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Do Inflows or Outflows Dominate? Global Implications of Capital Account Liberalization in China

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Strategy, Policy, and Review Department (SPR)

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Abstract

This paper assesses the implications of Chinese capital account liberalization for capital flows. Stylized facts from capital account liberalization in advanced and large emerging market economies illustrate that capital account liberalization has historically generated large *gross* capital in- and outflows, but the direction of *net* flows has depended on many factors. An econometric portfolio allocation model finds that capital controls significantly dampen cross-border portfolio asset holdings. The model also suggests that capital account liberalization in China may trigger net portfolio outflows as large domestic savings seek to diversify abroad.

JEL Classification Numbers: F2; F3; F4; F6; G1

Keywords: Capital account liberalization; portfolio flows; capital flows; financial development

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I. INTRODUCTION

China's 12th Five-Year Plan pledges to accelerate capital account liberalization. This would be a major event in the global financial architecture. Despite steps to ease restrictions and some circumvention over the past decade, much of China's capital account and, especially, portfolio investment flows remain severely restricted—as can be seen from various cross-country indexes of capital controls (Bayoumi and Sabroski, 2012, Table 2).¹ Accordingly, this paper looks into the potential consequences of a full opening of China's capital markets. We do this by estimating an empirical model that relates the level of gross bilateral international assets and liabilities between a wide range of countries to fundamentals, including the level of capital controls. We then use the results to infer the potential portfolio in- and outflows that might follow liberalization of the Chinese capital account. We find that *gross* flows both into and out of China would be substantial and that the likely direction of *net* flows would be outflows. Our estimated orders of magnitude would imply significant repercussions for both Chinese and global financial markets.²

Previous authors have also estimated potential capital flows if China liberalizes its capital account and have found broadly similar results. In a study that this paper builds on but that is limited to U.S. financial markets, Forbes (2010) estimates that capital account opening could raise Chinese exposures to U.S. equity markets by almost half. Based on the experience of 37 developing and emerging markets that liberalized since the mid-1990s, Sedik and Sun (2012) estimate that inflows and outflows could rise by 2–3¼ percentage points of GDP between 2012 and 2016, and outflows would increase by more than inflows. Based on a dynamic panel estimation of portfolio and FDI asset and liability flows in advanced or emerging markets, He and others (2012) estimate that capital account opening could generate a stock adjustment in international portfolio assets and liabilities of 21 and 16 percent of GDP, respectively, by 2020 and in direct investment assets and liabilities of 22 and 11 percent of GDP, respectively.³

The following section describes the main Chinese capital controls. Section III recaps briefly the experience of other advanced and emerging market countries that have opened their

¹That said, realization cannot be assured. A pledge for full convertibility by 2000 was made in 1993 but its implementation was delayed after the Asian financial crisis.

²Of course, our exercise implicitly assumes that inferences drawn from our sample are applicable to China. Also, ours is a partial equilibrium exercise. The existing set of very large and complementary distortions makes it difficult to contemplate removal of any one distortion in particular. Effects of the order of magnitude projected here could well generate offsetting general equilibrium effects that dampen the overall impact of liberalization but would go beyond the scope of this paper.

³He and others (2012) discuss the difficulties in identifying the determinants of other investment flows, where inconclusive results are found based on panel regression analysis.

capital accounts since the 1970s. Section IV presents the econometric results and Section V concludes with some implications of the econometric results.

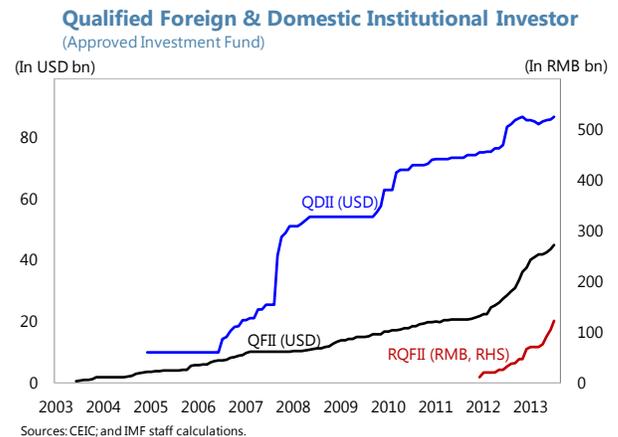
II. BACKGROUND: RESTRICTIONS IN CHINA

China has gradually been opening its capital account, but capital flows remain subject to considerable restrictions. There are at least three categorizations of capital account openness: Quinn (2003) for capital and current accounts; Chinn and Ito (2008) for FDI and non-FDI financial accounts; and Schindler (2009) for detailed capital account categories. Schindler (2009) has proposed a classification of capital controls based on the main categories of capital flows in the balance of payments: FDI, equity and bond flows; flows through collective investment vehicles (e.g., ETFs or mutual funds); and foreign borrowing. Of course, these measures are indices of the existence of restrictions, not their intensity. They would not capture a relaxation (as opposed to elimination) of existing controls, e.g., by increasing quotas. Bearing in mind this caveat, every category of flow—whether by residents or nonresidents, inflows or outflows—retains some approval requirement or quota in China (Table 1). By comparison with other emerging markets, the existence of restrictions remain pervasive (Table 2). Specifically:

- *FDI*. Inward FDI and its liquidation remain subject to approval requirements in several areas (Table 1).
- *Portfolio investment* is controlled by quotas. Inward investment is channeled through Qualified Foreign Institutional Investors (QFII), subject to a 3-month lock-in period for most shares, and an aggregate ceiling of US\$150 billion (since July 2013). In 2011, an R-QFII scheme was introduced that allows qualified firms to invest offshore renminbi back into China, subject to an overall ceiling that was raised to renminbi 270 billion by end-2012. Outward portfolio investment—for foreign securities purchased by residents—is channeled through Qualified Domestic Institutional

		Capital account restrictions										
		China	Malaysia	Korea	Brazil	India	Poland	Australia	Russia	Indonesia	Turkey	
SCHINDLER financial account restrictions (2010) 1/												
	Overall inflow restrictions index	Red	Yellow	Green	Yellow	Red	Red	Yellow	Yellow	Yellow	Yellow	Yellow
	Overall outflow restrictions index	Red	Yellow	Green	Yellow	Red	Red	Yellow	Yellow	Yellow	Yellow	Yellow
	Overall non-FDI financial account restrictions index	Red	Yellow	Green	Yellow	Red	Red	Yellow	Yellow	Yellow	Yellow	Yellow
QUINN capital and financial account openness (2011) 2/												
	Capital outflows/residents	Yellow	Yellow	Green	Yellow	Red	Red	Yellow	Yellow	Yellow	Yellow	Yellow
	Capital inflows/nonresidents	Yellow	Yellow	Green	Yellow	Red	Red	Yellow	Yellow	Yellow	Yellow	Yellow
CHINN-ITO openness (2010) 3/												
		Red	Yellow	Green	Yellow	Red	Red	Yellow	Yellow	Yellow	Yellow	Yellow

Source: Schindler (2009); Quinn (1997); Chinn and Ito (2007).
 1/ Includes ratings for FDI which are not shown here. 1 indicates a restriction that goes beyond registration and notification requirements.
 2/ Quinn (1997) index takes into account intensity of restrictions on a scale of 0, 0.5, 1, 1.5, and 2. Capital restrictions include FDI and nonFDI.
 3/ Chinn-Ito (2007) index is principal component of four 0-1 subindices on average over 5 years. Index refers to current account and financial account restrictions.



Investors (QDII), subject to institution-specific ceilings that amounted to US\$86 billion by end-2012. Cross-border issuance of securities requires approval.

- *Other investment.* Foreign borrowing is subject to a ceiling (for short-term borrowing) or approval requirements (for long-term borrowing), but lending abroad is largely unrestricted. The holding of cross-border accounts requires SAFE approval.

Despite these restrictions, there are substantial non-FDI capital flows into and out of China. In particular, “other” investment flows are similar in absolute magnitude to those of a fully liberalized country such as Australia. These other investment flows include the buildup or drawdown of foreign currency deposits at domestic banks. These deposits have tended to fluctuate with exchange rate expectations (Ma and McCauley, 2003) as state-owned enterprises have adjusted their profit repatriation. Many capital flows also pass through the current account. Li (2008) estimated capital flows through mis-invoicing of trade flows on the order of 5.5–5.9 percent of GDP in 2007.

As China’s authorities speed up steps to open the capital account, historical experience in other countries serves as caution. Capital account liberalization has historically often been followed by exchange rate or banking crises (Box 1). That said, the link is not always as close as is sometimes portrayed. For example, the financial crises in the U.K. and Japan occurred about a decade after capital account liberalization and that in Denmark two decades later.

Several authors have explored the preconditions for “safe” capital account liberalization and have concluded that they are not yet fulfilled in China. Since Fischer (1998), the preconditions for successful capital account liberalization have generally been accepted to be a stable macroeconomic environment, a sound banking system, and developed financial markets. Already in 2001, Groomberg (2001) listed weak SOEs and banks as well as underdeveloped capital markets as risk factors in capital account liberalization for China.⁴ Most recently, Lardy (2011) also argued that the preconditions for

⁴However, Groomberg (2001) also called for capital account liberalization to provide a new reform impulse.

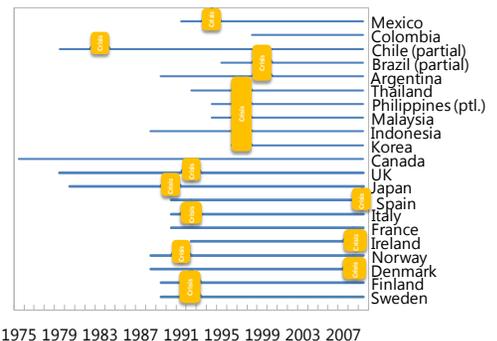
Capital flows, average 2005-2010 (percent of GDP)

	China	Malaysia	Korea	Brazil	India	Poland	Australia	Russia	Indonesia	Turkey
Financial account	3.0	8.0	0.0	2.9	4.2	5.4	-5.1	0.8	0.9	5.3
Overall non-FDI capital account	-0.2	6.5	1.3	1.6	3.2	3.5	-3.9	1.0	0.0	2.9
FDI	3.2	1.5	-1.4	1.3	1.0	1.9	-1.3	-0.2	0.9	2.4
Inflow	4.0	4.7	0.3	2.1	2.2	3.0	1.3	3.0	1.8	-0.3
Outflow	-0.8	3.2	-1.7	-0.8	-1.2	-1.1	2.6	3.2	-0.8	1.0
Portfolio investment	-0.1	0.4	0.8	1.8	1.3	1.3	-4.2	0.3	1.3	0.0
Average equity	0.5	2.3	-1.9	1.2	...	...	0.8	-0.1	...	0.0
Average bond	-0.5	-0.5	1.8	0.7	...	...	-5.0	0.4	...	0.4
Other investment	-0.1	6.2	0.6	-0.3	1.9	2.2	0.3	0.7	-1.3	2.9
Average financial credit	-0.1	6.2	0.6	-0.3	1.9	2.2	0.3	0.7	-1.3	2.9
Liabilities	1.8	1.1	1.5	0.9	1.0	-0.1	-1.9	-3.6	...	2.9
Assets	-1.9	4.9	-0.9	-1.1	0.9	2.3	2.2	4.3	...	0.0
International investment position: Portfolio and other investment										
Assets	15	30	21	6	1	9	47	17	4	10
Liabilities	16	64	60	33	24	54	95	36	32	46

Source: Haver Analytics; IMF IFS; staff estimates.

Note: Colours reflect the quartile of absolute values in each row, with red the lowest quartile and yellow the highest quartile. Data for Australia, Russia, Malaysia based on BPM6. For all others based on BPM5.

The next crisis: Financial or exchange rate crisis following capital account liberalization



1975 1979 1983 1987 1991 1995 1999 2003 2007

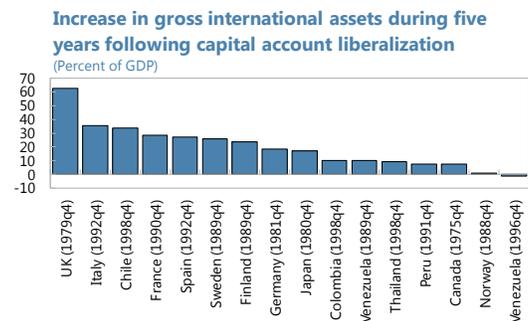
Sources: Kaminsky and Schmukler (2003), IMF (2012).

“safe” capital account liberalization have not yet been fulfilled: without interest rate liberalization it is difficult to assess the soundness of the financial system; parts of the Chinese financial system, and especially the corporate bond market, are profoundly underdeveloped; and the exchange rate remains undervalued. Whether conditions are in place for smooth capital account opening, is a question that is beyond the scope of this paper.

III. STYLIZED FACTS: CAPITAL ACCOUNT LIBERALIZATION EPISODES SINCE THE 1970S

Kaminsky and Schmukler (2003) have compiled a database that dates full or partial capital account, financial sector, and stock market liberalization. These dates are used to compare changes in portfolio and other investment capital flows (in percent of GDP) before and after liberalization.

Following liberalization, *gross* capital flows generally increased substantially. For example, capital account liberalization was followed by a buildup of gross international assets over the subsequent five years of some 60 percent of GDP in the United Kingdom (1979) and about half that amount in Chile (1992) and Italy (1992).



Sources: IMF IFS.

Note: Data for UK only available for year after capital account liberalization.

The direction of *net* capital flows after liberalization, however, depended on many factors.

Prasad and Rajan (2008) point to a plethora of nonlinearities and threshold effects that make predictions about the eventual impact of capital account liberalization unreliable. For example, capital account liberalization was followed by substantial net portfolio and other investment outflows in Sweden, Finland, and Spain, but inflows in Denmark, Chile, and Colombia.

Here we focus on four factors that could determine net flows: the domestic and global business cycle, the sequencing of ancillary reforms, and growth prospects. For each country a bilateral trade-weighted average real GDP growth of 12 of the largest economies is defined as “world” growth.⁵ For both domestic and world real GDP growth, business cycle peaks and troughs at least four quarters apart are identified using the algorithm of Harding and Pagan (2002). A country’s or the world’s position in the business cycle is described by a variable that is the fraction of an upswing underway (positive) or the fraction of a downswing

⁵These economies are the U.S., Japan, the U.K., Germany, France, Italy, Canada, Norway, Sweden, Finland, Spain, Korea, and Argentina. These are the countries for which a continuous time series is available since the 1970s.

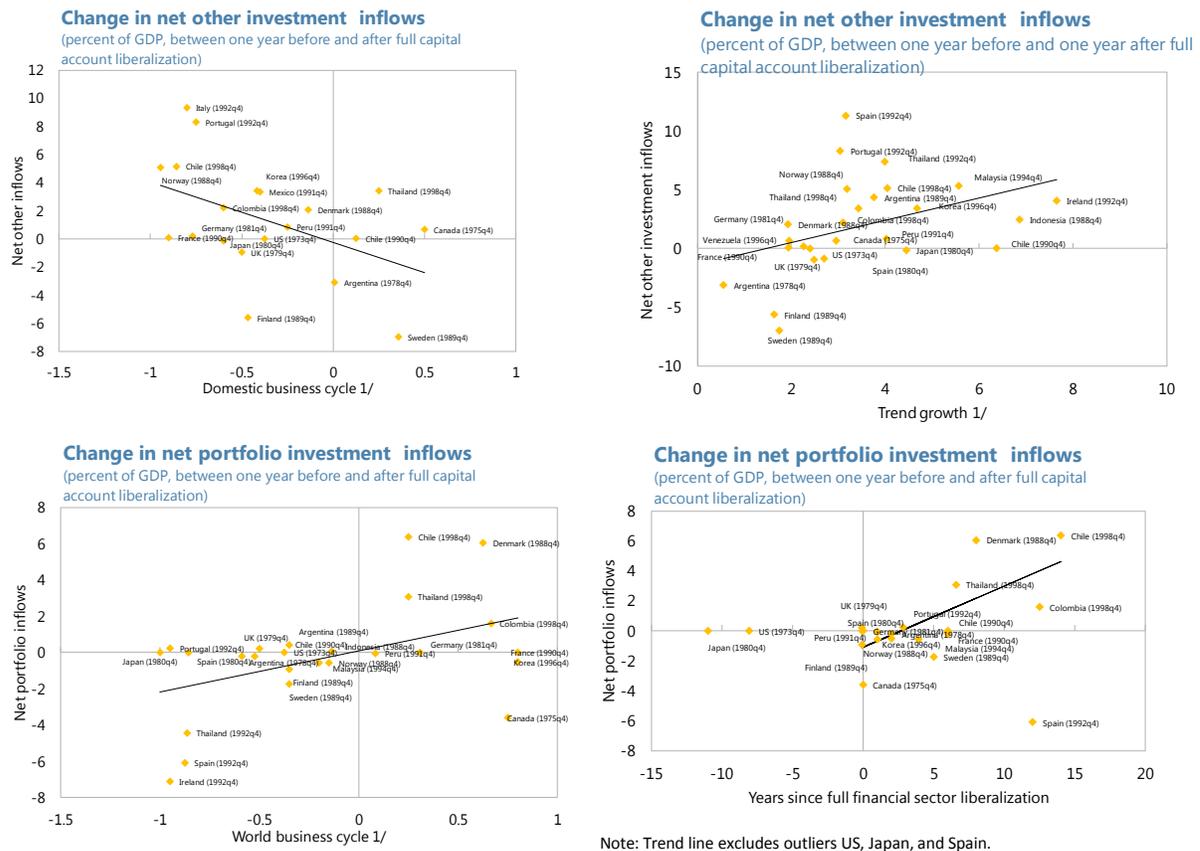
underway (negative).⁶ Since data on both business cycles and capital flows is only available for some 16–21 countries, regression estimation is of doubtful value. However, there are a few correlations that are noticeable in scatter plots; especially for the relationship between net other investment flows and domestic growth and the relationship between portfolio investment flows and world growth and financial sector liberalization.

- *Domestic business cycle:* Figure 1a shows the business cycle position at the time of capital account liberalization against the change in net other investment inflows (in percent of GDP) between the year following liberalization and the year preceding it. Typically, the more advanced a domestic upswing, the greater the net outflows.⁷ This may have reflected residents seeking to diversify their domestic financial assets in upswings and borrowing in downswings.
- *Growth prospects:* Figure 1b shows the correlation between average annual growth in the ten years following capital account liberalization (a proxy for growth prospects) and the change in net other investment inflows between the years following and preceding liberalization. Net inflows increased more in countries with higher growth prospects.

⁶A positive business cycle variable indicates the share of quarters since the last business cycle *trough* in the total number of quarters between the last trough and next peak. A negative business cycle variable indicates the share of quarters since the last business cycle *peak* in the total number of quarters between the last peak and next trough.

⁷In contrast, the relationship between net inflows and the domestic business cycle seems to be nonlinear. There have been net outflows both when the domestic business cycle emerged from a trough and when it had reached a peak.

Figure 1. Change in Net Financial Flows and Business Cycle at Time of Capital Account Liberalization



1/Business cycle defined as share of real GDP growth upturn completed from trough to peak (+) or share of downturn completed from peak to trough (-). Peak and trough dated using Harding-Pagan (2002) algorithm. Timing of financial sector and capital account liberalization as in Kaminsky and Schmukler (2003).
2/Trend growth is defined as real GDP growth over the ten years following capital account liberalization.

- World business cycle:** Figure 1c shows a similar plot to Figure 1a, of the world business cycle position at the time of capital account liberalization and the change in net portfolio investment inflows. A more advanced upswing in the *world* business cycle typically increased net portfolio inflows. This may reflect inflows from nonresidents seeking to diversify their securities exposures when the global business growth is buoyant and investor sentiment sanguine.
- Financial sector liberalization:** Figure 1d plots the number of years from financial sector liberalization to capital account liberalization (both dated as in Kaminsky and Schmukler, 2003) against the change in net inflows of portfolio investment (in percent of GDP) in the year following liberalization and the year preceding it. In general, the more recent financial repression, the greater net outflows in portfolio investment tended to be. In contrast, in Japan and the United States, where capital account liberalization preceded financial sector liberalization by several years, net inflows were negligible after capital account liberalization.

The experiences of capital account liberalization in the U.K. and Japan in 1979 and 1980, respectively, serve as contrasting examples. The U.K. (Box 2) liberalized its capital account in 1979 and removed remaining financial sector restrictions shortly thereafter. The liberalization was followed by substantial net capital outflows in a stock adjustment that has been estimated at up to 10 percent of GDP (Taylor and Artis, 1989).⁸ Following two decades of alternating liberalizing and restricting measures, Japan (Box 3) eventually liberalized its capital account in 1980 but the financial sector remained heavily restricted. Capital account liberalization was initially not followed by any significant net capital flows. Financial sector liberalization only began in 1985. (Note that despite the different timing of the Japanese and U.K. financial sector liberalizations, both countries experienced a credit boom in the late 1980s and a housing market crash in 1989–90.)

IV. ESTIMATING THE POSSIBLE IMPACT OF CAPITAL ACCOUNT LIBERALIZATION

The previous section described capital flows over a short two-year window. Such short-term flows would be motivated not only by capital account liberalization but also by short-term factors such as business cycles. A long history of capital controls, however, is likely to cause a stock adjustment that may take longer than two years and is driven by structural factors such as financial market development. This is what we explore next.

The baseline regression equation is the generalized, multi-country version of that used in Forbes (2010) for the U.S. alone:⁹

$$w_{ij} = \beta_0 w_j^* + \beta_1 c_i - (\beta_2 c_{i,j} - \beta_3 c_j)$$

where w_{ij} is the share of country i 's total portfolio investment that is invested in country j , w_j^* is country j 's share in the world market portfolio, c_i are the marginal cost of investing in country i , c_{ij} are the marginal cost of an investor in country i investing in country j , and c_j are the marginal cost of investing in country j . The first term on the right hand side controls for the share of country j in the global stock market portfolio. The second term captures the fact that higher cost of investing in country i increase the share of portfolio investment abroad, in any country j .

⁸But note that Bank of England (1981) estimated the stock adjustment at only 0.2 percent of GDP.

⁹Specifically, the regression equation is based on equation (9) of Forbes (2010).

The last term in brackets captures the notion that country i will invest a greater share of its portfolio assets in country j *than the world market share* if country i 's cost of investing in j are less than world average cost of investing in j .¹⁰

This regression specification is similar to that of Bertaut and Kole (2004) and Lane and Milesi-Ferretti (2008) but expanded to focus on capital controls which is a core variable of interest here. Capital controls are not included in the regressions reported in Bertaut and Kole (2004), only source country controls are included in the regressions reported in Lane and Milesi-Ferretti (2008) and only destination country controls in Guo (2011).

The focus on bilateral exposures mitigates some of the concerns about reverse causality with which previous studies have struggled.¹¹ The independent country-level variables are unlikely to be driven by the dependent variable of diversified bilateral exposures to investment partner countries. The size of source country and destination country financial markets are the exception. Since they include foreign holdings, they could in principle be biased by reverse causality. We therefore include an instrumental variables regression as robustness check. Forbes (2010) highlights other econometric challenges of the regression specification above: persistence in the dependent variable that is defined as a stock variable—and hence likely autocorrelation in the error term—and heteroskedasticity in the variance across country pairs. Following Forbes, an FGLS estimation is used that allows for heteroskedasticity and country-pair-specific autocorrelation in the error term with a first-order autoregressive process.

The dependent variable, the share of country i 's total portfolio investment that is invested in country j , is calculated using bilateral portfolio assets (equity and debt separately) reported in the IMF's CPIS database as a share of country i 's total securities portfolio. Unfortunately, China does not report CPIS data. Constrained by this lack of data, we assume that international experience over the decade is still a relevant—even if only approximate—benchmark for China. For equities, country i 's total securities portfolio consists of domestic stock market capitalization as reported in the World Bank's Global Financial Development Database plus all international equity assets of country i minus country i 's international equity liabilities. Similarly, for debt, the size of the domestic holdings is defined as outstanding domestic private and public debt securities as reported in the World Bank's

¹⁰We have also used a log specification to confirm robustness. The regression results were broadly similar. The implications for China were also qualitatively similar in that they yielded a net outflow. However, this outflow was much smaller. Using coefficient estimates from the log regression amounted to applying a percentage to the share of foreign Chinese asset holdings in their total portfolio assets. This share is currently much smaller than in countries with comparably sized capital markets and nets to about 0. Applying a percentage to these small numbers naturally yields much smaller projections. However, it fails to capture the discrete jump in levels that has typically followed past liberalizations.

¹¹Sedik and Sun (2012) and He and others (2012), who estimate regression of capital flows on various country-level macroeconomic variables, address possible endogeneity by estimating GMM models.

Global Financial Development Database.¹² Although data on bilateral international equity and bond assets are available to 2011, the broader cross-country financial development indicators are only available to 2010.¹³

The cost of investing in any country depend on the depth and size of financial markets, on capital controls, on information asymmetries, and return differentials and correlations. In line with Forbes (2010) but updating the data to 2010, the following variables are included to capture the cost of investing:¹⁴

- *Financial market size:* A larger financial market is likely to be a more liquid one and hence reduce the cost of investing. For regressions on equity assets, stock market capitalization in percent of GDP from the World Bank's Global Financial Development Database is used and for regressions on bond assets, outstanding domestic public and private debt securities in percent of GDP from the same database are used.
- *Capital controls:* Capital controls can raise the cost of investing cross-border both for residents and nonresidents. Schindler (2009) develops a detailed categorization of equity and bond inflow and outflow restrictions. Using the same methodology, his dataset is updated to 2011.
- *Information asymmetries:* Existing trade or other nonfinancial ties and greater proximity are likely to reduce information asymmetries and reduce the cost of investment between any country pair. Such ties are proxied by bilateral trade (exports and imports) in percent of GDP using data from the IMF's DOTS database. The population-weighted geodesic distance between the largest cities of both partner countries is available from Mayer and Zignano (2011).
- *Return differentials:* A greater relative return in the host market makes portfolio investment in the host country more attractive. For regressions on equity portfolio assets, the annual average of monthly stock market returns for the stock market index with the broadest coverage in 59 countries in the sample is used based on Bloomberg

¹²Extreme outliers, in particular those with greater reported international debt or equity liabilities than the total size of the domestic market, are excluded. Those countries are all small offshore financial centers.

¹³The sample is further restricted to begin in 2005 by the requirement for FGLS estimation of a strictly balanced panel. If a strictly balance panel was constructed including earlier data, several large exposures in Asia (notably of Australia, New Zealand, and Korea), Europe (notably Russia) and Latin America (notably of Mexico) would be missing.

¹⁴For a review of results in the literature for each of these variables, see Forbes (2010). Forbes (2010) used data to 2006.

data. For regressions on bond portfolio assets, the annual average 5-year sovereign bond yield for 37 countries is used based on Bloomberg data.

- *Return correlations:* Risk diversification, e.g., as measured by a minimum variance portfolio, is a key motivation for cross-border investment. Hence the bilateral correlation coefficient in monthly stock market returns or sovereign bond yields over the past three years is added as a control. Alternatively, high bilateral correlations may proxy fewer informational asymmetries.
- *Governance:* Better governance increases the transparency of investment and thus may reduce investment cost. Governance is proxied by the first standardized principle component of indicators of control of corruption, rule of law, and regulatory quality, all available from the World Bank's World Governance Indicators database.

As expected, the results confirm that international investors seek exposure to deeper financial markets and higher returns. Table 3 shows the baseline regression results for equities in columns I–II and for bonds in column IV–V. There is a concern that the bilateral holdings or the denominator in the dependent variable may be correlated with financial market size in the source and destination country, Columns III and VI show estimation results from an instrumental variables regression. For equity exposures, financial market size is instrumented with stock market value traded in percent of GDP (Column III).¹⁵ For bond exposures, financial market size is instrumented with the share of private debt in total domestic outstanding debt (Column VI).¹⁶ Table 4 tests the robustness of the results in column I and IV by removing each source and each destination country at a time and showing the range of coefficient estimates.

A few robust results stand out. First, for both asset classes, larger *source* country financial markets discourage domestic investors from investing abroad. The effect of larger *destination* market size is more complicated. Although in the baseline FGLS regressions larger destination markets attract foreign *equity* exposures, these results are not robust to our instrumental variables specification. In contrast, the counter-intuitive sign on destination *bond* market size in Columns III and IV corrects in our instrumental variables specification

¹⁵Its correlation with stock market capitalization—the measure of financial market size in the regressions for equities—is 72–76 percent (for destination and source country, respectively) whereas its correlation with the dependent variable is –4–7 percent (for destination and source country, respectively). First-stage regressions yield highly significant coefficient estimates of 0.4–0.41. We interpret this as evidence that stock market trading volume is a legitimate instrument.

¹⁶The correlation of the share of private debt with total outstanding debt—our measure of financial market size in the regressions for bonds—is 17–32 percent (for source and destination country, respectively) whereas its correlation with the dependent variable is 3–8 percent (for source and destination country, respectively). First-stage regressions yield highly significant coefficient estimates of 0.31–0.52 (for source and destination country, respectively). Again, we interpret this as evidence that the share of private debt is a legitimate instrument.

or once Japan or the U.K. are removed from the sample: Japan—despite being the second largest bond market in the world—has only half the average share of global bond holdings; the U.K.—with a bond market one-eighth the size of Japan’s—on average accounts for four times the average share of bond holdings. If *either* of these two countries is removed from the sample, the sign reverses to the expected positive sign and is significant (Table 4).¹⁷ Second, higher returns in the destination country (and, for bonds, lower returns at home) also encourage greater exposures of domestic investors in foreign markets. Being significantly the opposite of the expected sign, the correlation in bond yields is clearly picking up effects other than diversification; this could reflect correlation being another proxy for information cost. Third, the other control variables have the expected signs: cross-border portfolio exposures are greater if home and host country have better governance and if there are greater other bilateral ties (greater trade and proximity). In general, bond exposures are more responsive than equity exposures to returns, source country financial market depth, destination country governance, and other bilateral ties.¹⁸

Capital controls both in the source and the destination country significantly reduce cross-border portfolio exposures. In general, equity exposures appear less sensitive to capital controls than bond exposures and less sensitive to destination country controls than source country controls. For equity exposures, the coefficients on capital controls on equity *outflows* from the source country and equity *inflows* into the destination country (Column II in Table 3) are somewhat stronger than a wider measure of controls that averages in- and outflows (Column I in Table 3).

What if investors, instead of separately deciding on bonds and equities portfolios, view equities and bonds as substitutes in their portfolio decision? Table 5 shows the results for the allocation of portfolio assets in total (bonds plus equities). Both the control variables and capital controls retain their significance and broadly similar magnitudes to those in the regression for bond exposures. However, returns in source and destination country are too poorly measured as simple averages to generate robust and significant coefficient estimates.

The results are broadly robust to including country dummies, a broader or narrower sample, or wider measures of capital controls. Columns I and VI of Table 6 show the baseline regressions of Table 3 as reference. Not surprisingly, adding country fixed effects (Columns II and VII) removes the significance of some of the country-level explanatory variables, including capital controls for both equities and bonds. During the sample period 2005–10,

¹⁷In addition, the effect of destination country controls on equity exposures are also not robust to removing the U.K. from the sample.

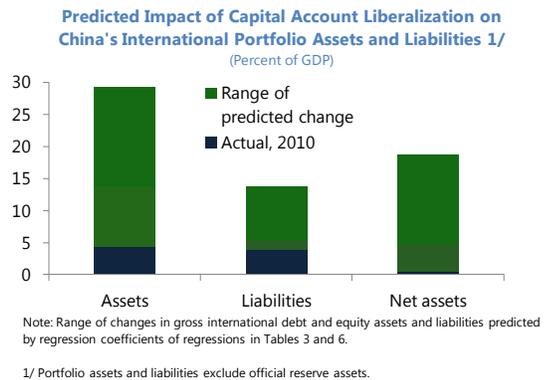
¹⁸A standard goodness of fit measure is not readily available for an FGLS regression. The Wald statistic testing joint significance of all coefficients is highly significant in all regressions. In addition, the correlation between the predicted and the actual values of the dependent variable is 17 percent for the regression in column I of Table 3 and 14 percent for the regression in column III of Table 3.

capital controls were mostly unchanged. As a result, their effect is absorbed by country fixed effects. Stock market prices and sovereign bond yields are only available for a subsample of 59 and 37 countries, respectively. Columns III and VIII of Table 6 exclude assets returns and correlations and show results for the resulting larger sample. In this larger sample, the effect of restrictions on bond and equity flows shrink in magnitude but remain significant. Replacing of the measure of capital controls in Schindler (2009) with that of capital account openness as in Chinn and Ito (2008) confirms that capital account openness increases bilateral exposures (except for source country controls in equity markets, Columns IV and IX). Finally, the two remaining large countries with heavily restricted capital accounts are China and India. Results excluding them—and Hong Kong SAR as gateway for investment in and from China—are shown in Columns V and X of Table 6. The coefficient estimates on capital controls remain significant and negative although they fall somewhat for equity exposures.

V. IMPLICATIONS FOR CHINA AND CONCLUSIONS

Using the coefficient estimates of the regressions above, one can speculate about the effects of Chinese capital account liberalization on the accumulation of foreign portfolio assets and liabilities. This speculation is necessarily partial-equilibrium. It does not take into account other changes in the macroeconomic environment that would occur as the capital account is opened: changes in interest rates domestically and abroad; structural changes in financial markets and institutions or governance; offsetting other investment flows; or offsetting changes in reserve accumulation policy.

The magnitude of the predicted stock adjustment in gross exposures and the resulting net flows is subject to substantial uncertainty, depending on the underlying regression specification. For example, applying the coefficient estimates on capital controls of Columns I through V of Table 3 and Columns III, V, VIII, and X of Table 6 to data for 2010 yields a wide range of estimates of counterfactual stock adjustments in China's international portfolio assets and liabilities had there been no capital controls.¹⁹ These estimates suggest that capital account liberalization may be followed by a stock adjustment of *Chinese assets abroad* on the order of 15–25 percent of GDP and a smaller stock adjustment for *foreign assets in China* on the order of 2–10 percent of GDP.

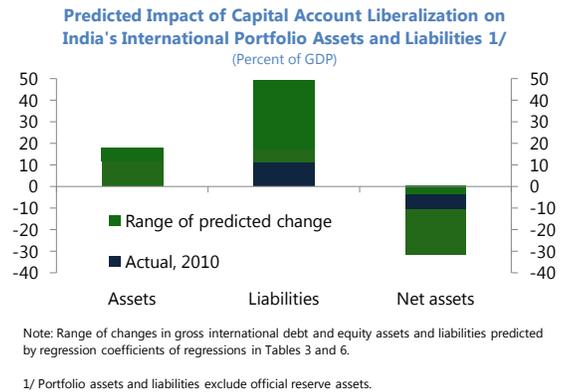


¹⁹The calculation is done by multiplying the coefficient estimate with the assumed change in capital controls. This yields the predicted change in each source country's holdings in percent of its total market size. Multiplying by source country market size and adding across source countries yields the total change in exposures in the counterfactual scenario compared with the actual 2010 data.

This would imply a net accumulation of Chinese net international assets of 11–18 percent of GDP (Table 7). While the magnitudes differ, the direction is in line with that estimated by He and others (2012) and Sendik and Sun (2012).

One concern with these estimates is that the size of the Chinese financial markets may be overstated by aggregate market capitalization and outstanding debt. Nontradable shares account for about one quarter of equity market capitalization. In the bond market, bond market debt may have substituted for bank lending since almost half of the outstanding bond market debt is held by banks. Once equity and bond market size is adjusted for these two factors, the predicted net accumulation of portfolio assets would narrow to 4–8 percent of GDP.

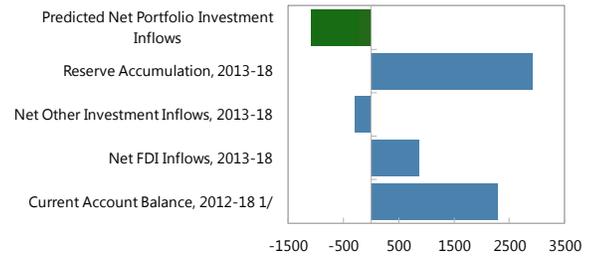
A similar thought experiment can be conducted for India, the other large economy with extensive capital account restrictions. By all of the three widely used capital account openness measures (see Section I), India's capital account restrictions are the same as China's. However, the regression equations suggest that a capital account opening may lead to more balanced gross flows, with possibly some net inflows especially into the bond market.



The discrepancy in the effect on Chinese and Indian *assets* abroad reflects the different size of existing total portfolio assets that could potentially be diversified abroad by domestic investors. China's stock market capitalization was the second largest in the sample in 2010 and its outstanding debt the sixth largest. Indian bond and stock market sizes were about one quarter those of their Chinese equivalent. Hence, if Indian investors diversify the same fraction of their holdings abroad as Chinese investors, their reallocation accounts for much smaller nominal amounts (although of similar orders of magnitude in percent of GDP because Indian GDP was also about one quarter that of China's in 2010). The discrepancy in the effect on Indian and Chinese *liabilities* to foreigners reflects the smaller size of the Indian economy: since Indian GDP is about one quarter that of China, similar flows triggered by capital account opening would account for about four times the share of the Indian economy compared with that of the Chinese economy.

Capital account liberalization is likely to proceed gradually. Similarly, the net outflows the model predicts for China could well be spread out over several years and, over this period, would partially offset other balance of payments inflows over the medium-term. The July 2013 World Economic Outlook Update projects a widening current account surplus to 4.1 percent of GDP by 2018 and continued net FDI inflows. As a result, reserve accumulation is expected to continue on the order of USD 580 billion per year on average over the period 2013–18. Were our predicted stock adjustment in net portfolio assets phased over a similar 5-year horizon, reserve accumulation could be reduced by up to one-third.

Projected Stock Adjustment versus Cumulative GDP, Net BOP Inflows, and Reserve Accumulation
(billions of U.S. dollars)



Sources: Authors' estimates.

1/ Current account projections assume constant real exchange rates, no additional reforms to rebalance the economy, and a global recovery.

An accumulation of 9–25 percent of GDP in international portfolio assets by Chinese residents could have significant repercussions for global asset prices. If allocated along MSCI portfolio shares, it would account for up to 3 percent of global financial markets or up to a quarter of financial markets in emerging market economies. If the Chinese authorities were to offset all or parts of these outflows by slowing reserve accumulation or reserve drawdown, yields on reserve assets could come under pressure.

Equivalents of 9.4-24.5 percent of Chinese GDP, 2010				
	Equity impact in % of stock market capitalization	Portfolio debt impact in % of outstanding portfolio debt	Total impact in % of stock and debt market size	Total impact (trillions of U.S. dollars)
MSCI global	0-1	0-1	0-1	0.6-1.5
US	0-2	1-3	1-2	0.4-1
UK	0-1	1-3	1-2	0.1-0.2
Japan	0-1	0-1	0-1	0.1-0.2
Canada	0-1	1-3	1-2	0-0.1
France	0-1	0-1	0-1	0-0.1
EM excl. China	1-5	7-23	4-10	0.6-1.5

Sources: GFSR April 2012 for 2010 market sizes;
MSCI factsheet 2013 for shares, rescaled to exclude an unspecified "Other".

Benelli (2011) estimates that a \$500 billion (some 7 percent of China's 2011 GDP) shift out of U.S. public debt into emerging market government debt could increase U.S. bond yields by 60 bps and decrease emerging market bond yields by 240 bps. Benelli's (2011) premise is that the Chinese authorities choose to reallocate their reserve holdings away from U.S. debt towards emerging market debt. A similar reallocation would be achieved if capital account liberalization in China led to gross portfolio outflows that were offset by a drawdown of official reserves. Here, the potential order of magnitude for such a reallocation is significantly larger than Benelli's (2011) thought experiment.

By opening up alternative investment opportunities for savings, capital account liberalization in China could also have important repercussions for Chinese financial markets. Interest rate regulation continues to depress returns on bank deposits, which have offered negative real returns since 2003. Alternative instruments for household savings are the stock market, "wealth management products", and the property market. The Chinese stock market remains a highly speculative investment vehicle for household savings (Mei and others, 2009). With

less volatility, residential investment has yielded significantly higher returns than deposits: year-on-year returns since 2005 have averaged 10½ percent countrywide and year-on-year price declines have thus far never lasted longer than four months before rebounding. Finally, wealth management products have generated yields substantially above regulated benchmark deposit rates—on average 2 percentage points for one-year deposits in 2012 (Barclays, 2013). As a result, by some estimates (Barclays, 2013), these products have grown sevenfold since end-2009 to RMB 7.1 trillion (15 percent of GDP) by end-2012. If households savings gained access to global financial markets, liquidity in these three domestic financial markets could shrink.

In sum, our econometric results as well as the stylized facts from past capital account liberalizations suggest three conclusions:

- Capital account opening in China will likely be followed by substantial *gross* portfolio flows as global and domestic portfolio holdings adjust.
- During the adjustment period there may be *net* outflows from both equity and bond markets as domestic investors seek to diversify large domestic savings. This is in contrast to what would be expected if, say, India opened its capital account.
- Such net outflows of portfolio investment could offset pressures for reserve accumulation from net FDI or other investment inflows or current account surpluses for several years to come.

Box 1. Country Examples of Capital Account Liberalization

There are several helpful examples of liberalizations since the 1970s that “succeeded” or contributed to subsequent crises (Rodlauer and N’Diaye (eds), 2013).

Best practice. The following factors remain relevant for smooth capital account opening.

- Implemented in an environment of macroeconomic balance, fiscal discipline and tight financial system supervision. A current account surplus helps.
- Following the textbook sequencing: short-term flows liberalized before long-term flows, inflows before outflows, and FDI before debt flows.
- Interaction with financial sector and exchange rate reform. To succeed in establishing a market based exchange rate, exchange rate flexibility needs the two-way capital flows of a liberalized capital account; financial market liberalization helps develop a yield curve for a functioning exchange rate market and avoid the buildup of domestic foreign currency mismatches.
- Even in the best of circumstances, the effect of capital account liberalization remains difficult to anticipate. Many relationships are highly nonlinear (Prasad and Rajan, 2008). For example, widely expected large and persistent net capital outflows in Israel and Sweden never materialized.

Five country examples.

- *Poland:* Pressures to finance the budget deficit forced the authorities to liberalize short-term debt flows before long-term FDI flows. However, to offset financial stability risks, intrusive bank supervision constrained flows entering through the liberalized capital account into the banking system.
- *Korea:* Korea’s capital account liberalization was sequenced in an unconventional manner, liberalizing short-term bank flows before corporate flows, portfolio flow liberalization before exchange rate liberalization and FDI liberalization. This sequencing supported large external borrowing and a buildup of foreign currency mismatches in balance sheets.
- *Turkey:* Capital account liberalization during the 1980s (completed by 1989) under fiscal dominance and an underdeveloped banking systems was followed by destabilizing capital inflows and two crises, in 1994 and 2001.
- *Israel:* Israel implemented two capital account liberalizations: a “big bang” in 1977 that was reversed within 1½ years and a gradual liberalization in 1987–2005. The “big bang” liberalization was a 50 percent devaluation and full exchange rate and capital account liberalization in the context of underdeveloped capital markets, a lack of hedging markets, and severe macroeconomic imbalances. It was followed by large inflows that subsequently reversed. Restrictions were re-imposed in 1979. The second liberalization was accompanied by macroeconomic stabilization, followed the conventional sequencing and a careful phasing by sector (beginning with foreign residents, then new immigrants, asset managers, corporates, and finally households). Approval requirements were converted into reporting requirements resulting in an important database for monitoring vulnerabilities.
- *Sweden:* Sweden liberalized bond markets first, followed by financial sector liberalization in 1985, and partial capital account deregulation beginning in 1989. Pre-1985, the financial sector was centrally planned. When bank lending was liberalized, a credit boom to satisfy pent-up demand followed, coinciding with large fiscal deficits and rising inflation. A tax change in 1991 raised the real interest rate from -1% to 4% overnight and ended the credit boom. The fixed exchange rate could not be defended absent capital controls and was allowed to float.

Box 2. U.K. Removal of Exchange Controls in 1979–80

Previous regime. While the amount of FDI flows was unrestricted, their domestic financing was restricted. Portfolio investments were confined to the offshore market.

- **Sterling-financed outward FDI** (at official exchange rates) had to improve the balance of payments.
- **Foreign borrowing-financed outward FDI** was freely allowed and subsequent profits from such FDI could be freely used to repay the foreign borrowing.
- **Foreign currency transactions** related to outward FDI not financed by foreign borrowing, to portfolio flows, and to other investment had to be channeled through the “investment currency market”. All purchases of foreign exchange in the investment currency market were financed only by the sale of existing securities and by foreign borrowing. This created a parallel exchange rate in the investment currency market that persistently demanded a 30–50 percent premium over the official exchange rate. To prevent leakages, at least two thirds of after-tax profits from outward FDI had to be repatriated and, until end-1977, at least 25 percent of the proceeds of the sale of foreign portfolio securities had to be exchanged at the official exchange rate (“surrender penalty”).
- **Foreign currency deposits** of residents were restricted to working balances and **domestic currency lending** by resident banks to nonresidents was restricted to trade-related purposes.

Reforms. From June 1979, interest payments on foreign borrowing and repayment of foreign borrowing with maturities above one year could be financed at the official exchange rate and all restrictions related to financing FDI and on European Economic Community securities were lifted. All remaining restrictions on portfolio investments were lifted in October 1979. Separately, in June 1980, additional reserve requirements on domestic banks for credit growth in excess of 1 percent per month were lifted, thus reducing incentives for banks to move trade credit off balance sheet into the commercial bill market.

Impact. Artis and Taylor (1989) and Bank of England (1981) estimate the impact of the abolition of the controls. These estimates do not take into account that, simultaneously, the new Thatcher government launched a series of macroeconomic stabilization and labor market reforms and the North Sea oil came on stream. The pound appreciated strongly and domestic interest rates rose.

- **Change in financing of FDI.** Levels of FDI were unaffected but about GBP 638 million (0.27 percent of GDP) of FDI-related foreign borrowing were refinanced. The share of repatriated foreign earnings initially dropped from 47 percent to 37 percent but subsequently increased again.
- **Increased portfolio outflows.** Portfolio investment outflows increased from negligible amounts to GBP 45 billion (20 percent of GDP) although this was partly offset by increased portfolio inflows, such that the overall impact was to increase net portfolio outflows by some GBP 30 billion (13 percent of GDP). The abolition of the controls triggered a substantial reallocation of investment portfolios of pension, investment, and unit trust funds. The foreign share of net investment *flows* increased from 7 to 20 percent for pension funds, from 4 to 17 percent for insurance companies, and to 100 percent for unit trust funds.
- **Foreign currency deposits of residents.** Residents’ foreign currency deposits in U.K. banks doubled while their foreign currency borrowing increased by one third. Residents’ foreign currency deposits and borrowing from foreign banks both increased by about half as much again. Sterling lending by U.K. banks to nonresidents—mostly foreign banks—increased from about GBP 6 million per month in September 1979 to GBP 300 million (0.13 percent of GDP) in June 1981. Some of this was offset by rising Sterling deposits of nonresident banks with U.K. banks.
- **Onshore/offshore interest rate differential disappeared.** The onshore/offshore interest rate differential dropped from about 4 percent in late 1978 to close to zero by end-1979 and remained around zero thereafter. The deviation from covered interest parity also virtually closed.

Box 3. Japan. Removal of Exchange Controls in 1979–80

Previous regime. Japan oscillated between imposing capital inflow and outflow controls depending on exchange rate pressures. OECD (1984) identify several waves of capital controls: (i) 1970–72, tightening of already strict capital inflow controls and easing of outflow controls in response to current account surpluses; (ii) 1973–74, easing of restrictions on inflows and tightening of restrictions on outflows in response to current account deficits and capital outflows; (iii) 1975–77, easing of all restrictions as exchange pressures eased; and (iv) 1977–78, tightening of inflow controls to contain short-term capital inflows. By 1978, nonresident yen deposits (a key channel for short-term capital inflows) were subjected to a 100 percent reserve requirement and foreign debt to a reserve requirement of 0.25 percent. Banks were subject to a daily conversion limit of foreign currency into yen. Nonresident purchases of yen-denominated securities were strictly controlled and nonresident purchases of government bonds prohibited. Residents were prohibited from issuing foreign currency bonds or yen-denominated foreign bonds and nonresident issuance of yen-denominated bonds was restricted. Foreign currency borrowing by residents was tightly controlled. Offshore interest rates (euroyen rates) were about 5 percent below onshore money market rates (Fukao, 1995). The domestic financial system remained subject to regulation of deposit rates and a strict separation of banks between those engaged in short-term lending, those engaged in long-term lending, those engaged in foreign exchange deposit-taking, trust funds, and securities firms.

Reforms. All remaining capital account restrictions on both outflows and inflows were removed in 1979/1980. Domestic interest rates remained heavily regulated and the main push for financial sector liberalization occurred only around 1985.

- **Capital account liberalization 1979–80.** In January and February 1979, reserve requirements on nonresident yen deposits and restrictions on nonresident purchases of yen-denominated securities were eliminated. In May 1979, the government bond (Gensaki) market was opened to nonresidents. In November 1979, the quota for foreign currency conversion by banks was increased. Restrictions on medium and long-term foreign currency borrowing by corporates were successively relaxed between February 1979 and March 1980. In March 1980, limits on interbank transfers to domestic banks were raised, interest rates on foreign deposit in domestic banks were liberalized, and Japanese banks were allowed to issue yen-denominated foreign bonds. In 1981 and 1983, foreign asset holdings were permitted for pension funds and postal life insurance funds up to ceilings of 10 percent of assets.
- **Financial liberalization 1979–92.** A market with liberalized interest rates was introduced for commercial deposits in May 1979, for money market certificates in March 1985, for yen-denominated bankers' acceptances in September 1985, and for commercial paper in November 1987. Interest rates for large time deposits were liberalized in October 1985, for all time deposits in June 1993, and for all sight deposits in October 1994 (Aramaki, 2006). The Tokyo offshore market, established in December 1986, allowed resident banks to take deposits and lend to nonresidents without the restrictions applying to domestic banking. Competition between banks, trust funds, and securities firms was allowed in June 1992.

Impact.

- **Net capital outflows.** In the five years following capital account liberalization, net foreign assets increased by some 10 percent of GDP. Especially the permission for institutional investors to acquire foreign assets generated strong capital outflow pressures (Fukua, 1995). However, far larger flows followed financial system liberalization: Between 1985 and 1990, foreign assets and liabilities increased by some 30 percent of GDP each, whereas net foreign assets remained broadly around 10 percent of GDP.
- **Onshore/offshore interest rate differential disappeared.** The differential between the London euroyen market rate and the domestic money market rate dropped from about 5 percent in early 1979 to close to zero by end-1979 and remained around zero thereafter (Fukao, 1995, Maloney, 1992).

TABLES

Table 1. Capital Account Restrictions in China

FDI	
Inflow restrictions	Approval by Ministry of Commerce, local branches of the PBoC (for R-FDI), or local commerce agencies
Outflow restrictions	In start-up phase, transfers require SAFE approval.
Portfolio investment	
Average equity restrictions	
Equity inflow restrictions	
Purchase locally by nonresidents (equity)	QFIIs may hold minority stakes in A <i>shares</i> (denominated in RMB), up to an aggregate ceiling of USD 80 billion. Currency conversion and repatriation of principal for all QFIIs other than open-end China funds require SAFE approval.
Sale or issue abroad by residents (equity)	CSRC approval
Equity outflow restrictions	
Sale or issue locally by nonresidents (equity)	Sale allowed for QFII but subject to initial lock-up period of 3-12 month depending on type of QFII; Issue unrestricted in principle (but unprecedented)
Purchase abroad by residents (equity)	Approved QDII subject to institution-specific ceilings
Average bond restrictions	
Bond inflow restrictions	
Purchase locally by nonresidents (bond)	Approved QFII subject to aggregate and institution-specific ceilings.
Sale or issue abroad by residents (bond)	NDRC and State Council approval
Bond outflow restrictions	
Sale or issue locally by nonresidents (bond)	Allowed for QFII subject to initial lock up period of 3-12 months depending on type of QFII vehicle; MOF, PBC, and NDRC approval for issuance (unprecedented)
Purchase abroad by residents (bond)	Approved QDII subject to institution-specific ceilings
Average money market restrictions	
Money market inflow restrictions	
Purchase locally by nonresidents (money market)	Approved QFII subject to aggregate and institution-specific ceilings.
Sale or issue abroad by residents (money market)	Only for maturities <1 year and only with SAFE approval.
Money market outflow restrictions	
Sale or issue locally by nonresidents (money market)	Sale allowed for QFII subject to initial lock up period of 3-12 months depending on type of QFII vehicle; Issuance prohibited.
Purchase abroad by residents (money market)	Approved QDII subject to institution-specific ceilings

Table 1. Capital Account Restrictions in China (concluded)

Other investment

Average collective investment restrictions	...
Collective investment inflow restrictions	...
Purchase locally by nonresidents (collective investment)	QFIIs may hold minority stakes in <i>A shares</i> (denominated in RMB), up to an aggregate ceiling of USD 80 billion. Currency conversion and repatriation of principal for all QFIIs other than open-end China funds require SAFE approval.
Sale or issue abroad by residents (collective investment)	SAFE approval.
Collective investment outflow restrictions	...
Sale or issue locally by nonresidents (collective investment)	Prohibited
Purchase abroad by residents (collective investment)	Approved QDII subject to institution-specific ceilings
Average financial credit restrictions	Loans from nonresidents to preapproved domestic banks and corporates are allowed as long as they have maturities below 1 year and are within the overall limits established by SAFE. Longer-term loans require NDRC approval. SAFE approval required for resident MNC to provide loans to nonresident MNC.
Financial credit inflow restrictions	<i>Resident institutions</i> may open foreign currency accounts domestically but may hold balances in them only for operating needs. With SAFE approval, they may also open foreign currency accounts abroad if they can prove foreign payment requirements and fulfill origin of export requirements. <i>Resident individuals</i> may open foreign currency savings accounts domestically, but documentation is required for account balances in excess of USD 50,000. Residents are not allowed to hold RMB accounts abroad. <i>Nonresident investors</i> may open foreign currency accounts subject to SAFE approval. Also subject to SAFE approval, nonresidents may maintain onshore RMB accounts for purposes of offshore RMB settlement or trade settlement purposes. <i>Nonresident individuals</i> may open foreign currency accounts.
Financial credit outflow restrictions	Real estate purchases by residents abroad are allowed but domestic real estate purchases by nonresidents are restricted to self-use and the conversion of liquidation proceeds requires SAFE approval. Transfer of emigrants' assets requires approval and is only allowed in steps. A pilot project "Wenzhou project" allows a capital outflow of up to RMB 3 million per person per year.

Source: AREAR (2011).

Table 2. Capital account restrictions

	China	Malaysia	Korea	Brazil	India	Poland	Australia	Russia	Indonesia	Turkey	China	Malaysia	Korea	Brazil	India	Poland	Australia	Russia	Indonesia	Turkey
SCHINDLER financial account restrictions (2010)																				
Overall restrictions index 1/																				
Overall inflow restrictions index	Red	Red	Green	Red	Red	Red	Yellow	Yellow	Orange	Orange	Red	Red	Green	Red	Red	Red	Yellow	Yellow	Orange	Orange
Overall outflow restrictions index	Red	Red	Green	Red	Red	Red	Yellow	Yellow	Orange	Orange	Red	Red	Green	Red	Red	Red	Yellow	Yellow	Orange	Orange
Overall non-FDI financial account restrictions index	Red	Red	Green	Red	Red	Red	Yellow	Yellow	Orange	Orange	Red	Red	Green	Red	Red	Red	Yellow	Yellow	Orange	Orange
Portfolio investment																				
Average equity restrictions	Red	Red	Green	Red	Red	Red	Yellow	Yellow	Orange	Orange	Red	Red	Green	Red	Red	Red	Yellow	Yellow	Orange	Orange
Equity inflow restrictions	Red	Red	Green	Red	Red	Red	Yellow	Yellow	Orange	Orange	Red	Red	Green	Red	Red	Red	Yellow	Yellow	Orange	Orange
Purchase locally by nonresidents (equity)	Red	Red	Green	Red	Red	Red	Yellow	Yellow	Orange	Orange	Red	Red	Green	Red	Red	Red	Yellow	Yellow	Orange	Orange
Sale or issue abroad by residents (equity)	Red	Red	Green	Red	Red	Red	Yellow	Yellow	Orange	Orange	Red	Red	Green	Red	Red	Red	Yellow	Yellow	Orange	Orange
Equity outflow restrictions	Red	Red	Green	Red	Red	Red	Yellow	Yellow	Orange	Orange	Red	Red	Green	Red	Red	Red	Yellow	Yellow	Orange	Orange
Sale or issue locally by nonresidents (equity)	Red	Red	Green	Red	Red	Red	Yellow	Yellow	Orange	Orange	Red	Red	Green	Red	Red	Red	Yellow	Yellow	Orange	Orange
Purchase abroad by residents (equity)	Red	Red	Green	Red	Red	Red	Yellow	Yellow	Orange	Orange	Red	Red	Green	Red	Red	Red	Yellow	Yellow	Orange	Orange
Average bond restrictions	Red	Red	Green	Red	Red	Red	Yellow	Yellow	Orange	Orange	Red	Red	Green	Red	Red	Red	Yellow	Yellow	Orange	Orange
Bond inflow restrictions	Red	Red	Green	Red	Red	Red	Yellow	Yellow	Orange	Orange	Red	Red	Green	Red	Red	Red	Yellow	Yellow	Orange	Orange
Purchase locally by nonresidents (bond)	Red	Red	Green	Red	Red	Red	Yellow	Yellow	Orange	Orange	Red	Red	Green	Red	Red	Red	Yellow	Yellow	Orange	Orange
Sale or issue abroad by residents (bond)	Red	Red	Green	Red	Red	Red	Yellow	Yellow	Orange	Orange	Red	Red	Green	Red	Red	Red	Yellow	Yellow	Orange	Orange
Bond outflow restrictions	Red	Red	Green	Red	Red	Red	Yellow	Yellow	Orange	Orange	Red	Red	Green	Red	Red	Red	Yellow	Yellow	Orange	Orange
Sale or issue locally by nonresidents (bond)	Red	Red	Green	Red	Red	Red	Yellow	Yellow	Orange	Orange	Red	Red	Green	Red	Red	Red	Yellow	Yellow	Orange	Orange
Purchase abroad by residents (bond)	Red	Red	Green	Red	Red	Red	Yellow	Yellow	Orange	Orange	Red	Red	Green	Red	Red	Red	Yellow	Yellow	Orange	Orange
Average money market restrictions	Red	Red	Green	Red	Red	Red	Yellow	Yellow	Orange	Orange	Red	Red	Green	Red	Red	Red	Yellow	Yellow	Orange	Orange
Money market inflow restrictions	Red	Red	Green	Red	Red	Red	Yellow	Yellow	Orange	Orange	Red	Red	Green	Red	Red	Red	Yellow	Yellow	Orange	Orange
Purchase locally by nonresidents (money market)	Red	Red	Green	Red	Red	Red	Yellow	Yellow	Orange	Orange	Red	Red	Green	Red	Red	Red	Yellow	Yellow	Orange	Orange
Sale or issue abroad by residents (money market)	Red	Red	Green	Red	Red	Red	Yellow	Yellow	Orange	Orange	Red	Red	Green	Red	Red	Red	Yellow	Yellow	Orange	Orange
Money market outflow restrictions	Red	Red	Green	Red	Red	Red	Yellow	Yellow	Orange	Orange	Red	Red	Green	Red	Red	Red	Yellow	Yellow	Orange	Orange
Sale or issue locally by nonresidents (money market)	Red	Red	Green	Red	Red	Red	Yellow	Yellow	Orange	Orange	Red	Red	Green	Red	Red	Red	Yellow	Yellow	Orange	Orange
Purchase abroad by residents (money market)	Red	Red	Green	Red	Red	Red	Yellow	Yellow	Orange	Orange	Red	Red	Green	Red	Red	Red	Yellow	Yellow	Orange	Orange
FDI																				
Abroad	Red	Red	Green	Red	Red	Red	Yellow	Yellow	Orange	Orange	Red	Red	Green	Red	Red	Red	Yellow	Yellow	Orange	Orange
In reporting economy	Red	Red	Green	Red	Red	Red	Yellow	Yellow	Orange	Orange	Red	Red	Green	Red	Red	Red	Yellow	Yellow	Orange	Orange
Other investment																				
Average collective investment restrictions	Red	Red	Green	Red	Red	Red	Yellow	Yellow	Orange	Orange	Red	Red	Green	Red	Red	Red	Yellow	Yellow	Orange	Orange
Collective investment inflow restrictions	Red	Red	Green	Red	Red	Red	Yellow	Yellow	Orange	Orange	Red	Red	Green	Red	Red	Red	Yellow	Yellow	Orange	Orange
Purchase locally by nonresidents (collective investment)	Red	Red	Green	Red	Red	Red	Yellow	Yellow	Orange	Orange	Red	Red	Green	Red	Red	Red	Yellow	Yellow	Orange	Orange
Sale or issue abroad by residents (collective investment)	Red	Red	Green	Red	Red	Red	Yellow	Yellow	Orange	Orange	Red	Red	Green	Red	Red	Red	Yellow	Yellow	Orange	Orange
Collective investment outflow restrictions	Red	Red	Green	Red	Red	Red	Yellow	Yellow	Orange	Orange	Red	Red	Green	Red	Red	Red	Yellow	Yellow	Orange	Orange
Sale or issue locally by nonresidents (collective investment)	Red	Red	Green	Red	Red	Red	Yellow	Yellow	Orange	Orange	Red	Red	Green	Red	Red	Red	Yellow	Yellow	Orange	Orange
Purchase abroad by residents (collective investment)	Red	Red	Green	Red	Red	Red	Yellow	Yellow	Orange	Orange	Red	Red	Green	Red	Red	Red	Yellow	Yellow	Orange	Orange
Average financial credit restrictions	Red	Red	Green	Red	Red	Red	Yellow	Yellow	Orange	Orange	Red	Red	Green	Red	Red	Red	Yellow	Yellow	Orange	Orange
Financial credit inflow restrictions	Red	Red	Green	Red	Red	Red	Yellow	Yellow	Orange	Orange	Red	Red	Green	Red	Red	Red	Yellow	Yellow	Orange	Orange
Financial credit outflow restrictions	Red	Red	Green	Red	Red	Red	Yellow	Yellow	Orange	Orange	Red	Red	Green	Red	Red	Red	Yellow	Yellow	Orange	Orange

Source: Schindler (2009), extended to 2010.

Note: Red denotes either a restriction beyond reporting requirements. Green denotes no restrictions. Yellow in an aggregate position denotes one out of four categories are restricted; orange in an aggregate position denotes two out of four categories are restricted; red in an aggregate position denotes three or four out of four categories are restricted.

Table 3. FGLS regression: Share of bilateral portfolio assets in total portfolio, 2005-2010						
	(1)	(2)	(3)	(4)	(5)	(6)
VARIABLES	Stocks	Stocks	IV 1/	Bonds	Bonds	IV (private share) 2/
Share of destination in global portfolio	0.115*** (0)	0.116*** (0)	0.120*** (0)	0.141*** (0)	0.131*** (0)	0.166*** (0)
Stock market capitalization or outstanding domestic bonds (% of GDP) in source	-0.00204*** (0)	-0.00200*** (0)	-0.00252*** (0)	-0.00723*** (0)	-0.00571*** (0)	-0.00471*** (0)
Stock market capitalization or outstanding domestic bonds (% of GDP) in destination	0.000376*** (0.00141)	0.000287** (0.0170)	-0.00165*** (0)	-0.00286*** (1.48e-06)	-0.00126** (0.0147)	0.0209*** (0)
Inflow or outflow restrictions in source	-0.107*** (1.18e-05)		-0.102*** (5.91e-06)	-0.685*** (0)		-0.577*** (0)
Outflow restrictions in source		-0.154*** (0)			-0.362*** (0)	
Inflow or outflow restrictions in destination	-0.0448** (0.0249)		-0.106*** (6.76e-08)	-0.711*** (0)		-0.374*** (9.84e-10)
Inflow restrictions in destination		-0.0495*** (0.00343)			-0.127** (0.0401)	
Governance in source	0.218*** (0)	0.208*** (0)	0.205*** (0)	0.136*** (0)	0.163*** (0)	0.280*** (0)
Governance in destination	0.111*** (0)	0.113*** (0)	0.119*** (0)	0.157*** (0)	0.203*** (0)	0.162*** (0)
Bilateral trade (% of destination GDP)	0.0394*** (0)	0.0398*** (0)	0.0352*** (0)	0.0583*** (0)	0.0644*** (0)	0.0473*** (5.15e-08)
Log distance	-0.353*** (0)	-0.355*** (0)	-0.392*** (0)	-0.826*** (0)	-0.774*** (0)	-1.097*** (0)
Stock market return or bond yield in source	0.0104 (0.157)	0.00716 (0.330)	0.0246*** (0.000714)	-0.145*** (0)	-0.120*** (0)	-0.0809*** (0)
Stock market return or bond yield in destination	0.0164*** (0.00849)	0.0195*** (0.00165)	0.0125* (0.0560)	0.0496*** (0)	0.0527*** (0)	0.193*** (0)
Correlation in stock market returns or sovereign bond yields	0.359*** (0)	0.385*** (0)	0.339*** (0)	0.114*** (1.76e-08)	0.0905*** (9.80e-06)	0.217*** (0)
Constant	2.658*** (0)	2.711*** (0)	3.175*** (0)	8.613*** (0)	7.338*** (0)	7.631*** (0)
Observations	8,382	8,382	8,382	4,278	4,278	3,636
Number of node12code	1,397	1,397	1,397	713	713	713
Wald statistic	5549	5970	6724	3229	2142	41942
pval in parentheses						
*** p<0.01, ** p<0.05, * p<0.1						
Note: Regression includes time fixed effects.						
1/ Stock market capitalization is instrumented with stock market value traded in percent of GDP.						
2/ Total outstanding debt is instrumented with the share of private domestic debt in total domestic outstanding debt (in percent).						

Table 4. FGLS regression: Share of bilateral portfolio assets in total portfolio, 2005-2010

VARIABLES	Stocks			Bonds			
	All	Range of estimates excl. destinations	excl. UK as destination	All	Range of estimates excl. destinations	excl. UK as destination	excl. Japan as destination
Share of destination in global portfolio	0.12 (0)***	0.083* to 0.129*	0.109 (0)***	0.141 (0)***	0.119* to 0.175*	0.134 (0)***	0.175 (0)***
Stock market capitalization or outstanding domestic bonds (% of GDP) in source	-0.002040 (0)***	-0.0022* to -0.00162*	-0.002 (0)***	-0.00723 (0)***	-0.0081* to -0.00426*	-0.00426 (0)***	-0.00781 (0)***
Stock market capitalization or outstanding domestic bonds (% of GDP) in destination	0.000376 (0.00141)***	-0.000221* to 0.00183*	0.000344 (0.00286)***	-0.00286 (1.48e-06)***	-0.0066* to 0.00271*	0.00271 (0)***	0.000976 (0.0920)*
Inflow or outflow restrictions in source	-0.11 (1.18e-05)***	-0.158* to -0.0596*	-0.096 (5.12e-05)***	-0.685 (0)***	-0.901* to -0.291*	-0.291 (0)***	-0.732 (0)***
Inflow or outflow restrictions in destination	-0.04 (0.0249)**	-0.202* to 0.0317	0.032 (0.10)	-0.711 (0)***	-1.684* to -0.156*	-0.156 (0.000668)***	-0.687 (0)***
Governance in source	0.22 (0)***	0.164* to 0.228*	0.196 (0)***	0.136 (0)***	0.0687* to 0.24*	0.24 (0)***	0.165 (0)***
Governance in destination	0.11 (0)***	0.0354* to 0.141*	0.109 (0)***	0.157 (0)***	-0.0135 to 0.255*	0.0985 (0)***	0.129 (0)***
Bilateral trade (% of destination GDP)	0.04 (0)***	0.0214* to 0.0425*	0.034 (0)***	0.0583 (0)***	0.0311* to 0.111*	0.0367 (4.99e-07)***	0.0636 (0)***
Log distance	-0.35 (0)***	-0.392* to -0.23*	-0.341 (0)***	-0.826 (0)***	-0.977* to -0.664*	-0.747 (0)***	-0.803 (0)***
Stock market return or bond yield in source	0.01 (0.157)	-0.00383 to 0.0161*	0.016 (0.0244)**	-0.145 (0)***	-0.157* to -0.0748*	-0.0748 (0)***	-0.149 (0)***
Stock market return or bond yield in destination	0.02 (0.00849)***	-0.00094 to 0.0278*	0.020 (0.000676)***	0.0496 (0)***	0.0387* to 0.0715*	0.0511 (0)***	0.0401 (2.71e-08)***
Correlation in stock market returns or sovereign bond yields	0.36 (0)***	0.278* to 0.458*	0.287 (0)***	0.114 (1.76e-08)***	0.0828* to 0.136*	0.107 (0)***	0.136 (0)***
Constant	2.66 (0)***	1.737* to 2.975*	2.570 (0)***	8.613 (0)***	8.613* to 8.613*	6.455 (0)***	8.250 (0)***
Observations	8382	8106 to 8382	8124	4278	4122 to 8196	4,110	4,146
Number of node12code	1397	1351 to 1397	1354	713	687 to 1366	685	691
Wald statistic	5549	4224 to 6377	4894	3229	3220 to 5713	3540	3771
pval in parentheses							
*** p<0.01, ** p<0.05, * p<0.1, † p<0.11.							
Note: Regression includes time fixed effects.							

Table 5. Panel regression: Share of bilateral portfolio assets in total portfolio, 2005-2010				
VARIABLES	(1)	(2)	(3)	(4)
Destination's share of global portfolio	0.149*** (0)	0.146*** (0)	0.147*** (0)	0.131*** (0)
Equity market capitalization and outstanding bonds (% of GDP) in source	-0.00244*** (0)	-0.00255*** (0)	-0.00262*** (0)	-0.00224*** (0)
Equity market capitalization and outstanding bonds (% of GDP) in destination	-0.00148*** (0)	-0.00143*** (0)	-0.00148*** (0)	-0.00134*** (0)
Portfolio flow restriction in source	-0.797*** (0)		-0.778*** (0)	-0.585*** (0)
Portfolio outflow restriction in source		-0.572*** (0)		
Portfolio flow restriction in destination	-0.833*** (0)		-0.858*** (0)	-0.822*** (0)
Portfolio inflow restriction in destination		-0.399*** (0)		
Governance in source	0.356*** (0)	0.317*** (0)	0.357*** (0)	0.303*** (0)
Governance in destination	0.0525*** (0.000160)	0.153*** (0)	0.0662*** (4.51e-06)	0.0467*** (3.16e-08)
Bilateral trade (% of destination GDP)	0.0370*** (4.85e-10)	0.0313*** (7.80e-09)	0.0392*** (0)	0.0370*** (0)
Log distance	-0.511*** (0)	-0.500*** (0)	-0.543*** (0)	-0.403*** (0)
Average stock market return and bond yield in source	-0.140*** (0)	-0.185*** (0)		
Average stock market return and bond yield in destination	-0.00954 (0.331)	0.0300*** (0.00162)		
Average of stock market return and bond yield correlation	0.0923*** (0.000607)	0.0983*** (0.000254)		
Bond yield in source			-0.0787*** (0)	
Bond yield in destination			0.00207 (0.678)	
Correlation in sovereign bond yields			0.0205 (0.133)	
Stock market return in source				0.0114 (0.539)
Stock market return in destination				-0.0546*** (7.27e-05)
Correlation in stock market returns				0.665*** (0)
Constant	5.241*** (0)	4.852*** (0)	5.544*** (0)	3.800*** (0)
Observations	4,002	4,002	4,002	4,002
Number of node12code	667	667	667	667
Wald statistic	4188	3863	4468	5069
pval in parentheses				
*** p<0.01, ** p<0.05, * p<0.1				
Note: Regression includes time fixed effects.				

Table 6. FGLS regression: Share of bilateral portfolio assets in total portfolio, 2005-2010

VARIABLES	Stocks					Bonds				
	Baseline I	country FE II	larger sample III	Chinn-Ito IV	excl HKG CHN IND V	Baseline VI	country FE VII	larger sample VIII	Chinn-Ito IX	excl HKG CHN IND X
Share of destination in global portfolio	0.115 (0)***	0.0265 (5.16e-05)***	0.114 (0)***	0.126 (0)***	0.131 (0)***	0.141 (0)***	0.0556 (0.0135)**	0.136 (0)***	0.150 (0)***	0.130 (0)***
Stock market capitalization or outstanding domestic bonds (% of GDP) in source	-0.00204 (0)***	-0.00200 (0)***	-0.00190 (0)***	-0.00166 (0)***	-0.00281 (0)***	-0.00723 (0)***	-0.00584 (1.40e-06)***	-0.00478 (0)***	-0.00705 (0)***	-0.00748 (0)***
Stock market capitalization or outstanding domestic bonds (% of GDP) in destination	0.000376 (0.00141)***	-5.06e-05 (0.772)	0.000430 (0.000348)***	-4.51e-05 (0.473)	0.00201 (0)***	-0.00286 (1.48e-06)***	0.00123 (0.364)	-0.00293 (0)***	-0.00201 (0.000104)***	-0.00444 (3.35e-10)***
Inflow or outflow restrictions in source	-0.107 (1.18e-05)***	0.0468 (0.109)	-0.0766 (0.00181)***	-0.0565 (0)***	-0.0548 (0.0511)*	-0.685 (0)***	-0.0380 (0.811)	-0.407 (0)***	0.245 (0)***	-0.727 (0)***
Inflow or outflow restrictions in destination	-0.0448 (0.0249)**	-0.0824 (0.0178)**	-0.0471 (0.0186)**	0.0283 (4.60e-09)***	-0.0547 (0.0177)**	-0.711 (0)***	-0.0541 (0.639)	-0.421 (0)***	0.0951 (0)***	-0.909 (0)***
Governance in source	0.218 (0)***	-0.139 (9.69e-07)***	0.241 (0)***	0.261 (0)***	0.214 (0)***	0.136 (0)***	0.186 (0.00271)***	0.293 (0)***	0.111 (3.52e-09)***	0.147 (0)***
Governance in destination	0.111 (0)***	-0.0294 (0.286)	0.123 (0)***	0.0430 (0)***	0.0660 (0)***	0.157 (0)***	0.182 (0.00162)***	0.204 (0)***	0.226 (0)***	0.128 (1.28e-10)***
Bilateral trade (% of destination GDP)	0.0394 (0)***	0.0438 (0)***	0.0289 (0)***	0.0463 (0)***	0.0306 (0)***	0.0583 (0)***	0.0396 (7.95e-08)***	0.0523 (0)***	0.0407 (2.61e-07)***	0.118 (0)***
Log distance	-0.353 (0)***	-0.401 (0)***	-0.408 (0)***	-0.218 (0)***	-0.321 (0)***	-0.826 (0)***	-0.773 (0)***	-0.620 (0)***	-0.749 (0)***	-0.762 (0)***
Stock market return or bond yield in source	0.0104 (0.157)	0.0232 (0.00403)***		0.0268 (4.96e-05)***	0.00802 (0.310)	-0.145 (0)***	-0.0804 (4.45e-08)***		-0.126 (0)***	-0.150 (0)***
Stock market return or bond yield in destination	0.0164 (0.00849)***	-0.00163 (0.798)		0.0127 (0.00493)***	0.0279 (8.50e-05)***	0.0496 (0)***	0.00216 (0.802)		0.0618 (0)***	0.0306 (0.000355)***
Correlation in stock market returns or sovereign bond yields	0.359 (0)***	0.0858 (0.0152)**		0.397 (0)***	0.292 (0)***	0.114 (1.76e-08)***	0.0732 (5.22e-05)***		0.142 (0)***	0.122 (1.64e-07)***
Constant	2.658 (0)***	9.146 (0)***	3.213 (0)***	1.400 (0)***	2.373 (0)***	8.613 (0)***	12.45 (0)***	5.752 (0)***	6.565 (0)***	8.379 (0)***
Observations	8,382	8,382	8,508	8,142	7,632	4,278	4,278	5,964	4,278	3,840
Number of node12code	1,397	1,397	1,418	1,357	1,272	713	713	994	713	640
Wald statistic	5549	6686	5576	6167	3773	3229	7408	3465	2850	2978

pval in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Note: Regression includes time fixed effects.

Table 7. Impact of hypothetical capital account liberalization in China on gross portfolio investment, 2010 (percent of GDP)					
	Regressions Tables 3 and 6	Regressions Tables 3 and 6 using adjusted markets	He et al (2012)	Sedik and Sun (2012) 1/	Actual stock, end- 2010
Equity assets	2.6-7.3	1.9-5.3	...	...	1.1
Equity liabilities	0.3-0.4	0.3-0.4	...	...	3.5
Debt assets	10.5-21	6-12	...	...	3.3
Debt liabilities	1.3-9.5	1.3-9.5	...	...	0.3
Portfolio assets	15.4-24.9	9.4-15.1	21.0	3.3	4.3
Portfolio liabilities	1.7-9.9	1.7-9.9	16.0	2.0	3.8
Net portfolio assets	10.7-18.1	4.1-8.2	5.0	1.3	0.6
1/ Applies to total capital inflows and outflows.					

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