



# Measuring on-going changes in China's capital controls: A *de jure* and a hybrid index data set

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## ABSTRACT

Liberalizing China's capital account controls may have profound implications for the RMB exchange rate, monetary policy autonomy, and Chinese economy. However, rigorous studies on the importance of China's capital controls are limited, primarily due to the scarcity of proper measurements of China's capital controls. In this paper we create a new data set of indices including *de jure* and hybrid measurements of the changes in China's capital controls. In contrast to other capital control indices that are compiled in a yes-or-no style, we quantify the intensity of changes in China's capital controls. Our indices reveal a persistent but uneven process of capital account liberalization in China between 1999 and 2012. This paper describes the *de jure* and hybrid indices, including indices for capital controls on individual asset categories, gross flows, inflows and outflows, as well as for resident and nonresident asset transactions. Understanding that China usually implements policies in a step by step gradualist style, we extract this gradual information from the text in the IMF's *Annual Report on Exchange Arrangement and Exchange Restrictions* (AREAER) and some supplementary material from other sources.

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## 1. Introduction

In the era of globalization, cross-border capital flows are widely recognized as an essential ingredient for economic growth and a useful supplement to domestic savings to facilitate greater productive investment and smooth consumption. However, rapid and excessive capital inflows to emerging economies could entail a great risk of devastating financial crisis.

Capital account management (a.k.a. capital controls) (IMF, 2011) has long been adopted by many developing countries particularly during periods of rapid short-term capital inflows and disruptive outflows. Chilean- and Malaysian-type capital controls are two notable examples. Indeed, those countries deploying such controls were found among the least hard-hit and survived better during the recent global financial crises (Forbes, Fratzscher, & Straub, 2013; Ostry et al., 2011).

The 2008 global financial crisis opened a new chapter of policy discussion on how to use capital controls to deal with boom-and-bust capital flows — “capital controls are back” (Eichengreen & Rose, 2014). The contagion effect of the 2008 financial crisis and the subsequent quantitative easing (QE) policy of the US Federal Reserve caused wild swings of capital flows across the borders of emerging economies. Many emerging economies were affected by volatile capital flows. However, a number of economies, such as Brazil, Taiwan, and South Korea, successfully managed volatile capital flows using capital controls (Gallagher, 2011; IMF, 2011).

Maintaining the primacy of financial liberalization, the IMF started to partially recognize the appropriateness of capital account regulation in 2011; in 2012 the IMF endorsed it (IMF, 2012) and recommended a set of guidance notes on the appropriate use of

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capital account management (CFM) (IMF, 2013). The G-20 leaders endorsed these guidelines for the use of capital account management and agreed on a “coherent conclusion” in November 2011 that “there is no ‘one-size fits all’ approach or rigid definition of conditions for the use of capital flow management measures.”

China has a long history of tough regulations on capital flows. Since “opening its doors” in 1978, China has gradually liberalized its restrictions on selected cross-border capital flows, but started with a very cautious and small-step liberalization process, resulting in capital account being virtually closed until the mid-1980s, despite some progress in trade-related payment regulation. Starting from the early 90s, the liberalization of trade-related payment flows and FDIs made strides; in particular, inward FDI soared, making China the largest FDI receiver in the world in the 90s. However, the 1997 Asian financial crisis disrupted the entire process. In order to prevent capital flight of up to \$80 billion (Gunter, 2004; Cheung & Qian, 2010) in 1998 and shield the Chinese economy from financial turmoil in East Asia, the Chinese government imposed the strictest capital controls, going so far as to criminalize certain cross-border capital transactions<sup>1</sup> (Wu and Tang, 2000).

As with the experience of other countries, tight regulations on its capital account brought China greater financial stability.<sup>2</sup> It is conceivable that capital controls helped China survive the storm of the 1997 Asian financial crisis. The then US Treasury Secretary Rubin praised China as an “island of stability” in the region. With the help of capital controls, China seemed to manage the risk of possible contagion from the 2008 global financial crisis as well.

However, with greater globalization and associated problems, e.g. global imbalances of payments, a perceived undervaluation of the RMB exchange, and economic growth hitting a bottle neck, China has become more eager to liberalize its capital account to meet these new challenges. The People's Bank of China (PBOC), China's central bank, issued a report in 2012 that outlined a three-stage reform proposal to promote the international use of the RMB and to open up China's capital account within 10 years. However, the IMF warned via *Wall Street Journal* (2013) that speedy liberalization could trigger a massive capital exodus if not properly handled. It was estimated that net outflows from China could be as much as 15% of the country's GDP (Bayoumi & Ohnsorge, 2013) over several years. The domestic banking system may not be resilient enough to withstand such shocks, and could trigger a financial crisis. To minimize the possible dangers of liberalization, China's capital controls may remain necessary and effective before the implementation of policies to reform the RMB exchange rate and liberalize interest rates (Prasad, Rumbaugh, & Wang, 2005).

Before analyzing the policy sequence and the profound implications that capital controls may have on the Chinese economy, it is important to answer the following questions: Are China's capital controls still effective as the Chinese economy becomes increasingly complex? How do capital controls affect capital flows, particularly volatile short-term capital flows? What effect could liberalizing China's capital controls have on the RMB exchange rate, China's financial stability, and the Chinese economy?

There are a plethora of papers that discuss China's capital controls and attempt to answer these questions. However, many of them are narrative and use simple descriptive statistics on key variables to draw conclusions; they therefore lack robust statistical evidence from proper econometric analyses. There are only a handful papers which study China's capital flow regulations using regression analyses<sup>3</sup>, primarily due to the lack of appropriate measures of China's capital controls, particular measures of controls on subcategories of the capital account and inflows versus outflows.

In this paper, hoping to inspire and facilitate a new avenue of studies on China's capital controls and capital flows, we create an index data set measuring changes in China's capital controls by extracting detailed information from the text of IMF's *Annual Report on Exchange Arrangements and Exchange Restrictions* (AREAER). China usually implements policies step by step in a gradual style, and we extract the information about gradual changes from each line of the text in the IMF's AREAER and supplementary materials from other sources.<sup>4</sup> Our goal is to incorporate as detailed and accurate information as possible about China's capital controls. Our monthly indices data are from 1999 to 2012, and comprise two groups of indices, *de jure* and hybrid. Both groups include indices created for selected subcategories of China's capital account, including equities, bonds, money market instruments, commercial credits, financial credits and FDIs. Additionally, similar indices are generated from controls on inflows and outflows of funds and transactions made by residents and nonresidents. Indices for China's control on trade-related capital flows, namely export proceeds and import payments, are also created.

To compile the *de jure* index data, we adopt a straightforward coding rule — setting January 1999 as the benchmark and assigning it a score of 0, we add 1 to the previous capital control score if capital control tightens and subtract 1 if there is a relaxation on the control level in the next month. The score remains the same if there is no policy change. Hence, a high index score indicates tighter Chinese capital controls. Aggregated capital control indices, for example, the overall controls on China's capital account, are generated by an unweighted average of indices from its asset subcategories capital flows (Schindler, 2009). Further, we create a unique hybrid index data set by weighted averaging the *de jure* indices with the share of an asset subcategory in the total value of China's capital account as the weight.

In comparison to other indices, for instance, the Chinn–Ito index, the Quinn (1997) index, and the Schindler (2009) index, our indices possess several advantages, in particular, they 1) properly capture the overall liberalization trend of China's capital controls from 1999 to 2012, while other indices suggest unchanged or even tightening up on China's capital controls; 2) numerically measure the intensity of changes in capital controls over time; 3) relative to other indices, display substantially more variation,

<sup>1</sup> Appendix A provides detail description of capital control measures.

<sup>2</sup> Capital controls can stabilize financial markets via various channels, e.g. reducing foreign exchange market pressure. Li (2012) finds that China's capital controls lower the renminbi exchange market by 91% in average.

<sup>3</sup> See, e.g. Ma and McCauley (2008); Cheung and Qian (2010); Chen (2013) and Cheung and Herrala (2014).

<sup>4</sup> Appendix B provides the list of other information sources.

implying the uneven and complicated liberalization of China's capital controls during the sample period; 4) contain less subjective judgment, as we code policy changes by simply adding (subtracting) if there is a tightening (relaxing) of controls without incorporating judgment about the magnitude of the change<sup>5</sup>; and 5) are monthly-frequency and so can be used to study high-frequency short-term capital flows.

Our indices show an overall liberalization of capital controls in China since 2000. The liberalization process is persistent over time, albeit the trend being altered a few times when the Chinese government needed stricter capital controls to deal with threats to financial stability, e.g. the spillover from the 2008 financial crisis.<sup>6</sup> Moreover, China's capital control liberalization is uneven across different aspects. For example, capital controls are kept stricter on capital inflows than outflows. While China opens up swiftly to long-term capital movement, it maintains a fairly tight level of controls on short-term capital, particularly short term financial credits, including bank loans.

We outline the methodology for constructing our indices in the next section. Section 3 compares our indices to other indices, and Schindler's (2009) in particular. We provide some observations on our indices in Section 4. Section 5 concludes.

## 2. The index construction approach

We focus on China's case aiming to extract as detailed and accurate information as possible to construct a capital control index data set. As the domestic and global economy has become more complex, China's capital controls appear to be increasingly sophisticated and individual-transaction oriented. In addition, China usually implements reforms step by step – gradualism. Without carefully searching for detailed information on those steps, we may omit some important information and consequently understate the significance of policy changes.

### 2.1. De jure indices

This data set covers monthly data from 1999 to 2012 for changes in China's capital controls. As in other *de jure* indices of capital controls, we primarily rely on the information in the IMF's AREAER, but supplement and cross-check these data with information from other sources such as the Chinese government directives and reports, primary news sources, and academic papers on China's capital controls.

As with Schindler (2009), our data set contains a group of indices for asset subcategories as categorized in AREAER, which however are slightly different from the standard presentation of IMF and OECD balance of payment (BOP5) asset and liability categories; nevertheless, they are compatible after some adjustments. These subcategories include portfolio equity investment, debt security investment, commercial credits, financial credits, FDIs, etc. Further, we compile data for capital controls on gross capital flows, inflows and outflows, as well as on resident and nonresident transactions. Apart from the indices of capital account controls, we also create indices of controls on China's import and export payment flows. Given the fact that China's total imports and exports account for more than 50% of GDP, investors could easily move capital in and out via, for example, trade mis-invoicing (Cheung & Qian, 2010; Cheung, Steinkamp, & Westermann, 2015). Thus, it is likely that controls on trade payment flows are one of the key parts of overall capital control policy. The indices for controls on China's capital account and trade in our data set are listed below.<sup>7</sup> Due to the limited importance of some asset categories in China's capital account, we code and compile 6 major asset categories in AREAER, including equities, debt securities, commercial credits, financial credits, and FDIs, which account for more than 82% of the gross value of China's capital account.

*eq*: Shares or other securities of a participating nature

*eq\_plbn*: Purchase locally by nonresidents

*eq\_silbn*: Sale or issue locally by nonresidents

*eq\_pabr*: Purchase abroad by residents

*eq\_siabr*: Sale or issue abroad by residents

*bo*: Bonds or other debt securities

*bo\_plbn*: Purchase locally by nonresidents

*bo\_silbn*: Sale or issue locally by nonresidents

*bo\_pabr*: Purchase abroad by residents

*bo\_siabr*: Sale or issue abroad by residents

*mm*: Money market instruments

*mm\_plbn*: Purchase locally by nonresidents

*mm\_silbn*: Sale or issue locally by nonresidents

*mm\_pabr*: Purchase abroad by residents

*mm\_siabr*: Sale or issue abroad by residents

<sup>5</sup> This approach may ignore information that may affect the accuracy of intensity measure, because we treat every policy change equally without differentiating a big policy change versus a small policy change. For example, we consider a policy change that allows a Chinese citizen to bring \$5000 from \$0 per crossing border to be the same as a policy that allows a Chinese citizen to bring \$10,000 from \$0 per border cross.

<sup>6</sup> Appendix A provides some capital control measures imposed by the Chinese government during the 2008 financial crisis period.

<sup>7</sup> Like Schindler (2009) we drop financial derivatives, real estate transactions, and personal capital transactions. In addition, we also drop collective investment, since that we cannot identify the corresponding asset or liability categories from China's BOP report.

- cc: Commercial credits (trade credits)
  - cco: By residents to nonresidents
  - cci: To residents from nonresidents
- fc: Financial credits (mainly bank loans)
  - fco: By residents to nonresidents
  - fci: To residents from nonresidents
- di: Controls on direct investment
  - dio: Outward direct investment
  - dii: Inward direct investment
  - ldi: Controls on liquidation of direct investment
- im: Imports and import payments
- ex: Exports and export proceeds

The names for each index are in *italic font*. For example, *eq* is the index measuring China's overall controls on equity investment flows, both inflows and outflows; *eq\_plbn* is the index to measure the control on equities purchased locally by nonresidents in China (equity investment capital inflow). Other indices are named in a similar way. Given that we measure the change in intensity of capital controls, we set the level of capital controls in January 1999 as the benchmark<sup>8</sup> and assign a score of 0.<sup>9</sup> When there is a policy change that tightens controls on an individual transaction, e.g. a new policy to restrict bonds and other debt securities to be purchased locally by nonresidents (bond investment inflows), we add a value of 1 to the existing score. If there is a control-loosening policy change, we subtract 1 from the existing score. The score is kept unchanged if no change in policy occurs. For example, we have a  $-2$  control level of bond capital inflow in January 2004. If the Chinese government implements a policy restricting foreign capital investment in Chinese bond markets, we add 1 to  $-2$  and the bond capital inflow control index for February 2004 is  $-1$ . In this way, a higher score indicates tighter controls. We do not set an upper or lower boundary for our indices – as long as the Chinese government keeps tightening capital controls, the index will rise.<sup>10</sup> No-boundary setting is rationalized by the fact that China's gradual liberalization of its capital account is still in process and it is therefore hard to anticipate the number of steps that China will take to fully liberalize its capital account.

Table 1 provides statistical summaries of *de jure* indices.

Since capital controls are coded at the individual asset transaction level, we follow Schindler (2009)'s method to compile an aggregate index by taking the unweighted average of the appropriate asset subcategories. Let us take aggregate controls on the gross flows of “shares or other securities of a participating nature (equity investments)” as an example. The following five formulae describe how to compute the aggregate index for controls on gross equity flows (inflows plus outflows), inflows, outflows, nonresident, and resident equity capital investments, respectively.

$$eq = [eq\_plbn + eq\_silbn + eq\_pabr + eq\_siabr]/4 \quad (1)$$

$$eqi = [eq\_plbn + eq\_siabr]/2 \quad (2)$$

$$eqo = [eq\_silbn + eq\_pabr]/2 \quad (3)$$

$$eq\_nr = [eq\_plbn + eq\_silbn]/2 \quad (4)$$

$$eq\_r = [eq\_pabr + eq\_siabr]/2 \quad (5)$$

where *eq*, *eqi*, *eqo*, *eq\_nr*, and *eq\_r* denote the index of aggregate controls on gross capital flows, inflows, outflows, flows generated by nonresidents, and by residents, respectively. By applying a simple average method, we do not differentiate the relative importance or effectiveness of capital controls that are imposed on each individual asset subcategory, inflows or outflows, and resident or nonresident capital flows. For instance, in formula (1), we assume that controls on *eq\_plbn* are equally as important as those on *eq\_silbn*, *eq\_pabr*, and *eq\_siabr*. In Section 2.2, we discuss this issue in more depth.

As these formulae show, in addition to aggregating sub-indices along asset categories, we also bundle up sub-indices according to the direction of capital flows. For example, when we bundle up the equity inflow sub-indices, we calculate the simple average of “*eq\_plbn*: Purchase locally by nonresidents” and “*bo\_siabr*: Sale or issue abroad by residents” as the index of control on China's equity inflows. Similarly, controls on equity outflows are computed as a simple average of *eq\_pabr* and *eq\_siabr*. For direct

<sup>8</sup> Setting January 1999 as the bench mark is due to data availability.

<sup>9</sup> Alternatively, we can set the benchmark at 100, resembling the construction of CPI. Although setting the benchmark at different values, both approaches keep the essence of our indices that measure the intensity changes in China's capital controls.

<sup>10</sup> Although we do not have score boundaries, the highest and lowest score are 5 for commercial credits and  $-8$  for outward FDI, respectively.

**Table 1**  
Summary statistics (*De jure* indices).

Variable	Obs.	Mean	Std. Dev.	Min	Max
<i>eq</i>	168	-2.051	1.283	-4.000	0.250
<i>eqi</i>	168	-1.646	0.836	-3.000	0.000
<i>eqo</i>	168	-2.455	1.811	-5.000	0.500
<i>eq_nr</i>	168	-1.884	0.892	-3.000	0.000
<i>eq_r</i>	168	-2.217	1.763	-5.000	0.500
<i>bo</i>	168	-0.955	0.853	-2.500	0.250
<i>boi</i>	168	-1.753	1.136	-4.000	0.000
<i>boo</i>	168	-0.158	0.688	-1.000	1.000
<i>bo_nr</i>	168	-0.967	0.860	-2.500	0.000
<i>bo_r</i>	168	-0.943	0.869	-2.500	0.500
<i>mm</i>	168	-0.382	0.470	-1.000	0.500
<i>mmi</i>	168	-1.107	0.714	-2.000	0.000
<i>mmo</i>	168	0.342	0.355	0.000	1.000
<i>mm_nr</i>	168	-0.107	0.206	-0.500	0.000
<i>mm_r</i>	168	-0.658	0.825	-1.500	1.000
<i>cc</i>	168	0.054	0.738	-1.000	1.500
<i>cci</i>	168	1.018	1.429	-1.000	3.000
<i>cco</i>	168	-0.911	0.959	-2.000	1.000
<i>cc_nr</i>	168	1.018	1.429	-1.000	3.000
<i>cc_r</i>	168	-0.911	0.959	-2.000	1.000
<i>fc</i>	168	-0.304	0.371	-1.000	0.500
<i>fci</i>	168	0.321	0.641	-1.000	1.000
<i>fco</i>	168	-0.929	0.886	-2.000	1.000
<i>fc_nr</i>	168	0.321	0.641	-1.000	1.000
<i>fc_r</i>	168	-0.929	0.886	-2.000	1.000
<i>di</i>	168	-1.391	1.283	-3.667	0.333
<i>dii</i>	168	-1.024	0.997	-3.000	0.000
<i>dio</i>	168	-3.786	2.674	-8.000	0.000
<i>di_nr</i>	168	-1.024	0.997	-3.000	0.000
<i>di_r</i>	168	-3.786	2.674	-8.000	0.000
<i>ka</i>	168	-0.838	0.608	-1.778	0.306
<i>kai</i>	168	-0.698	0.375	-1.333	0.000
<i>kao</i>	168	-1.316	1.076	-2.667	0.583
<i>ka_nr</i>	168	-0.440	0.275	-1.083	0.000
<i>ka_r</i>	168	-1.574	1.198	-3.083	0.500
<i>im</i>	168	-0.513	0.436	-1.344	0.100
<i>ex</i>	168	0.131	0.386	-0.500	1.100
<i>ca</i>	168	-0.191	0.234	-0.622	0.200

Source: data that are generated in this paper. *eq*: equity securities; *bo*: bonds or other debt securities; *mm*: money market instruments; *cc*: commercial credits; *fc*: financial credits; *di*: the direct investment; *i* indicates the capital inflows and *o* indicates the capital outflows of these asset categories. *nr* and *r* respectively mark for capital flows from nonresidents to residents and residents to nonresidents; *ex* notes for controls on exports and *im* is for controls on imports; *ca* stands for current account and *ka* is for capital account.

investment, commercial credit, and financial credit, no such aggregation is necessary, if we assume that inflows are equal to the transaction made by nonresidents to residents, whereas outflows are transactions made by residents to nonresidents.<sup>11</sup>

It is intuitive to consider both “purchase locally by nonresidents” and “sale or issue abroad by residents” as capital inflows, and “sale or issue locally by nonresidents” and “purchase abroad by residents” as capital outflows. Hence, the restrictions on the former two are deemed as capital controls on inflows, whereas the restrictions on the latter two are capital controls on outflows. However, some restrictions on nonresident sales of domestic assets (outflows) may be considered a measure of capital controls that is designated to discourage nonresidents' purchase of domestic assets (inflows). For example, China's imposition of lock-up periods on the repatriation of sales of domestic assets by nonresidents (outflows) can be interpreted as a restriction on nonresidents' purchase of domestic assets (inflows) in that the lock-up may discourage the initial purchase of domestic assets. Without subjectively judging the orientation of government policy, we create a control index for “purchase locally by nonresidents”, “sale or issue abroad by residents”, “sale or issue locally by nonresidents”, and “purchase abroad by residents” of each asset category, respectively. Fig. 7 shows the evolution of these indices over time.

Regarding controls on the flow of funds from imports and exports, since resident exporters get payments from nonresident importers, the proceeds of exports are capital inflows; by the same logic, the payments made by resident importers to foreign exporters are capital outflows. Therefore, the control index on exports is essentially the control index of capital inflows, computed as  $ex = [ex1 + ex2 + ex3 + ex4... + exn]/n$ , where  $ex1, ex2, ..., exn$  are sub-items representing various aspects of export controls, e.g. repatriation requirements, documentation requirements, exports license, etc. To save space, we do not list the sub-items of the export control index.<sup>12</sup> Using a similar approach, we also generate an index of controls on import payment flows.

<sup>11</sup> Schindler (2009) applies the same assumption.

<sup>12</sup> We coded the index for each of those sub-items, which are available from the authors upon request.



Regarding control indices applying to residency, as shown in formula (4) and (5), we take the average of “sales or issue abroad by residents” and “purchase abroad by residents” to yield a control index for residents; the control index for nonresidents is the average of “purchase locally by nonresident” and “sale or issue locally by nonresident”. As in Schindler (2009), we interpret controls on direct investment inflows as nonresident restrictions, and those on direct investment outflows as resident restrictions.

These newly created indices for asset categories can be used to create more aggregate capital control indices. For example, we can construct an index of capital controls on China's overall capital account inflows by taking an average of all inflow indices in the capital account categories, including inflows of equities, bonds, money market instruments, commercial credits, financial credits, and FDI. Further, we create an aggregate index of China's capital controls that accounts for the controls on both the capital and current account.

## 2.2. Hybrid indices

As we discussed in the previous section, we generate aggregate *de jure* indices by simply averaging indices of an asset subcategory without differentiating the relative importance of each asset subcategory, which might cause some measurement errors. To pin down this issue, one of the strategies is to add a weight to each asset subcategory. Ideally, that weight can properly represent the importance of each asset sub-category. One weight that we investigate in this paper is the share of a subcategory asset value in the total value of all asset categories in China's capital account. For example, equity is a subcategory asset and the weight for controls on gross equity investment flows is the value of gross equity investments divided by the total value of gross capital flows of six aforementioned categories in China's capital account. Conceivably, larger flows point to more opportunities for investors to evade capital controls (Ma & McCauley, 2008). In order to be more effective in its capital controls, it is important for China to control an asset that accounts for a large share of its total assets. Thus, the higher the weight, the more important an asset subcategory is in evaluating capital control intensity or effectiveness.

Given that the indices we obtained in Section 2.1 are *de jure* measures and the weights we employed are *de facto* measures, we consider our indices hybrid ones. The weight data are based on the BOP data extracted from the State Administration of Foreign Exchange of China (SAFE), which has quarterly data for each asset subcategory, disaggregated into inflows and outflows and residents and non-residents.<sup>13</sup> To avoid introducing excess variation from using *de facto* BOP data, we use a four-year average moving window to create the weights.<sup>14</sup> The moving windows are applied in retrospective style, for example we use the average of year 1995, 1996, 1997, and 1998 to weight the 1999 index. The rationale is that policy makers may evaluate the importance of an asset category from its existing status. If we include the current year or the forward years in the four-year moving window, it introduces an endogeneity issue, because current or forward years' capital flows might be the result of current capital controls policy. Listed below are the formulas for the individual capital account control hybrid indices, again using equity capital flow indices as an example:

$$heq = eq\_plbn * w_1 + eq\_silbn * w_2 + eq\_pabr * w_3 + eq\_siabr * w_4 \quad (6)$$

$$heqi = eq\_plbn * w_1 + eq\_siabr * w_4 \quad (7)$$

$$heqo = eq\_silbn * w_2 + eq\_pabr * w_3 \quad (8)$$

$$heq\_nr = eq\_plbn * w_1 + eq\_silbn * w_2 \quad (9)$$

$$heq\_r = eq\_pabr * w_3 + eq\_siabr * w_4 \quad (10)$$

where “*heq*” denotes a hybrid index for the overall control on equity investments;  $w_1$  equals the value of “equity purchase locally by nonresident” divided by “the total value of China's equity investment gross flows”;  $w_2$  to  $w_4$  are obtained in a similar fashion.<sup>15</sup>

Using more aggregate BOP data to compute the weights, we are able to create three hybrid indices for China's overall capital controls on its capital account — the gross capital account control index, capital inflows control index, and capital outflows control index, as well as a hybrid index for overall controls on Chinese trade payment flows using Chinese foreign trade data.

$$hka = eq * w_{g1} + bo * w_{g2} + mm * w_{g3} + cc * w_{g4} + fc * w_{g5} + di * w_{g6} \quad (11)$$

$$hkai = eqi * w_{i1} + boi * w_{i2} + mmi * w_{i3} + cci * w_{i4} + fci * w_{i5} + dii * w_{i6} \quad (12)$$

$$hkao = eqo * w_{o1} + boo * w_{o2} + mmo * w_{o3} + cco * w_{o4} + fco * w_{o5} + dio * w_{o6} \quad (13)$$

$$hca = im * w_{im} + ex * w_{ex} \quad (14)$$

<sup>13</sup> The BOP uses different terminology. For example, debiting equity asset represents that a resident invests in overseas stock markets, while crediting equity asset refers to a resident's sale or issue of stock abroad.

<sup>14</sup> Using a four-year average moving window is based on our understanding of the development of the Chinese economy. From 1995 to 1998, the Chinese economy became more open to the world. In the 1999–2002 period, China recovered from the impact of the 1997 Asian financial crisis; 2003–2007 represented the take-off period for the globalization of the Chinese economy, including ballooning international trade and an increase in inward and outward FDI; and in 2008–2012, as in all other emerging economies, China dealt with the global financial crisis and liquidity issues.

<sup>15</sup> For FDI, the subcategory “liquidation of direct investment” is not taken into account to create the hybrid index since the corresponding gross flows data are not available in BOP to compute the weight.

where each weight is the share of an asset in the sum of all six assets and  $w_{im}$  and  $w_{ex}$  are the weights of imports and exports in total Chinese trade, respectively.

**Table 2**  
Summary statistics (hybrid indices).

Variable	Obs	Mean	Std. dev.	Min	Max
<i>heq</i>	168	−2.284	1.249	−4.654	0.000
<i>heqi</i>	168	−1.574	0.780	−2.969	0.000
<i>hego</i>	168	−0.710	1.031	−2.942	0.000
<i>heq_nr</i>	168	−1.535	0.842	−2.968	0.000
<i>heq_r</i>	168	−0.750	1.187	−3.365	0.000
<i>hbo</i>	168	−0.725	1.252	−3.191	1.142
<i>hboi</i>	168	−1.065	1.001	−3.095	0.000
<i>hboo</i>	168	0.340	0.453	−0.096	1.364
<i>hbo_nr</i>	168	−0.081	0.091	−0.333	0.000
<i>hbo_r</i>	168	−0.648	1.179	−2.858	1.142
<i>hmm</i>	168	−0.157	0.544	−0.901	0.874
<i>hmmi</i>	168	−0.427	0.472	−1.284	0.000
<i>hmmo</i>	168	0.270	0.323	0.000	0.954
<i>hmm_nr</i>	168	−0.003	0.006	−0.017	0.000
<i>hmm_r</i>	168	−0.154	0.543	−0.887	0.874
<i>hcc</i>	168	0.099	0.759	−1.039	1.482
<i>hcci</i>	168	1.018	1.429	−1.000	3.000
<i>hcco</i>	168	−0.911	0.959	−2.000	1.000
<i>hcc_nr</i>	168	1.018	1.429	−1.000	3.000
<i>hcc_r</i>	168	−0.911	0.959	−2.000	1.000
<i>hfc</i>	168	0.189	0.538	−0.820	0.886
<i>hfci</i>	168	0.321	0.641	−1.000	1.000
<i>hfco</i>	168	−0.929	0.886	−2.000	1.000
<i>hfc_nr</i>	168	0.321	0.641	−1.000	1.000
<i>hfc_r</i>	168	−0.929	0.886	−2.000	1.000
<i>hdi</i>	168	−1.394	1.290	−3.945	0.000
<i>hdii</i>	168	−1.024	0.997	−3.000	0.000
<i>hdi_o</i>	168	−3.786	2.674	−8.000	0.000
<i>hdi_nr</i>	168	−1.024	0.997	−3.000	0.000
<i>hdi_r</i>	168	−3.786	2.674	−8.000	0.000
<i>hka</i>	168	−0.763	0.498	−1.535	0.275
<i>hkai</i>	168	−0.152	0.335	−0.928	0.388
<i>hkao</i>	168	−1.086	0.942	−2.087	0.858
<i>hka_nr</i>	168	0.035	0.414	−0.659	0.674
<i>hka_r</i>	168	−1.288	1.292	−3.526	0.875
<i>him</i>	168	−0.513	0.436	−1.344	0.100
<i>hex</i>	168	0.131	0.386	−0.500	1.100
<i>hca</i>	168	−0.161	0.236	−0.611	0.281

Source: Data that are generated in this paper. *eq*: equity securities; *bo*: bonds or other debt securities; *mm*: money market instruments; *cc*: commercial credits; *fc*: financial credits; *di*: the direct investment; *i* indicates the capital inflows and *o* indicates the capital outflows of these asset categories. *nr* and *r* respectively mark for capital flows from nonresidents to residents and residents to nonresidents; *ex* notes for controls on exports and *im* is for controls on imports; *ca* stands for current account and *ka* is for capital account; *h* indicates hybrid indices.

In some ways, hybrid indices have advantages over both *de jure* and *de facto* indices when applied to empirical research. On the one hand, many *de jure* indices are limited in that they do not measure the importance of various capital controls; on the other hand, *de facto* measures may encounter measurement errors and endogeneity issues (Quinn, Schindler, & Toyoda, 2011). The hybrid indices that we generated seem to be able to mitigate issues of lack of importance measures and endogeneity by introducing weights in the coding mechanism and by using a retrospective-style moving average window to weight the *de jure* indices.

### 3. Comparison to other indices

As discussed in Chinn and Ito (2008) and Quinn et al. (2011), there are numerous capital control indices in the literature, including *de jure*, *de facto*, and hybrid indices. Most *de jure* indices use the IMF's AREAER and convert text information on capital controls to a binary 0/1 code. Before 1997, AREAER provided a summary table that enumerates the presence of restrictions for each country. Epstein and Schor (1992) were among the first papers to develop a binary index<sup>16</sup> for 16 OECD countries over the period of 1967–1986. The post-1997 AREAER enriches the dimensional structure of the reporting system to 13 separate aspects of capital account restrictions, which spurred a second wave of capital control index construction. For example, Abiad and Mody (2005); Chinn and Ito (2008); Johnston and Tamirisa (1998); Miniane (2004); Mody and Murshid (2005), and Tamirisa (1999) use AREAER information

<sup>16</sup> Other papers include Alesina, Grilli, and Milesi-Ferretti (1994); Grilli and Milesi-Ferretti (1995); Edison, Klein, Ricci, and Slok (2004), and Klein (2003)

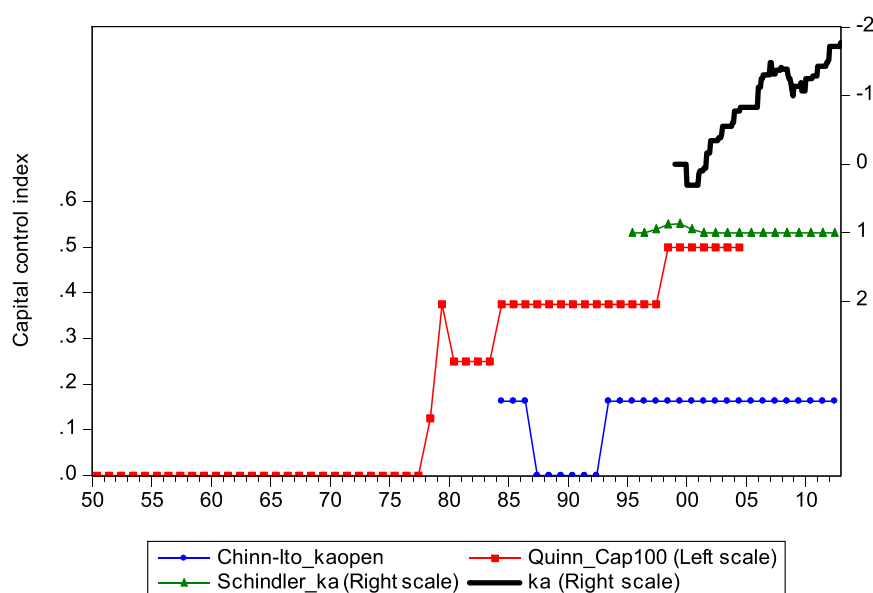


Fig. 1. Comparison to other *de jure* indices. Source: Chinn and Ito (2008), Quinn (1997); Schindler (2009), and authors' data compilation. *ka* notes for the gross capital account control index.

and idiosyncratic methods to create different capital control indices that have different country coverage and time spans. Although they may be generated in different ways and have different strengths and drawbacks, since they primarily rely on AREAER, the correlation between these indices is high (Chinn & Ito, 2008).

Note that almost all of the existing indices data are panel data, covering as many countries (with or without China) and time periods as possible, whereas we work on China as an experimental lab and focus on the critical time period (1999–2012) when China gradually liberalized its capital account.

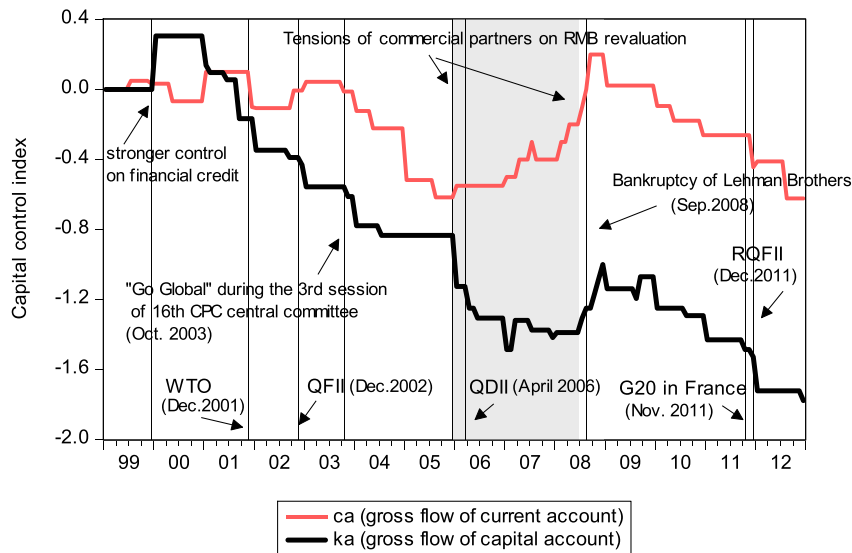
Methodology-wise, our indices are close to Schindler (2009). Both index data sets are based on AREAER, cover several subcategories of capital account transactions, and average the subcategories control indices to form more aggregate control indices. Moreover, both papers create control indices for inflows and outflows and resident and nonresident restrictions. However, our indices are different from Schindler (2009) in several important ways. First, rather than measure the capital control level in a yes-or-no style, we measure the monthly intensity of changes in China's capital controls. Second, we depart from the traditional binary coding to numerically measuring the changes in capital account restrictions over time. Due to a different coding mechanism, our indices properly reveal the evolution of China's policy on capital control and have more variation than Schindler's. Tables 1 and 2 provide summary statistics of our indices and Fig. 1 shows that our gross control index has significantly more variation compared to those of Chinn and Ito (2008); Quinn (1997), and Schindler (2009).<sup>17</sup> Third, we include some subcategory indices that are essential to China in our data set. For example, we add commercial credit indices and control indices for China's import and export payment flows to accommodate the large amount of Chinese foreign trade activities.

Another *de jure* index database that is close to ours is Forbes et al. (2013), in which the authors create a new capital flow management index (CFM) to identify any change, increase or decrease in restrictions, at a weekly frequency for 2009, 2010, and 2011 and 60 countries. As in Schindler's and our index data, they generate the data set by type of capital flow: inflows and outflows, residents and nonresidents. One difference is that, although Forbes et al. (2013) count the number of policy changes, albeit differentiating between a tightening and relaxation of controls, the authors do not measure their intensity over time. One advantage of our indices is that we have more disaggregate indices for various types of financial assets and the indices for controls on the current account, which is arguably a very important aspect of effective capital controls in some major current-account-convertible emerging countries such as China.

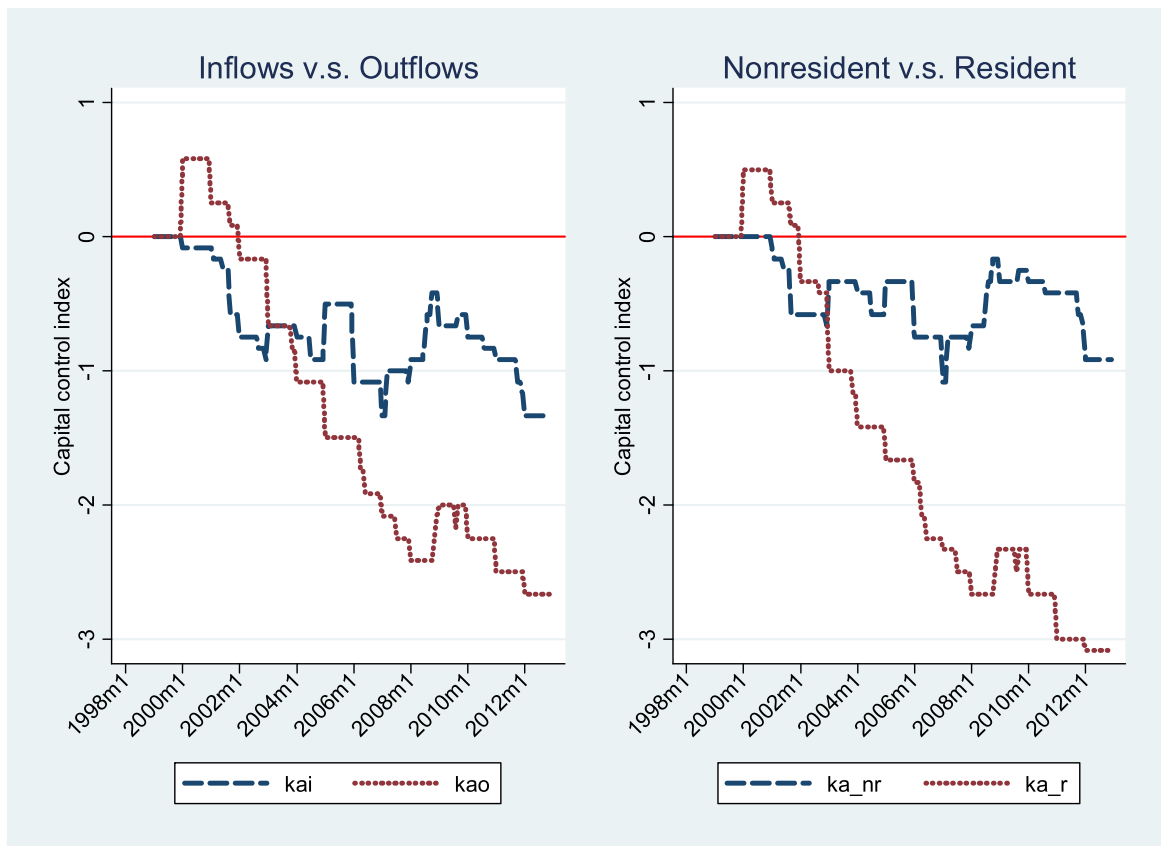
Unlike *de jure* indices, there are only a few hybrid indices of capital controls. Edison and Warnock (2003) create a monthly measure of capital account openness proxied by the share of domestic equities available to foreign investors. Dreher (2006) and Dreher, Gaston, and Martens (2008) create and update a broad measure of economic globalization, which is an aggregate of a group of sub-indices based on weights derived from a principal component analysis. Those sub-indices include *de facto* variables (trade, FDI, portfolio equity, tariff rate, hidden import barriers, and taxes on international trade) and a *de jure* index is constructed by counting the number of restrictions in 13 binary coded categories of AREAER. While it is appropriate to generate weights from principle component analysis (PCA) when there are several sub-components that measure different aspects of a principle component, it is hard to say that those weights reveal relevant information about the relative importance of each

<sup>17</sup> We convert Quinn (1997)'s index into a 0–1 scale.





**Fig. 2.** Index of controls on capital account (*ka*) and current account (*ca*). Source: Data that are generated in this paper. CPC stands for the Communist Party of China; QFII notes for the Qualified Foreign Institutional Investor Scheme; QDII and RQFII stand for the Qualified Domestic Institutional Investor scheme and the Renminbi Qualified Foreign Institutional Investor Scheme, respectively.



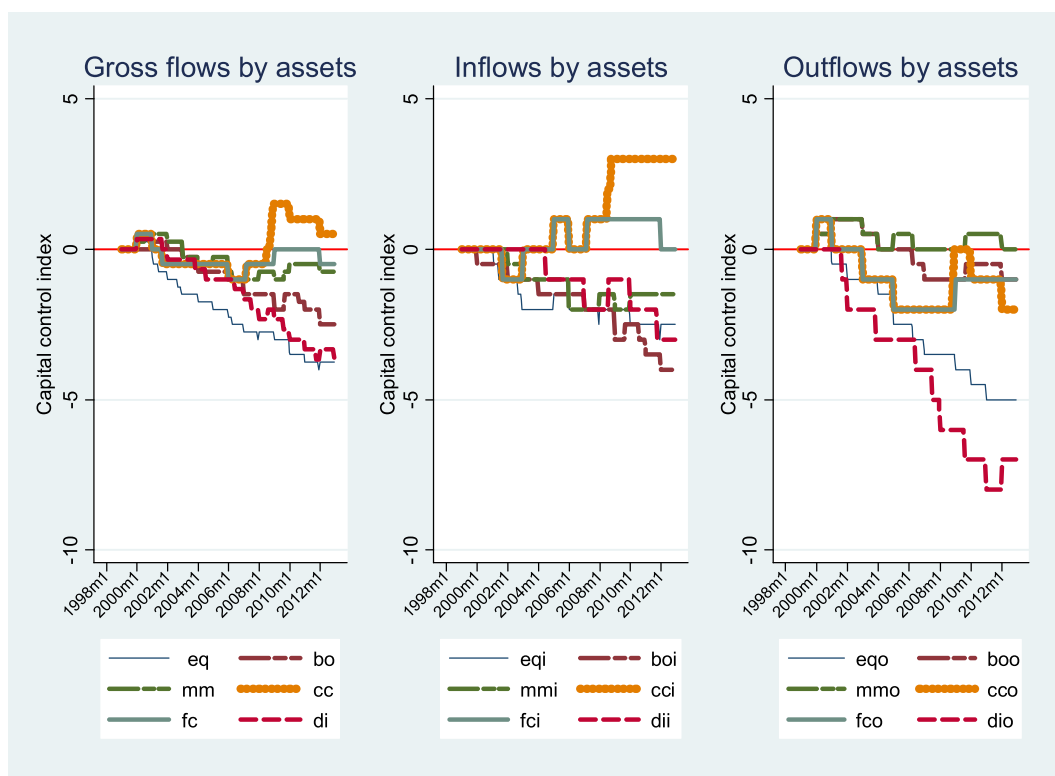
**Fig. 3.** De jure indices by direction of flows and residency. Source: Data that are generated in the paper. *kai* notes for the control index on capital account in-flows; *kao* stands for the control index for capital account outflows; *ka\_nr* and *ka\_r* stand for the control index of capital flows by nonresidents and by residents, respectively.

component. Moreover, PCA weights are fixed throughout the sample period. This might represent a deficiency in accounting for capital controls that have significant heterogeneity across countries and time periods.

In our hybrid index we choose a weight computed as the value share of a certain asset subcategory in the total value of all assets in China's capital account. A larger weight represents a more important asset subcategory for our capital controls measures. For example, it is more important to regulate the financial credits category (65% of total value of capital account gross flows considered for the period of 2008–2011) versus bond and other debt security categories (4%). In addition, we rely on a four-year-average moving window to account for the evolvement of the relative importance of each asset category from 1999 to 2012. Using the four-year moving window is also intended to harness the excessive variation associated with the weight and possible endogeneity issue. Arguably, differentiating the relative importance of each asset may enable our indices to better measure developments in China's capital controls.

#### 4. Indices description and some observations

Overall, our indices reflect a persistent process of liberalizing China's capital account since 2000. As shown in Fig. 2, there is a clear downward trend (a lower index represents a more liberalized capital account) in the gross capital account control index (*ka*). Although there is a structural shift around the 2008 global financial crisis, the downward trend continued after the crisis. That is, China kept loosening controls on its capital account despite the temporary reversal of this trend reflecting concerns about the spillover of the global financial crisis. The control index for current account gross flows (*ca*) also indicates a liberalizing trend, but at a slower pace than the capital account. Particularly during the period from 2005 to the 2008 global financial crisis, rather than liberalizing, China tightened up trade payment controls. This is probably due to the fact that China was using policy tools to rein in the booming trade surplus to ease political pressure from its major trade partners. In general, the control indices of both the current and capital account move in tandem, revealing that the Chinese government coordinates capital controls in the current and capital account. In addition, our indices may well reflect how the government implements capital control policies in response to major economic events and shocks. For instance, in responding to the 2008 financial crisis (pinpointed at the collapse of the Lehman Brothers in Sept. 2008) when capitals underwent a “flight to quality” from emerging economies, the Chinese government encouraged capital inflows by raising the QFII cap from \$800 million to \$1 billion and reducing the lock-up period for a certain amount of medium- and long-term capital to 3-month from six-month to 1 year; and allowed foreign investors to participate in the interbank foreign exchange market. At the same time, China tightened capital outflow measures to strictly enforce the QDII cap on the net amount of funds remitted abroad.



**Fig. 4.** Capital account controls *de jure* indices by assets. Source: Data that are generated in this paper. *eq*: the equity securities; *bo*: the bonds or other debt securities; *mm*: the money market instruments; *cc*: the commercial credits; *fc*: the financial credits; *di*: the direct investment; *i* indicates the capital inflows and *o* indicates the capital outflows of each of these asset categories.

In the two panels of Fig. 3, we show the indices of the intensity changes in capital controls on inflows versus outflows and on resident versus nonresident transactions, respectively. Although the controls on both inflows and outflows were generally becoming looser, the process was uneven. While outflow controls were persistently liberalized, inflow controls rotated with tightening and loosening, but generally the overall intensity of control on inflows was higher than that of the outflows. Capital controls on resident and nonresident transactions appear to follow a similar pattern as those on inflows and outflows. China kept loosening controls on residents, while retaining relatively tight controls on nonresidents.

Fig. 4 illustrates the control intensity of 6 different asset subcategories of China's capital account. There is an overall trend of liberalization, but at an uneven pace for different assets. For example, equity investments and FDI liberalization are put in the fast lane, whereas financial credits and money market instruments have a bumpier ride. Interestingly, controls on commercial credits were substantially tightened after 2005. Checking further by reviewing the index of commercial credit inflows and outflows separately, we find that this is attributable to stricter control on inflows relating to the repatriation of Chinese export proceeds (“inflows by assets” panel of Fig. 4). In fact, at the same time China encouraged outflows of commercial credits (payments for imports). This suggests that China intended to contain the runaway trade surplus in response to mounting political pressure from the US government. Comparing the “inflows by assets” with the “outflows by assets” panels in Fig. 4, it is noteworthy that China liberalized capital controls on outflows faster than on inflows. Outward FDI is the outstanding example: to support the “going global” policy initiative of 2002, China drastically opened up outward FDI and encouraged Chinese enterprises to invest and raise capital overseas.

Fig. 5 compares the controls on the inflows and outflows of six asset subcategories individually. Again, in general, controls on inflows and outflows were liberalized, except for commercial credits. The liberalization pace for outflows is faster than that of inflows. There are two exceptions, however, China opened up controls on inflows more than on outflows for bond securities and money market instruments. This may reflect China's policy intention of developing its domestic bond markets and money markets by introducing foreign competition.

Fig. 6 compares the *de jure* and hybrid indices for gross capital flows, inflows, and outflows. Both the *de jure* and the hybrid indices suggest a trend of liberalization of China's capital account controls. Although they are highly correlated, the hybrid gross flows control index deviated from the *de jure* index after 2007, showing a measure of tighter control than the *de jure* index.

The *de jure* and hybrid inflow control indices seem to head in the same direction but follow different paths after 2002 — the hybrid index suggests a higher intensity of inflow control than the *de jure* index does. Due to the investor one-way bet on the revaluation of RMB, China has experienced an episode of hot money inflows since 2003. The Chinese government has consequently tightened capital

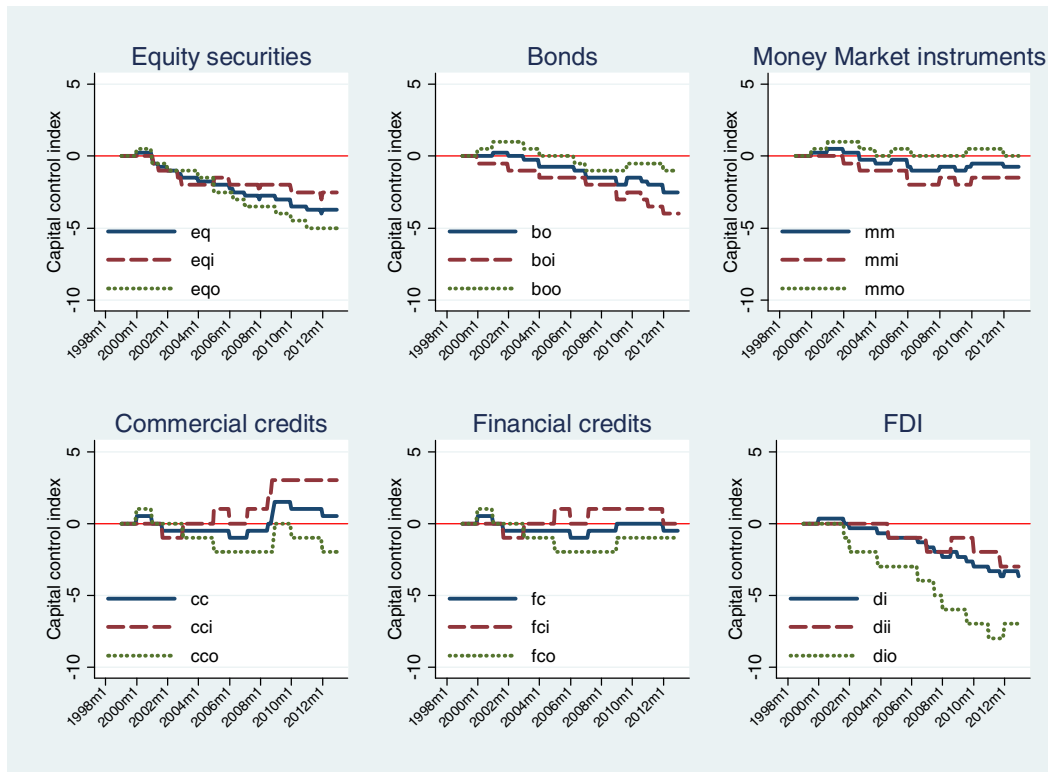
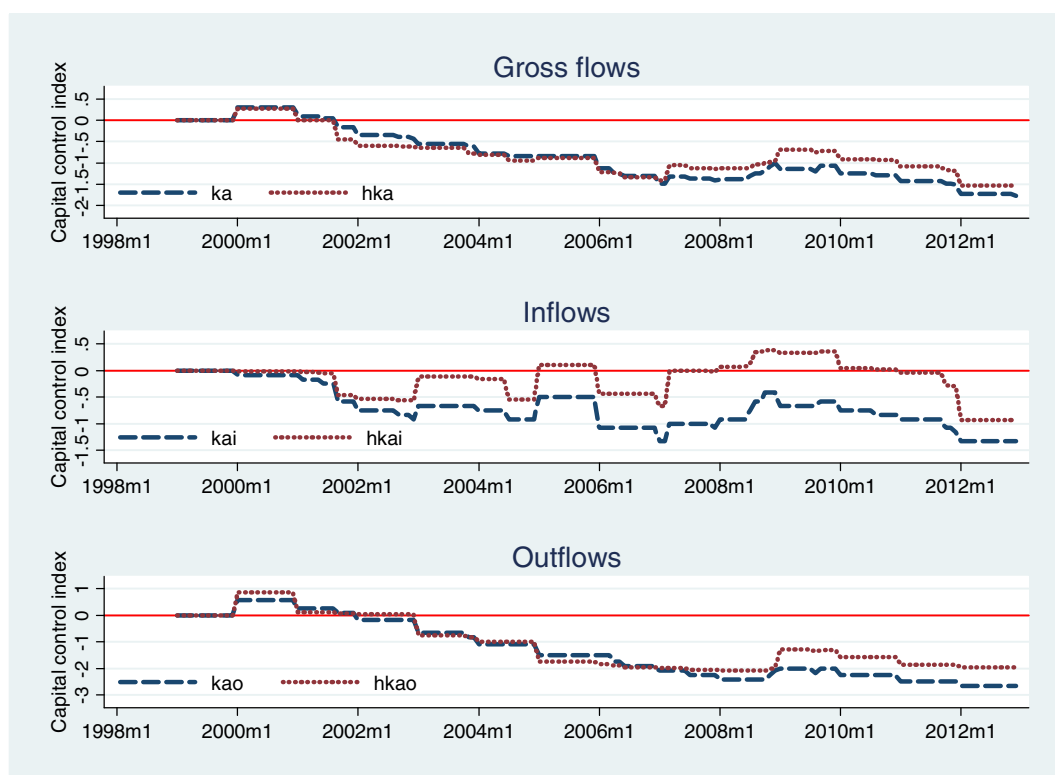


Fig. 5. *De jure* indices by assets and by flow types. Source: Data that are generated in this paper. *eq*: equity securities; *bo*: bonds or other debt securities; *mm*: money market instruments; *cc*: commercial credits; *fc*: financial credits; *di*: the direct investment; *i* indicates the capital inflows and *o* indicates the capital outflows of these asset categories.



**Fig. 6.** *De jure* and hybrid indices by flow types. Source: authors' dataset described in the text. *ka*: the control index of gross capital account flows. *i* and *o* indicate capital inflows and outflows, respectively. *h* indicates hybrid indices, otherwise *de jure* indices.

controls to restrain hot money inflows (as seen in the “financial credit” panel in Fig. 5). The influx of hot money drastically raised the share of financial credits (*fc*), which jumped from 30% to about 60% and consequently reduced the share of FDI inflows from 60% to 25%. The increased weights of financial credit (*fc*) substantially amplified the *de jure* measure of inflow capital controls, resulting in a higher hybrid control index than the *de jure* index.

Regarding the *de jure* and hybrid indices on capital outflows, both trend downward, except for a tightening spike during the 2008 financial crisis. But the hybrid index shows a higher level of controls than the *de jure* one. This is due primarily to the high share of financial credit (*fc*), which on average accounts for more than 70% of total outflows from capital account asset categories after 2007. Such heavy weights amplified capital control policy shifts in 2008 to restrict capital outflows during the “flight to quality” episode, and consequently keep the hybrid index of capital outflows away from the *de jure* index.

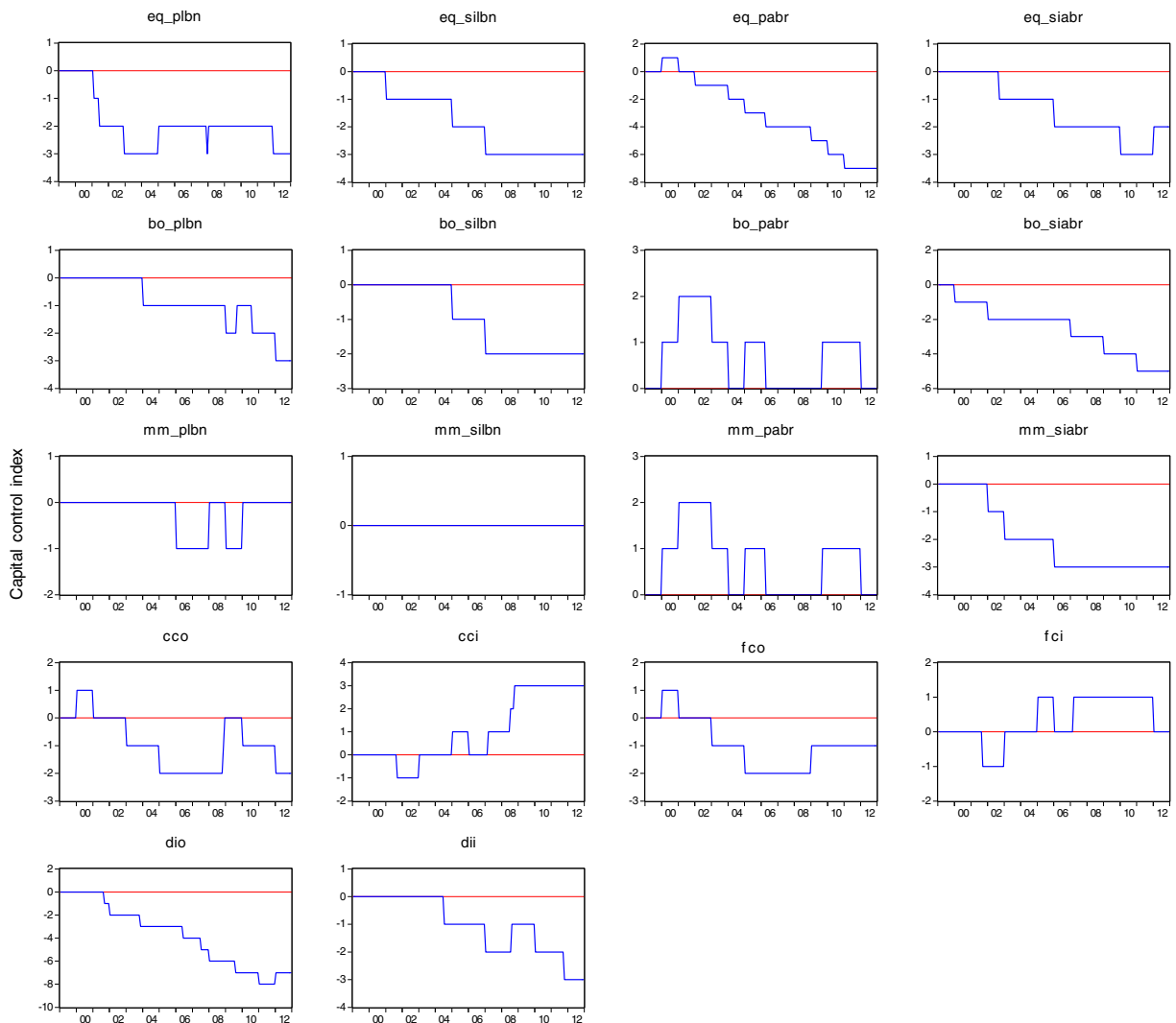
## 5. Conclusion

We create a capital control index data set to measure the on-going liberalization of China's capital account. The data set contains two groups of indices — *de jure* and hybrid indices measuring intensity changes in China's capital controls. As in Schindler (2009), we compile control indices of different asset categories in gross capital flows, capital inflows, and outflows, as well as controls on residents and nonresidents, respectively (Fig. 7).

The *de jure* indices are quantitatively coded according to information extracted from the IMF's *Annual Report on Exchange Arrangement and Exchange Restrictions* (AREAER) and supplementary materials from other sources. In addition, we contribute to the literature by constructing new hybrid indices of China's capital controls, compiled by a weighted-average of the *de jure* indices with the share of an asset subcategory in the total value of China's capital account categories.

Both the *de jure* and hybrid indices capture the overall liberalization of China's capital account restrictions after 2000, albeit at an uneven pace for inflows versus outflows and short-term versus long-term capital flows. In contrast to other indices that show little variation in China's capital controls, our indices reflect China's overall capital account liberalization process and show reasonable variation of intensity changes in China's capital controls. In addition, our indices contain little subjective judgment in that we code policy changes by adding (subtracting) 1 if there is a tightening (relaxation) of controls without trying to judge the magnitude of the change.

Our index data set is based on the foundation laid by many papers in the literature, including Chinn and Ito (2008); Quinn (1997) and Schindler (2009), in particular. We strive to integrate their strength and mitigate their drawbacks when constructing



**Fig. 7.** *De jure* indices for nonresidents' purchase and sale of domestic assets and residents purchase and sales of foreign assets. Source: Data that are generated in this paper. *plbn*: the purchase locally by nonresidents; *silbn*: the sale or issue locally by nonresidents; *pabr*: the purchase abroad by residents; *siabr*: the sale or issue abroad by residents; *eq*: equity securities; *bo*: bonds or other debt securities; *mm*: money market instruments; *cco*: commercial credits by residents to non-residents; *cci*: the commercial credits to residents from nonresidents; *fco*: financial credits by residents to nonresidents; *fci*: financial credits to residents from non-residents; *dio*: the outward direct investment; *dii*: the inward direct investment.

our indices. However, some caveats are inevitable. Listed below are three drawbacks associated with our indices. First, like other indices measuring the intensity of capital controls, our coding approach ignores the information that differentiates the magnitude of policy changes. Second, for our *de jure* indices, we do not differentiate the relative importance of each asset category when we aggregate the sub-indices. We do however create hybrid indices to tackle this issue. Third, when we create the hybrid indices, our choice of a four-year window is arguably arbitrary.<sup>18</sup>

Our indices are on a monthly frequency. Due to the availability of the AREAER data, the data set is relatively limited in its time span, from 1999 to 2012; and we cover only the case of China. Nonetheless, data updating and research projects to create indices for other countries would be easy to carry out as our coding mechanism and compilation approach are compatible with all other countries.

The liberalization process of China's capital account is still ongoing and numerous steps in policy and regulation changes designated to further open up the Chinese capital account and promote renminbi internationalization have continued to emerge since 2012. For instance, the establishment of the Shanghai Free Trade Zone (FTZ) in September 2013 and FTZs in Guangdong, Tianjin, and Fujian in April 2015 experiments with an economic environment of virtually full capital account convertibility in these controlled regions. China has also made a trial run to deepen the openness of domestic financial markets by creating the Shanghai–Hong Kong stock market

<sup>18</sup> In addition to 4-year window, we tried 3, 5, and 6-year moving average windows, as well as other alternative weights, e.g. contemporaneous 4-year average, the average of entire sample period 1999–2012. These indices are similar to the ones in the paper and are available from authors.

link, allowing Hong Kong and mainland Chinese investors to invest in each other's stock market. Other major liberalization measures include QDII2, Mutual Fund Connect, and further development of the offshore renminbi market (CHN) and dim sum bond markets. Should we update our capital control index data set in the future, we shall include these steps in policy changes in the data set.

## Acknowledgments

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## Appendix A

List of detailed capital control measures imposed by the Chinese government during

### 1) 1997 Asian financial crisis

- Regulation to stricter procedure on inspection, verification and the settlement of foreign exchange for payments of Chinese imports (SAFE, June, 1998)
- Detail measures on exports inspection, value verification, and collection of foreign exchange proceeds from exports (SAFE, June, 1998)
- Government directives on organizing special government offices to fight illegal foreign exchange purchases (PBoC, MOFTEC, and SAFE, July, 1998)
- Detailed regulation code on punishing illegal purchasing and selling foreign exchange (SAFE, August, 1998)
- Reinstated foreign debt management policies and prohibited purchase foreign exchange from SAFE for early repayment of foreign loans (SAFE, August, 1998)
- Prohibited certain renminbi loan to Chinese enterprises with the intention to purchase foreign exchange for early repayment of foreign loans (PBoC and SAFE, August, 1998)
- The Supreme People's court outline law code for trials related to illegal foreign exchange dealings (People's Supreme Court, August, 1998)
- Administration directive to address new situations and problems related to strengthening the administration of foreign exchange under capital account (SAFE, September 1998)
- Force close unregistered currency swap centers and directly administrate 35 registered currency swap centers by SAFE (PBoC and SAFE, October, 1998)
- Amended criminal code to including illegal foreign exchange purchasing as punishable economic crimes (the Standing Committee of NPC, October, 1998)
- Regulation on banning bank transfer of foreign exchange between enterprise and individual and individual to individual (PBoC, November, 1998)
- In addition to the measures listed above, the Chinese government also tightened up the re-enforcement of some existing control measures that were there but only lightly or sporadically enforced prior to the financial crisis.

### 2) 2008 global financial crisis

- Notice on issues concerning foreign exchange settlement or transfer of prepayment for some export firms (SAFE, July, 2008)
- Notice on the implement of measures for online inspection of exports foreign exchange proceeds collection and settlement procedure to reinforce the verification on authenticity and coherence for exports and foreign exchange collection and settlement (SAFE, the Ministry of Commerce, and the General Administration of Customs, July, 2008)
- Notice of SAFE for related issues to implement measures for online inspection of exports foreign exchange collection and settlement (SAFE, July, 2008)
- Regulation on foreign invested enterprises (FIE) to administrate their foreign exchange, facilitate the verification, payment, and settlement of foreign exchange capital of FIE, and standardize the some business operation of foreign-exchange banks and accounting firms (SAFE, August, 2008)
- Notice of SAFE on the execution procedure for online inspection of exports foreign exchange collection and settlement (SAFE, September, 2008)
- Circular on relevant issues concerning the administration of registration for deferred payments of importing firms (SAFE, September, 2008)
- Regulation on managing the registration system for foreign debts under firm's trade account to establish a comprehensive system of government supervision and management for foreign debt assets and regulate the cross-border trade flows and overall balance of payments (SAFE, October, 2008)
- Notice to implement a government registration and management system for trade credit (prepayments of imports), in order to establish a comprehensive system of statistical supervision and management for foreign obligatory right, regulating cross-border trade flows (SAFE, November, 2008)



- A parallel notice on a registration and management system of trade credit (deferred payments of exports), in order to improve the statistical supervision of foreign assets, regulate the registration management of foreign obligatory right under the trade account of domestic enterprises, and protect the legal right of exporting enterprises, to assure the authenticity and coherence of cross-border trade and related trade flows (SAFE, November, 2008)
- Notice on improving the registration and management system of foreign debts under firm's merchandise trade account to better withstand the negative impact of global financial crisis and promote stable economic growth (December, 2008)
- Currency swaps based on the RMB between the PBoC and Bank of Korea and other emerging economies (PBoC and SAFE, December 2008)

## Appendix B

Listed below are samples of China's rules, regulations and government website that we referred and cross-checked when compiling the *de jure* data.

- Foreign Exchange Regulations of the PBC (State Council Decree No. 193)
- Foreign Exchange Regulations of the PBC (State Council Decree No. 532)
- Border Trade Foreign Exchange Administration Procedures (Hui Fa [2003] No. 113)
- PBC Notice on Issues Related to the Conducting of Personal Renminbi Business by China Mainland Banks with Hong Kong and Macao Banks (Yin Fa [2004] No. 254)
- Interim Measures for the Administration of Foreign Currency Cash Taken into and out of the Customs Territory (Hui Fa [2003] No. 102)
- Administrative Measures for the Renminbi Settlement of Cross-Border Trade Pilot Project (People's Bank of China Announcement [2009] No. 10.
- Implementing Rules of the Administrative Measures for the Renminbi Settlement of Cross-Border Trade Pilot Project (Yin Fa [2009] No. 212)
- Administrative Measures for the Renminbi Settlement of Outward Foreign Direct Investment Pilot Project (People's Bank of China Announcement [2011] No. 1)
- Administrative Measures for the Renminbi Settlement of Inward Foreign Direct Investment (People's Bank of China Announcement [2011] No. 23)
- Notice Concerning Matters Relating to Utilization if to Invest Renminbi in the Interbank Bond Market by the Three Types of Off-shore Renminbi Clearing Bank Institutions (Yin Fa [2010] No. 217)
- Measures on the Pilot Domestic Securities Investment by Fund Management Company and Securities Company RMB Qualified Institutional Investors (CSRC, PBC, SAFE Decree No. 76)
- The People's Bank of China (PBoC), [www.pbc.gov.cn](http://www.pbc.gov.cn)
- The State Administration of Foreign Exchange of China (SAFE), [www.safe.gov.cn](http://www.safe.gov.cn)
- National Development and Reform Commission of China, [www.sdpc.gov.cn/](http://www.sdpc.gov.cn/)
- Ministry of Commerce of China, [www.mofcom.gov.cn](http://www.mofcom.gov.cn)

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