the process of capital account liberalization being a complex endeavor. The interrelation between variables highlights the fact that piecemeal institutional changes (e.g. a gradual integration into the international financial market) may not be sufficient in achieving an intended objective if the relationship between the targeted variable (i.e. KAO) and those that are interconnected (e.g. GOV and SAVE) is not well understood. This once again points to the prudence of being prepared for the impact wrought by higher degrees of capital account convertibility than liberalization policies are actually intended to achieve.

Simulation

Based on the estimated model, Figure 4 shows the simulated value of AFPOI for China ($AFPOI_{CHN}$) as a function of KAO for given values of other variables as recorded in the dataset, which are listed under Figure 4. The schedule is drawn from the following simulation equation:

$$AFPOI_{CHN} = 10.520 - 3.110\,KAO + (0.713 - 0.001\,OPEN_{CHN})KAO^2 - 0.036\,KAO^3$$

(2)

$$+(0.006\,OPEN_{CHN} + 0.035\,CAB_{CHN} - 0.024\,SAVE_{CHN} + 0.018\,FDI_{CHN})KAO*GOV_{CHN}$$

The constant term constant 10.520 is set in order to normalize the computed value of $AFPOI_{CHN}$ to the observed value 8.4 when KAO is equal to 1.1 as recorded in the dataset.

Figure 4. Simulated AFPOI for China
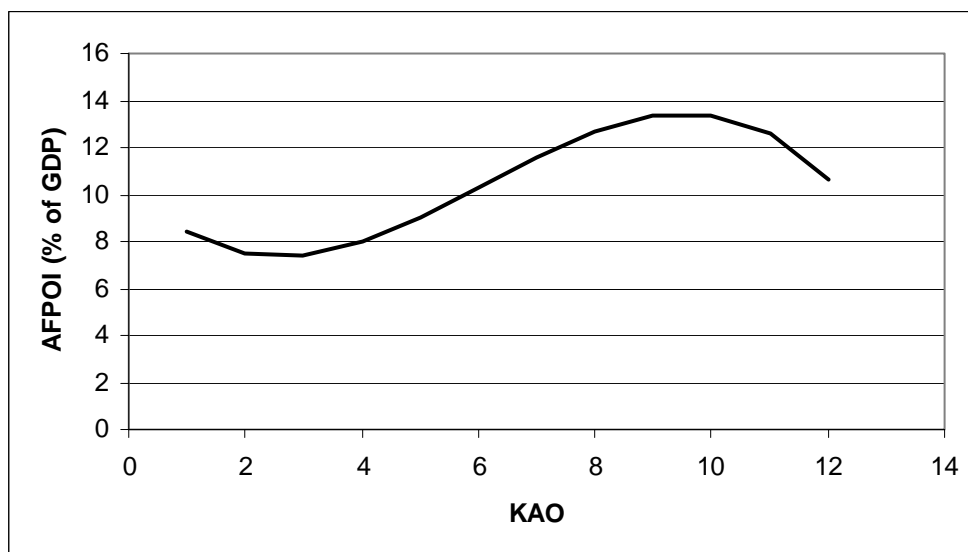
Values of variables for China used in stimulation: GOV = -0.74, OPEN = 44.38, CAB = 2.81, SAVE = 5.05.

Figure 4 reflects the non-linear nature of AFPOI flows as captured by the higher power terms of KAO. We caution that one should avoid pointing to the precise predicted value of $AFPOI_{CHN}$ associated with a particular value of KAO because of the qualitative data upon which KAO is constructed. We suggest a more appropriate interpretation of the simulation equation is that the squared and cubed terms of KAO are to keep the value of $AFPOI_{CHN}$ bound and the other interaction terms are to capture some underlying intertemporal dynamics. In this sense, the schedule in Figure 4 can be viewed as a S-curve with three segments: $AFPOI_{CHN}$ remains low and stable when KAO lies between 1-4, it then rises almost linearly up to KAO = 8, and then settles at a plateau at the high end of KAO between 8-11. Note that the fall at the very high end of KAO beyond 11 is rather deceptive. This is because, as seen in Table 3, the highest observed value of KAO in the sample is 12, and only two countries, Germany and the Netherlands, out of the 91 countries have attained that value.

In relation to the process of capital account liberalization, Figure 4 suggests that gradual capital account liberalization might initially be met with a muted capital flow response. As openness passes a certain threshold value, however, AFPOI starts to rise. The middle segment of the S-curve posits a steady increase in capital flows if the capital account can be gradually opened. The observed bipolar distribution of KAO values found in Figure 1 however should be kept in mind. The figure indicates that most countries either make the choice to be substantially closed or substantially open, thereby containing the suggestion that medium levels of openness may be difficult to maintain in practice.

Figure 4 indicates that if China completely opens up its capital account, its AFPOI flows would increase from the currently observed 8.4 percent of GDP (average over 1999-2003, see Table 1) to about 13.0 percent[5], a 55 percent rise. An increase in AFPOI of this magnitude would represent a sizeable prudential challenge for the monetary authorities. The GITIC debacle showed that in the past the monetary authorities have struggled to exercise effective prudential monitoring even with a detailed system of controls

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[5] The figure is the average values of $AFPOI_{CHN}$ for KAO equal to 8, 9, 10 and 11respectively.

constraining the volume of capital flows. On the other hand, it should be recalled that the predicted increase in AFPOI is a gross figure and hence represents an upper bound for AFPOI inflows. Also, given that during 1999-2003 the rate of gross capital formation averaged 38.6 percent of GDP, the fear that rising AFPOI inflows might worsen investment efficiency in China should not be exaggerated. What the findings imply is that investment efficiency will continue to be overwhelmingly determined by the manner in which domestic capital is allocated. In terms of whether capital account liberalization might endanger financial sector stability by compromising China's international payments ability, the results suggest that China's foreign reserves, which stood at nearly 40 percent of GDP at year-end 2004, are more than adequate. In terms of the impact of China opening up its capital account on other countries, the 4.6 percentage point increase in AFPOI translates to an amount of US$53 billion.[6] This amount is equivalent to a mere 0.03 percent of the total FPOI for the world as a whole. If these additional capital flows are equally spread across the globe, the impact on individual countries appears very much manageable. Naturally, if additional capital flows concentrate on certain markets (i.e., certain countries or certain financial products), the impact will be more pronounced.[7] One scenario worth contemplating is that Chinese investors might target the property and stock markets of its more developed economic annex – Hong Kong, and risk prompting another bubble crisis in that economy. Nonetheless, overall the findings suggest that the challenge in managing the opening China's capital account rests far more on China itself than on its counterparts.

By way of rounding up this section, two caveats regarding the simulation process are in order. Firstly, in the simulation we hold the values of all explanatory variables constant at their currently observed levels, except KAO. However, a deeper integration with the global financial market is likely to impact on some, if not all, of the explanatory variables in the long run. Therefore, the simulation result is better interpreted as being a short to

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[6] The figure is based on the average GDP measured in constant 2000 US dollar terms for China over 1999 to 2003 is equal to $118 billion.

[7] If the distribution of China's FDI stocks serves as a guide, the latter scenario is more likely to be the case. By 2003, FDI involving China displayed a strong orientation toward the US and Asia, with these two regions accounting for around 60 percent of the inward FDI stock in China and around 70 percent of China's outward FDI stock by 2003 (UNCTAD 2004).

medium term result. Since three-year average values are used in the estimation and there is a three-year lag between the explained and explanatory variables, the short to medium term can be viewed as something between one to three years. Secondly, the expected capital flow response discussed above is based on the point estimates implied by the econometric model. The explanatory power of the model in terms of its adjusted R^2 is around 0.5. While this is not a small number, clearly there remains a sizeable (and unavoidable) margin of error. Nonetheless, we feel confident that most of our main conclusions are quite robust. For example, that rising capital account convertibility is unlikely to endanger China's international payments ability is almost guaranteed by having foreign exchange reserves nearly 10 times greater than the level of AFPOI the model predicts would be associated with an entirely open capital account. Likewise, the fact that the predicted increase in gross AFPOI flows is only around 10 percent of gross capital formation means that even if one takes a dim view of the impact of rising capital account convertibility on investment efficiency, the scale to which this might occur is limited. Finally, the fractional predicted increase in China's AFPOI flows as a percentage of global FPOI makes it hard to dispute that the real challenge of rising convertibility in China will rest far more on China itself than on its foreign counterparts.

5.   CONCLUSION

This paper sought to investigate the impact that rising capital account convertibility would have on the volume of China's AFPOI flows. Gauging the magnitude of the capital flow response is important because, while both the opportunities and challenges posed by capital account liberalization are widely debated, the existing literature provides stakeholders with little quantitative guidance. The main findings of the paper are as follows.

Firstly, for China (and many other countries), estimated unrecorded capital flows were found to be sizeable compared with recorded flows. This highlights the importance of accounting for unrecorded flows when estimating the extent to which a country is integrated into the global financial system and the expected capital flow response to rising capital account convertibility. It was also found that after accounting for

unrecorded flows, the effect of the *de jure* capital account regime on capital flows was somewhat diluted but far from being eliminated. Also, in years of financial turbulence the importance of unrecorded capital flows in total capital flows was seen to rise considerably. Together these findings imply that unofficial channels are not as effective as official ones in routing capital flows across border and capital controls do continue to bite. This in turn suggests that despite being partially undermined by unrecorded flows, capital controls can still provide the government with some room to maneuver monetary policy to deal with internal balance and the exchange rate to deal with external balance.

Secondly, the econometric analysis predicts that if China were to lift all restrictions on capital flows, other things equal, AFPOI flows would rise by about 55 percent, or 4.6 percent of GDP. Given the size of the Chinese economy, and the fact that at the monetary authorities have struggled to exercise effective prudential monitoring of international capital flows in the past, an increase of this magnitude would present a challenge to ensure that additional capital inflows do not reach speculative ends. Nonetheless, the predictions of the model generally serve to allay fears associated with rising capital account convertibility. Increases in AFPOI inflows, which necessarily must be less than the gross predicted figure of 4.6 percent of GDP, are marginal compared with the rate of gross capital formation. The predicted volume of AFPOI under a completely opened capital account is also small compared with China's stockpile of foreign exchange reserves, as is the size of the increase compared with global FPOI flows. Thus, the findings suggest that rising capital account convertibility is unlikely to trigger a capital flow response of sufficient magnitude to call into question financial sector stability, either in China or overseas.

Thirdly, while the results suggest that capital account liberalization is unlikely to threaten financial sector stability, they do nonetheless point to the process as being a complex undertaking. The estimated capital flow function was highly non-linear in nature and consisted of economic and institutional variables, as well as interaction terms that related to intertemporal substitution. This makes predicting the impact of piecemeal changes in the level of capital account openness difficult. In addition, the fact that most variables

related to intertemporal substitution are largely determined by the private sector means that the extent in which the monetary authorities can stage manage the impact of rising levels of convertibility is limited. There is further the consideration that while the simulation equation suggested a steady increase in capital flows in response to a gradual opening of the capital account, the bipolar distribution of capital account openness amongst countries suggested that a capital control regime in the middle ground could be difficult to maintain in sheer practical terms. The key message, overall, is that the monetary authorities should prepare for higher levels of convertibility than that which their liberalization policies are intended to achieve.

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