

How would Capital Account Liberalization Affect China's Capital Flows and the Renminbi Real Exchange Rates?

Dong He, Lillian Cheung, Wenlang Zhang and Tommy Wu*

Abstract

In this paper we study the determinants of gross capital flows, project the size of China's international investment position in 2020, and analyze the implications for the renminbi real exchange rate if China liberalizes the capital account. We assume in this exercise that the renminbi will have largely achieved capital account convertibility by the end of the current decade, a timetable consistent with recent proposals by the People's Bank of China. Our analysis shows that if the capital account were liberalized, China's gross international investment position would grow significantly, and inflows and outflows would become much more balanced. The private sector would turn its net liability position into a balanced position, and the official sector would reduce its net asset position significantly, relative to the country's GDP. Because of the increasing importance of private sector foreign claims and the decreasing importance of official foreign reserves, China would be able to earn higher net investment income from abroad. Overall, China would continue to be a net creditor, with the net foreign asset position as a share of GDP remaining largely stable through this decade. These findings suggest that the renminbi real exchange rate would not be particularly sensitive to capital account liberalization as capital flows are expected to be two-sided. The renminbi real exchange rate would likely be on a path of moderate appreciation as China is expected to maintain a sizeable growth differential with its trading partners.

Key words: capital account liberalization, exchange rates, net foreign asset position

JEL codes: F21, F31, F37, O24

* Dong He, Executive Director of Research Department, Hong Kong Monetary Authority, Hong Kong, China. Email: dhe@hkma.gov.hk; Lillian Cheung, Head of Economic Research Division, Research Department, Hong Kong Monetary Authority, Hong Kong, China. Email: lcheung@hkma.gov.hk; Wenlang Zhang (corresponding author), Senior Manager, Economic Research Division, Research Department, Hong Kong Monetary Authority, Hong Kong, China. Email: wzhang@hkma.gov.hk; Tommy Wu, Manager, Economic Research Division, Research Department, Hong Kong Monetary Authority, Hong Kong, China. Email: ttowu@hkma.gov.hk. The authors would like to thank Robert McCauley, William Gavin, conference participants at the Federal Reserve Bank of St. Louis and Tsinghua University Conference of "Monetary Policy in a Global Setting: China and United States," and seminar participants at the China State Administration of Foreign Exchange for their comments on the paper. Thanks also go to Simon Chan for his excellent research assistance. The views expressed in this paper are those of the authors, and do not necessarily reflect those of the Hong Kong Monetary Authority, Hong Kong Institute for Monetary Research, its Council of Advisers, or the Board of Directors.

I. Introduction

While it is generally expected that the renminbi will remain strong given the favorable economic outlook for Mainland China, concerns have emerged that it could weaken significantly if China liberalizes the capital account. In particular, there are worries that the relaxation of capital account controls could lead to large-scale capital outflows, and, hence, generate some downward pressures on the renminbi. This will become a concern particularly if the pace of domestic financial development does not keep up with the intention of diversifying investment when the capital account opens. However, it is also recognized that a well sequenced process of capital account liberalization has the benefit of releasing inflationary pressures on domestic asset prices in a high saving economy like China. Assuming a simultaneous process of domestic and external financial liberalization, the present paper studies how capital account liberalization would affect China's international investment position and the renminbi exchange rate.

The degree of capital account convertibility in China remains relatively low compared with the advanced economies as well as major emerging market economies. Inward foreign direct investment (FDI) has largely been liberalized since the early 1990s, and has been a major channel for technology transfer from abroad. The stock of inward FDI stood at over US\$1400bn in 2010, equivalent to 25 percent of China's GDP. In contrast, outward FDI and portfolio flows remain restricted, with the stocks of outward FDI, and inward and outward portfolio investments amounting to 5 percent of GDP or less in 2010. The People's Bank of China (PBC) has been expanding the list of overseas financial institutions that can participate in the Mainland interbank bond market in recent years. Progress has also been made in the Qualified Foreign Institutional Investor (QFII) and the Qualified Domestic Institutional Investor (QDII) programs. The scale of these programs, however, is still small, and the QDII program for Mainland investors has not been a significant channel for diversifying private savings because the investment scope of products is still narrow. Our analysis based on the IMF survey of capital account liberalization shows that China has remained in the class of economies with the lowest degree of capital account openness over the past decade.

A report released by the PBC in early 2012 suggests a process of China's capital account liberalization over three time horizons: the short term (1–3 years), the medium term (3–5 years) and the long term (5–10 years). In other words, the report envisages that the process of liberalization will be basically completed in a decade's time.¹ The goal to gradually realize renminbi convertibility for capital account transactions was reiterated in the 12th

¹ This is referring to a report (in Chinese) released by the Financial Survey and Statistics Department of the People's Bank of China on 23 February 2012.

Five-Year Plan. The State Administration of Foreign Exchange also stated that steps would be taken during the 12th Five-Year period to gradually liberalize the capital account in line with the needs of China's economic development. The official endorsements to strengthen the role of offshore renminbi centers and the continued expansions of the QFII and the QDII programs are important steps towards a more liberalized capital account.

Based on the experience of 25 advanced and emerging economies, the analysis below first develops an empirical framework to quantify how different international investment positions would change with capital account liberalization. While international experience shows that relaxation of capital account controls could lead to a significant increase in international investment positions, other factors such as financial market development also have an important role to play. Assuming China's capital account will be fully liberalized by the end of the current decade, we project that China's outward FDI will increase at a faster pace than inward FDI, partly reflecting that a deeper domestic financial market would help domestic corporations undertake cross-border mergers and acquisitions. The FDI in net terms, however, would maintain a liability position due to a large initial stock of FDI liability.

The outward portfolio investment position would increase at a relatively fast pace, reflecting domestic investors' intention of diversifying portfolio risks. The inward portfolio position would increase at a relatively slower pace. This is because the positive effects from financial market deepening would be partly offset by the adverse effects from decreasing returns on domestic investments relative to global investments along with a more open capital account. The private sector's net liability position would become a balanced position, and the official sector's net asset position would reduce significantly, relative to the country's GDP. Because of the increasing importance of private sector foreign claims and the decreasing importance of official foreign reserves, China would be able to earn higher net investment income from abroad. Overall, China will continue to be a net creditor, with the net foreign asset (NFA) position as a share of GDP projected to be largely stable in the 10 years to 2020. If the renminbi becomes a major reserve currency, China would likely see a faster accumulation of foreign portfolio liabilities, but this would not change our basic scenario of the largely stable NFA position as a share of GDP.

Our analysis suggests that the renminbi real exchange rates would not be very sensitive to capital account liberalization, and the effects of the growth differentials between China and its trading partners will dominate and continue to support the renminbi against downward pressure. In theory, capital account liberalization could affect the real exchange rate of a currency through its impact on the NFA position. As residents become able to make their portfolio choices across the globe, and as foreign financing becomes more accessible, their preferences for risk-return trade-off might change. This, in turn, might affect their saving and investment rates and, hence, the country's current account balances.

However, a priori, the net effect of capital account liberalization on the path of current account balances or the NFA position is ambiguous.

The rest of the paper is organized as follows. Section II illustrates the relationship between capital account openness and international investment position according to international experience. Section III estimates China's FDI and portfolio investment positions and net investment income through this decade, as well as the resulting changes in official foreign reserves. Section IV estimates how capital account liberalization and future economic development would affect the renminbi exchange rates. Section V conducts an alternative scenario analysis, under which the renminbi becomes a major international reserve currency. Section VI investigates the consistency between our trade balance and renminbi exchange rate projections using a dynamic stochastic general equilibrium model, and Section VII concludes the paper.

II. Capital Account Openness and International Investment Positions: Some Stylized Facts

We first examine the asset and liability positions of FDI and portfolio investment for 25 advanced and emerging economies with different degrees of capital account liberalization. The sample includes OECD, Asian and Latin American economies for the period between 1997 and 2009.² The economies are grouped into four classes according to the degree of capital account liberalization based on the IMF's *Annual Report on Exchange Arrangements and Exchange Restrictions*.³ Table 1 presents the economies by their degree of capital account openness for the two periods of 1997–2003 and 2004–2009.⁴ Class A contains the economies with the lowest degree of capital account liberalization, followed

² The economies included in the sample are: Australia, Belgium, Brazil, Chile, China, Finland, France, Germany, Hong Kong SAR, Indonesia, India, Italy, Japan, Korea, Malaysia, Mexico, the Netherlands, Peru, Russia, Singapore, Thailand, Turkey, the UK, the USA and Venezuela.

³ The IMF report on exchange restrictions provides a basis for a de jure measure of capital control, which is more closely related to the intentions of a country's policies in regards to its capital account, as opposed to the de facto measures, which are associated with what actually happened.

⁴ The IMF reports describe capital controls imposed in 13 broad categories for each of the IMF's member countries. For each economy, we construct binary indices based on the 13 categories, and we sum them up for each year so that each economy has a time-varying capital account openness index. The indexes range from 1 to 13, with 13 representing economies with the most liberalized capital account. For illustrative purposes, we group the economies into four classes according to their degrees of capital account openness in Table 1. We calculate the average index numbers for 1997–2003 and 2004–2009 for each economy and then group the economies with index numbers of 1 to 4 as class A, 5 to 7 as class B, 8 to 10 as class C, and 11 to 13 as class D. A potential drawback of this measure is that it does not distinguish the intensity of the controls across economies, as discussed in Chinn and Ito (2002).

Table 1. Capital Account Openness across Economies

	Class A	Class B	Class C	Class D
1997–2003	China	Australia	Finland	Belgium
	India	Brazil	Singapore	France
	Indonesia	Chile	Venezuela	Germany
	Korea	Mexico		Hong Kong SAR
	Malaysia	Turkey		Italy
	Russia			Japan
	Thailand			Netherlands
				Peru
			UK	
			USA	
2004–2009	China	Australia	Belgium	Hong Kong SAR
	India	Brazil	Chile	Italy
	Indonesia	Finland	France	Netherlands
	Malaysia	Russia	Germany	Peru
	Mexico	Turkey	Japan	UK
	Thailand	Venezuela	Korea	
			Singapore	
			USA	

Sources: IMF's *Annual Report on Exchange Arrangements and Exchange Restrictions* (1997–2010) and authors' estimates.

Notes: Class A contains countries with the lowest degree of capital account openness, followed by class B then class C, with class D representing the most liberalized countries.

by classes B and C, while class D contains those with the highest degree of liberalization. Some emerging economies, including China and India, fall into Class A for both sample periods, while others, such as Korea and Russia, became much more liberalized in the second sample period. Many of the advanced economies, especially the members of the European Union (EU), have dropped from class D to class C since 2005, as controls have been imposed on the purchases by non-EU residents of capital and money market securities.

Preliminary statistics show that capital account openness tends to lead to a notable rise in international investment positions.⁵ We construct the asset and liability positions in

⁵ The same analysis has been conducted using international investment position data from the external wealth of nations dataset by Lane and Milesi-Ferretti, and the results are largely consistent. This set of data was constructed using official data in which only the most recent years are available for most countries, and the estimates of stock positions were backdated to 1970 following the methodology described in Lane and Milesi-Ferretti (2007).

Table 2. Capital Account Openness and International Investment Positions across Economies

Percentage of GDP (standard deviations in parentheses)	FDI assets (%)		FDI liabilities (%)		Portfolio assets (%)		Portfolio liabilities (%)	
	Class A	5.2	(7.2)	20.7	(15.3)	3.0	(3.4)	14.9
Class B	15.8	(12.9)	20.0	(6.4)	25.3	(22.0)	36.8	(31.9)
Class C	35.1	(32.4)	43.6	(40.6)	58.5	(45.8)	49.1	(30.1)
Class D	36.3	(28.3)	32.6	(22.0)	51.8	(33.1)	54.2	(34.3)

Sources: IMF International Financial Statistics, CEIC and authors' estimates.

Note: The average ratios of international investment positions to GDP are illustrated for each class of economies with the same capital account openness. Standard deviations are also in percentage of GDP. FDI, foreign direct investment.

FDI and portfolio investment as shares of GDP for each economy using annual data from the IMF International Financial Statistics. To smooth out short-term volatilities, we take 3-year averages for each of the 3-year sub-periods between 1995 and 2009, and remove time effects in the five sub-periods.⁶ We then compute the cross-country average asset and liability positions of FDI and portfolio investments as shares of GDP for each class in the sub-periods.⁷ As shown in Table 2, FDI and portfolio assets have increased, on average, from 5.2 and 3.0 percent of GDP to 36.3 and 51.8 percent of GDP, respectively, as economies have moved from the least to the most liberalized class. There is a similar pattern for FDI and portfolio liabilities, but relatively speaking, the changes are smaller due to higher initial levels.

However, the variations in international investment positions, as represented by the standard deviations in parentheses, generally increase along the scale of increasing openness. For instance, the standard deviation of FDI assets increased from 7.2 percent for class A to 28.3 percent for class D, while that for portfolio assets increased from 3.4 to 33.1 percent accordingly. This suggests that other economic fundamentals in addition to capital account liberalization also play important roles in determining an economy's international investment position. Therefore, in the following section, we will use an empirical model to identify the impacts of various variables on the changes in international investment position.

⁶ We also remove outliers that fall outside the 90-percent confidence interval around the mean for each of the four types of international investment positions.

⁷ We assume that the 1995 capital account openness index value is the average value of 1996–1997 because the coverage of capital controls of the IMF reports after 1997 is different from that before 1996.

III. How would China's International Investment Position Change with Capital Account Liberalization?

This section first estimates the empirical relationships between capital flows and their determinants and then projects China's FDI and portfolio investment positions, as well as the official foreign reserves based on some assumptions about the developments of major economic indicators.

1. Determinants of Capital Flows

We follow the literature to identify the determinants of changes in various investment positions. Using data from advanced and emerging economies, Alfaro *et al.* (2007) highlight the importance of institutional quality and capital account openness in driving FDI and portfolio flows. Walsh and Yu (2010), however, find that FDI flows are closely related to fundamentals of the domestic economy, such as the level of per capita GDP, in addition to institutional factors.⁸ Casi and Resmini (2010) support the importance of domestic economic fundamentals in determining inward FDI using regional European FDI data, and Cheng and Ma (2010) find similar results using cross-country data. However, studies on portfolio flows have found mixed results regarding to whether global factors or domestic factors are more important drivers. Baek (2006) suggests that foreign investors' risk appetite and world GDP growth are important global factors of portfolio flows to emerging economies. Hernandez *et al.* (2001) find the opposite and claim that domestic factors, such as domestic economic growth and debt service capacity, are the main drivers. Chuhan *et al.* (1998) find that both global factors, such as US interest rates, and domestic factors, such as returns on domestic equity and domestic credit ratings, are important drivers of portfolio inflows.

We use the following equation to investigate the linkages between capital flows and their respective determinants:

$$y_{i,t} = a + Iy_{i,t-1} + X_{i,t}b + m_t + n_{i,t}, \quad (1)$$

where y denotes capital flows, subscript i denotes country and t denotes time. There are four types of capital flows: FDI outflows, FDI inflows, portfolio outflows and portfolio inflows. X is the vector of explanatory variables for each country i , μ denotes the time-invariant country-specific effects and v is an error term. The explanatory variables include an index of capital account openness, stock market capitalization as a share of GDP, a stock

⁸ Studies that focus on international investment positions also suggest a similar set of factors. For instance, using data from the OECD countries, Cheung *et al.* (2006), Lane (2000), Lane and Milesi-Ferretti (2003) and Furceri *et al.* (2011) find that capital account openness and financial development are important factors behind the accumulation of investment positions, while the level of per capita GDP and trade openness also play significant roles.

market development indicator (the product of the capital account openness index and stock market capitalization-to-GDP ratio),⁹ financial market deepening (broad money-to-GDP ratio), trade openness (the ratio of total trade to GDP), national savings rate, per capita real GDP, world GDP growth and equity return differential vis-à-vis the USA.¹⁰

We conduct dynamic panel regression analyses to account for possible endogeneity between lagged capital flows ($y_{i,t-1}$) and country-specific effects (μ_i), as well as reverse causality from capital flows to explanatory variables (e.g. stock market capitalization and equity return differentials). Taking the first difference of Equation (1) eliminates the country-specific effects:

$$y_{i,t} - y_{i,t-1} = I(y_{i,t-1} - y_{i,t-2}) + (X_{i,t} - X_{i,t-1})b + (n_{i,t} - n_{i,t-1}). \quad (2)$$

The dynamic panel model of Equation (2) is estimated using the generalized method of moments approach, following Blundell and Bond (1998).¹¹ We use annual data of the inflows and outflows of FDI and portfolio investment from 1995 to 2009 for the panel of 25 economies, as described in the previous section. Other investment flows (e.g. currencies and loans) are not included in our discussions because they mostly consist of banking-related capital flows, which are typically of a short-term nature; their long-term determinants are difficult to identify.¹² All capital flows are expressed as percentages of GDP.¹³

⁹ The intuition is that increasing openness in the capital account could increase foreign investors' access to the domestic stock market, and the impact of openness on capital flows increases as the domestic stock market becomes more sophisticated.

¹⁰ A capital account openness index is constructed using the IMF's *Annual Report on Exchange Arrangements and Exchange Restrictions*, as discussed in footnote 4, but without classifying the economies into four classes, as shown in Table 1. Stock market capitalization data and stock indices for constructing equity returns are collected from various stock exchange data through Ecwin and CEIC. Data on inflows and outflows of FDI and portfolio investment, total trade and broad money (except for the Eurozone) are from IMF International Financial Statistics, while broad money of Eurozone countries are from their respective national sources. National savings rates and world GDP growth are from the World Bank's World Development Indicators. Data on per capita real GDP are from Penn World Table 7.0.

¹¹ The use of a lagged dependent variable as an instrument turns out to be sufficient and valid.

¹² We estimated various panel regression models in an attempt to identify the determinants of other investment flows with the same set of explanatory variables as in the FDI and portfolio investment regressions. The overall results, however, are inconclusive.

¹³ Capital flows are used instead of international investment positions, or "stock" variables, due to the non-stationary nature of stock variables, which have exhibited increasing trends over the past two decades. Alternatively, we could take the changes (or first difference) in international investment positions to eliminate the problem. However, this would include changes in the valuation effects in the stock variables, which are difficult to explain using economic fundamentals. Therefore, we conduct our analysis using data on capital flows, even though our ultimate goal is to project international investment positions. We will discuss how to construct the stock variables using projections of capital flows later in this section.

The impacts of major determinants are largely in line with the results found in the literature. Table 3 shows the significant determinants for each type of capital flow; the insignificant determinants have been dropped. We undertake two tests to ensure the validity of our regression results. First, while $y_{i,t-2}$ on the right-hand-side of Equation (2) can be correlated with $v_{i,t-1}$ through $v_{i,t-2}$ due to serial correlation, our test statistics on AR(2) suggest that this is not the case. Second, because $y_{i,t-1}$ and $v_{i,t-1}$ are correlated in Equation (2), lags of the dependent variable are used as instrument variables. The Sargan test statistics suggest that the choice of instruments is valid. We find that capital account openness and stock market capitalization help to better facilitate FDI and outward portfolio transactions and lead to an increase in various types of capital flows. Capital account openness by itself, however, could have a negative impact on portfolio inflows. As returns on domestic and global investments will tend to be equalized along with a more open capital account, domestic assets become less attractive to foreign investors, resulting in less portfolio inflows. This effect could be partly offset by a decline in liquidity risk and an increase in investment opportunities as the stock market continues

Table 3. Determinants of Capital Flows

	Dependent variables			
	Outward FDI	Inward FDI	Outward portfolio investment	Inward portfolio investment
Lagged capital flows	0.17 (3.68)***	0.18 (4.64)***	0.26 (5.31)***	0.03 (0.67)
Capital account liberalization index				-0.004 (-3.96)***
Stock market capitalization-to-GDP ratio		0.02 (5.42)***		
Stock market development indicator	0.002 (3.84)***		0.002 (4.78)***	0.003 (4.13)***
World GDP growth	0.18 (2.06)**	0.16 (2.69)***		0.22 (2.33)**
M2-to-GDP ratio	0.05 (3.23)***	0.02 (2.12)**		
National savings rate				-0.23 (-4.40)***
Trade-to-GDP ratio	-0.01 (-2.61)***	0.02 (7.30)***		
Equity return differential			0.01 (1.97)**	
Log of real GDP per capita		-0.01 (-2.52)**	0.03 (4.85)***	0.06 (7.07)***
AR(2) (<i>p</i> -value)	0.8899	0.2317	0.5407	0.1281
Sargan test (<i>p</i> -value)	0.6284	1.0000	0.6506	0.8928
Observations	264	398	272	286

Sources: IMF International Financial Statistics, World Bank World Development Indicators, CEIC and authors' estimates.

Notes: The Z-statistics are in parentheses. ***, ** and * denote significance at the 1, 5 and 10-percent level, respectively.

to develop.¹⁴

World GDP growth shows a positive impact on FDI and portfolio inflows because more favorable global economic conditions increase the supply of funds. Financial deepening, which is proxied by an increase in the size of broad money, facilitates the financing of FDI flows. An increase in the national savings rate means that there is a smaller need for foreign financing, and, thereby, smaller portfolio inflows. An increase in trade openness, however, can lead to a decline in outward FDI. This might reflect the “proximity–concentration” trade-off in the empirical trade literature. That is, outward FDI as an alternative channel to serve the foreign market can become less attractive as trade cost decreases with trade openness. Although an increase in per capita real GDP contributes to the growth in portfolio flows, it has a small negative impact on inward FDI as the rate of return on investment is expected to decline with economic development, as suggested in the growth literature.

2. Projecting China’s International Investment Position

The path of China’s international investment position is projected based on the accumulation of respective capital flows between 2011 and 2020, with the valuation effect assumed away. For instance, the FDI asset position in 2020 is the sum of FDI assets in 2010 and the cumulated FDI outflows between 2011 and 2020. The projections of capital flows are based on the assumptions about China’s and global economic and financial developments from 2011 to 2020.¹⁵ To list a few, we assume that China’s stock market capitalization increases from 67 percent of GDP in 2010 to the average OECD ratio of 87 percent by 2020. In accordance with a World Bank study by Kuijs (2009), China’s real GDP is assumed to grow by 8.4 percent per year from 2012 to 2015 and by 7 percent per year from 2016 onwards, while world GDP growth is assumed to be 4.4 percent from 2012 onwards (in line with the September 2011 IMF World Economic Outlook).

Our research shows that China’s outward FDI will increase at a faster pace than inward FDI, but the net FDI will remain in a liability position due to a large initial stock of inward FDI (Table 4). We project that the stock of outward FDI will increase from US\$311bn (5 percent of GDP) in 2010 to around US\$5150bn (27 percent of GDP) in 2020, partly reflecting that a deeper domestic financial market would help domestic corporations to undertake

¹⁴ Another plausible explanation is that as volatilities in capital flows increase with liberalization of the capital account, foreign investors would factor in the increasing risks, so that domestic financial assets become less attractive to foreigners. The volatilities can be lowered by financial market and institutional development (e.g. see Aoki *et al.*, 2009; Broner and Ventura, 2010; Park and An, 2011; Broto *et al.*, 2007; Broner and Rigobon, 2005).

¹⁵ Detailed information is available upon request.

Table 4. Projections of International Investment Positions

US\$bn (% of GDP in parentheses)	2010 (actual)		2015		2020	
Foreign direct investment assets	311	(5.3)	1348	(11.7)	5149	(26.9)
Foreign direct investment liabilities	1476	(25.1)	3397	(29.6)	6968	(36.3)
Foreign portfolio investment assets	257	(4.4)	1273	(11.1)	5474	(28.6)
Foreign portfolio investment liabilities	222	(3.8)	1030	(9.0)	3876	(20.2)
Net foreign direct investment position	-1166	(-19.8)	-2049	(-17.8)	-1819	(-9.5)
Net foreign portfolio investment position	36	(0.6)	244	(2.1)	1598	(8.3)
Official reserves	2847	(48.4)	5277	(46.0)	6292	(32.8)
Net foreign assets (excluding other assets)	1717	(29.2)	3471	(30.2)	6072	(31.7)
Mainland's nominal GDP	5879		11 482		19 170	

Sources: IMF International Financial Statistics, CEIC and authors' estimates.

cross-border mergers and acquisitions. Inward FDI will rise to over US\$6900bn (36 percent of GDP) from US\$1476bn (25 percent of GDP) over the same period. This is because more developed financial markets, institutional quality improvement and a liberalized economic environment would continue to attract foreign investors to China.¹⁶ In net terms, FDI will remain in a liability position of US\$1800bn (9.5 percent of GDP) by 2020.

The outward portfolio investment position would increase at a fast pace, partly reflecting domestic investors' intention of diversifying portfolio risks.¹⁷ Our projection suggests that the outward portfolio investment position would increase from US\$257bn (4 percent of GDP) in 2010 to around US\$5500bn (29 percent of GDP) in 2020, while inward portfolio investment position will rise to around US\$3900bn (20 percent of GDP), from US\$222bn (4 percent of GDP) over the same period. Portfolio assets will increase faster than portfolio liabilities because, while capital account liberalization has a positive impact on portfolio assets, it could have both positive and negative effects on portfolio liabilities. Foreign investors would increase their investments in China's stock markets in view of the better

¹⁶ Faria and Mauro (2004) find that better institutional quality can attract inward FDI, which leads to more foreign involvement in corporate governance and technology transfer. Although better institutions also attract portfolio equity flows, they have a negative impact on portfolio debt inflows.

¹⁷ According to the regression results from Table 3, portfolio outflows are driven by stock market development, a decline in domestic equity differential relative to the USA, and domestic economic development.

financial institutional quality. However, their incentives to hold Chinese assets could be contained by a narrowing of return differentials between China's assets and global assets as a result of capital account liberalization as well as increasing risks related to higher capital flow volatility.¹⁸ Since the long-term determinants of other investment flows (e.g. cross-border bank lending) are difficult to identify, as discussed earlier, we do not project assets and liabilities of other investments, and just project other net investment flows following the 2011 IMF Article IV Consultation.¹⁹

Our projections of NFA positions by components allow us to project the net investment income for China over the next decade. We estimate the net investment income from China's net FDI by using the average rates of returns of 7.4 and 6.1 percent on OECD's outward and inward FDI, respectively, for the period between 1998 and 2007. We project the net investment income from China's net portfolio investments by applying the average return from major OECD stock and bond markets. Specifically, we take the simple average of the 1998–2007 OECD average stock market return of 11.4 percent and the average bond return of 6.1 percent on US Treasury and corporate bonds over the same period.²⁰ We use the 1998–2007 average yield of 4.2 percent on US Treasury bonds to project the return on investment for China's official reserves. The net investment income as a share of GDP will increase gradually from 0.5 percent in 2010 to 1.3 percent in 2020 (Figure 1).^{21,22} Based on the projections of net export contribution to output growth by Kuijs (2009), we predict that China's trade surplus will decline gradually from 3.9 percent of GDP in 2010 to 1.7 percent of GDP in 2020 (Figure 1).²³ Assuming the annual net transfers of 2012–2020 in US dollar terms to equal the average of 2006–2011, the overall current account surplus will decline from 5.2 percent of GDP in 2010

¹⁸ Empirical studies support this argument (e.g. see Furceri *et al.*, 2011). The returns from China's stock markets over the past 20 years have been approximately 3 percentage points higher than the average of the OECD economies.

¹⁹ Detailed information is available upon request.

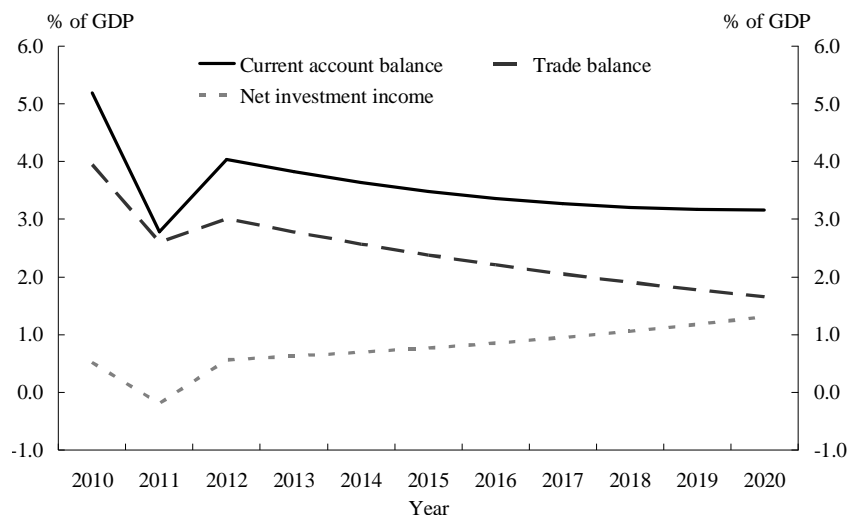
²⁰ The rates of returns on OECD outward and inward FDI are reported in "OECD Economic Globalisation Indicators 2010." The average return on US Treasury and corporate bonds applied to portfolio investment is the total return, which is equal to bond yield plus capital gain. The bond returns across other OECD countries are similar to the US bond returns.

²¹ Detailed information is available upon request.

²² This is consistent with Japan's capital account liberalization experience. After the Plaza Accord, Japan's net foreign investment income increased from 0.5 percent of GDP in 1986 to an average 1.4 percent of GDP in the late 1990s, when its capital account reached a high degree of openness.

²³ In our baseline scenario we assume that China will enter a phase of rebalancing from a manufacturing-based to a more service-based economy, with slower output and trade growth than in the previous decade. This scenario is in line with Kuijs (2009), who considers the rebalancing of China's economy and structural reforms.

Figure 1. Path of Current Account Balances



Sources: IMF International Financial Statistics, World Bank, CEIC and authors' estimates.

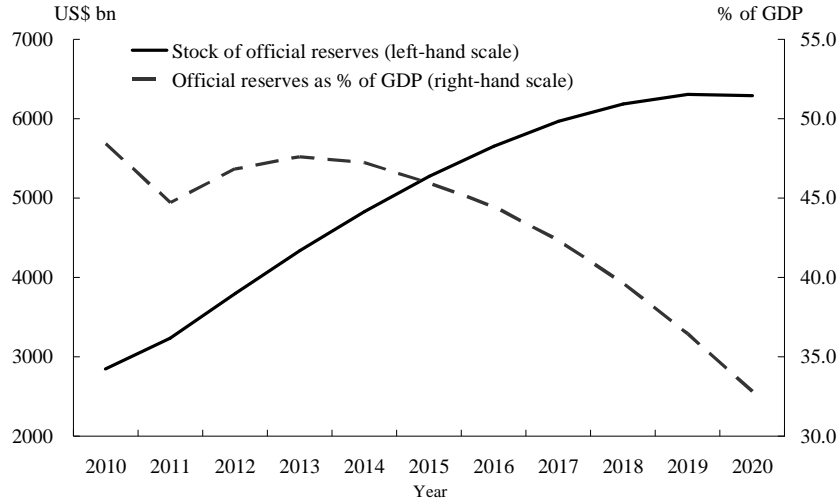
to 3.2 percent by 2020.

The stock of foreign exchange reserves would continue to increase with capital account liberalization, but will decline as a share of GDP over time. The stock of official foreign exchange reserves increase from US\$2847bn in 2010 to US\$6300bn in 2020, as shown in Table 4.²⁴ As shown in Figure 2, the official reserves will continue to rise before 2019, and then fall. The trend looks different when expressed as a share of GDP, however, with the official reserves starting to decline from 48 percent in 2013 to around 33 percent of GDP by 2020.

The composition of the NFA position will change significantly. China's NFA position (the sum of the net FDI positions, net portfolio investment positions and the official reserves excluding other assets and liabilities) will rise from US\$1717bn in 2010 to around US\$6100bn in 2020, but will remain largely stable as a share of GDP. Although the private NFA position (excluding official reserves, other assets and liabilities) was in a large deficit in 2010, it will register a much smaller deficit of US\$200bn (1.2 percent of GDP) in 2020. In other words, China's private sector will have a more or less balanced position over the next decade. While the Chinese government will remain as a net creditor, its share in China's total NFA

²⁴ We calculate the changes in official reserves by taking the difference between the current account balance and net FDI, net portfolio and other net flows. The projected changes in official reserves do not include the valuation effect because that would imply a projection on movement of the US dollar against other major currencies for a 10-year horizon.

Figure 2. Projection of Foreign Exchange Reserves



Sources: IMF International Financial Statistics, CEIC and authors' estimates.

position will decline.

Our results are consistent with some of the findings in the existing literature. Peng (2008) projects that China's NFA position will continue to rise for decades to come, as the savings–investment gap remains positive, despite an aging population over time. Ma and Zhou (2009) predict that China will maintain its net creditor position well into 2025, while its gross international investment position (the total of foreign asset and liability positions) could reach 150 percent of GDP by 2015, driven by capital account liberalization as well as fast GDP and trade growth. Similarly, our results suggest that China's NFA position will remain positive and roughly stable in the 10 years to 2020, while the gross international investment position will reach around 145 percent of GDP by 2020. However, because we have only considered FDI and portfolio investments, and have excluded other investment assets and liabilities, the projected gross international investment positions could have been underestimated. In contrast, the NFA position might change significantly if China runs a trade deficit in the future. Using a neoclassical growth model, Dollar and Kraay (2006) predict that China will become a net debtor, with net foreign liabilities reaching 40 percent of GDP by 2025. This is because they envisage large capital inflows, attracted by higher productivity growth relative to the rest of the world as well as possible current account deficits.²⁵

²⁵ The negative NFA results in Dollar and Kraay (2006) imply that China's current account will remain in deficit of 2–5 percent of GDP until 2025. In contrast, the positive NFA projections from Peng (2008) and Ma and Zhou (2009) imply future current account surpluses, in line with our projection in the present paper.

IV. Projections for the Renminbi Equilibrium Real Exchange Rate in the Context of Capital Account Liberalization

We use the equilibrium real exchange rate (ERER) behavioral equation derived from the “transfer problem” model in Lane and Milesi-Ferretti (2004) and Faruquee (1995) to project the changes in the renminbi ERER by 2020. In this model, capital account liberalization affects the ERER of a currency mainly through its impact on an economy’s NFA position. For instance, it requires future outflows of domestic goods, or positive net exports, to service the debt arising from a negative NFA position, thereby calling for a downward adjustment of relative price of domestic goods and a real depreciation of the domestic currency.

Other explanatory variables for the ERER include relative per capita GDP and terms of trade. Higher output could drive up the real value of a currency through various channels. For instance, the wealth effect from rising income can bid up the relative price of non-tradable factors given that tradable goods prices are determined in world markets, leading to a real appreciation in the domestic currency. Rising income could also reflect higher productivity in domestic tradable sectors relative to its trading partners, which can result in a real appreciation in the domestic currency (i.e. the Balassa–Samuelson effect).²⁶ The terms of trade can also affect the real exchange rate via multiple channels. For instance, an improvement in the terms of trade might induce a wealth effect that could boost the real value of domestic income, thereby driving up domestic demand for goods and, hence, higher domestic prices relative to foreign prices, which further results in a real appreciation of the domestic currency. Using our projections on the net FDI, portfolio investment and official reserves positions, we study how capital account liberalization would affect the renminbi ERER.

1. Relationship between the Real Exchange Rate and Net Foreign Asset Position

We quantify the impacts on the long-run real exchange rate from the three major determinants by using panel data of 50 advanced and emerging economies for the period of 1995–2009.²⁷ We use the real effective exchange rate indices compiled by the Bank for International

²⁶ See Lane and Milesi-Ferretti (2002) for a discussion on the impact of relative output levels on real exchange rates.

²⁷ The economies included in the sample are: Australia, Austria, Belgium, Brazil, Bulgaria, Canada, Chile, China, Chinese Taipei, Croatia, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, India, Indonesia, Ireland, Israel, Italy, Japan, Korea, Latvia, Lithuania, Malaysia, Malta, Mexico, the Netherlands, New Zealand, Norway, Peru, the Philippines, Poland, Portugal, Singapore, Slovak Republic, Slovenia, South Africa, Spain, Sweden, Switzerland, Thailand, Turkey, the UK, the USA and Venezuela.

Settlements to measure the real exchange rate. We drop the outliers and those economies from our sample for which no data on international investment positions and terms of trade are available.²⁸ Since our focus is on the long-run relationship between the real exchange rate and its determinants, we smooth out short-term volatilities in all variables by taking 3-year averages for each of the 3-year sub-periods between 1995 and 2009.²⁹ The empirical relationship is specified as:

$$\log(RER)_{i,t} = g + b^{NFA} NFA_{i,t}^{alt} + b^{YD} \log(YD)_{i,t} + b^{TOT} \log(TOT)_{i,t} + h_i + x_{i,t}, \quad (3)$$

where the RER denotes the real exchange rate, η denotes the time-invariant country-specific effects and ζ is an error term.

The NFA^{alt} is NFA as a share of GDP and excludes other assets and liabilities and net FDI assets. We do not consider other assets and liabilities because it is difficult to specify their determinants. We find that net FDI and the real exchange rate are negatively correlated for the period between 2001 and 2009, even though they are positively correlated before 2000. Although previous studies such as Lane and Milesi-Ferreti (2004) and Faruqee (1995) have found significantly positive estimates for β^{NFA} (in Equation 3), they focus on sample periods only up to the late-1990s. By including the period after 2000, we obtain a negative and insignificant estimate for the coefficient if we also consider net FDI in the NFA position. This is because FDI could have two effects in opposite directions on the real exchange rate of a currency, with the direction of the overall effect being unclear. On the one hand, inward FDI is a foreign claim on domestic return that results in an outflow of future income and a depreciation of the real value of the domestic currency. On the other hand, it promotes domestic economic growth, not only through financing but also through knowledge spillovers, and, hence, leads to an appreciation in the real value of the domestic currency. The opposite is true for outward FDI.³⁰ As a result, it seems reasonable to exclude net FDI

²⁸ The following economies have been eliminated from the sample although they are included in the construction of the REER indices from the Bank for International Settlement: Algeria and Saudi Arabia due to missing data on net foreign portfolio asset; Cyprus, Romania and Russia due to missing data on export and import prices for constructing terms of trade; Argentina is an outlier economy in terms of its movement in REER; and Hong Kong SAR is an outlier in terms of its net foreign portfolio asset accumulation.

²⁹ The international investment positions data are from the external wealth of nations dataset by Lane and Milesi-Ferretti, which backdated the official data of many countries to 1970. Data on per capita real GDP are from Penn World Table 7.0. Export and import value indices for constructing the terms of trade are from World Bank's World Development Indicators.

³⁰ Although FDI does not enter the NFA definition directly, it affects the valuation of the real exchange rate through a change in the official reserves, which is the difference between the current account balance and the sum of net FDI, net portfolio and net other investment flows.

in the NFA position. To deal with the endogeneity between the real exchange rate and its determinants, we estimate Equation (3) with instrumental variables, including trade-to-GDP ratio, net FDI and other-NFA as shares of GDP, age dependency ratio, lagged domestic output growth and lagged NFA^{alt} .³¹

The panel regression results are illustrated in Table 5 for the full sample, as well as for the subsamples of advanced and emerging economies, respectively.^{32,33} We find that a 1-percentage point increase in NFA^{alt} leads to an approximate 0.1-percent appreciation of the real exchange rate of a currency using the full sample and the subsample of emerging economies, but it is insignificant for the subsample of advanced economies. These results are in line with those of Lane and Milesi-Ferretti (2004), who find that the impact of an increase in the NFA on the real exchange rate decreases with international openness and

Table 5. Determinants of Equilibrium Real Exchange Rate

Dependent variable: $\log(RER)$	Full sample	Advanced economies	Emerging economies
Explanatory variables			
NFA^{alt}	0.09 (2.21)**	-0.01 (-0.14)	0.13 (1.66)*
$\log(YD)$	0.58 (5.77)***	0.66 (3.88)***	0.31 (2.06)**
$\log(TOT)$	0.43 (1.23)	0.44 (3.07)***	0.43 (1.17)
Hansen J -test (p -value)	0.12	0.59	0.24
Observations	198	101	89

Sources: Penn World Table 7.0, External Wealth of Nations Dataset by Lane and Milesi-Ferretti, World Bank World Development Indicators, CEIC and authors' estimates.

Notes: The Z-statistics (heteroskedasticity-autocorrelation-consistent) are in parentheses. ***, ** and * denote significance at the 1, 5, 10-percent level, respectively. $\log(RER)$ denotes the logarithm of the real effective exchange rate. NFA^{alt} denotes net foreign asset as a share of GDP that excludes other assets and liabilities and net FDI assets. $\log(YD)$ and $\log(TOT)$ denote the logarithm of relative per capita GDP and terms of trade (TOT), respectively. The null hypothesis for the Hansen J-test is that the model is not overidentified. Instrumental variables include: M2-to-GDP ratio, ratios of net FDI and others to GDP, age dependency ratio, lagged domestic output growth and lagged NFA^{alt} .

³¹ Data for the M2-to-GDP ratio, the trade-to-GDP ratio and the age dependency ratio are primarily from the World Bank's World Development Indicators. Where data are missing, we use data obtained from official sources through CEIC.

³² Advanced economies include Australia, Austria, Belgium, Canada, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Japan, the Netherlands, New Zealand, Norway, Portugal, Spain, Sweden, Switzerland, the UK and the USA. Other countries not listed as advanced economies are classified as emerging economies.

³³ We estimated a vector error correction model using annual data for the same set of countries and we arrived at similar results. We also estimated Equation (3) with instrumental variables using 5-year averages instead of 3-year averages, and the results are largely similar.

income as the wealth effect diminishes.

We also find that a 1-percent increase in relative per capita GDP leads to an approximate 0.6-percent real appreciation using the full sample and the subsample of advanced economies, but the effect is smaller for the emerging economies (a 0.3-percent real appreciation). The coefficients are largely consistent with the literature on the Balassa–Samuelson hypothesis.³⁴ In particular, the literature suggests that structural factors, such as labor surplus in agriculture, could explain why the impacts from productivity growth do not create inflationary pressures, and thereby do not have an impact on the real exchange rate. Finally, the effect from terms of trade is significant across advanced economies but becomes insignificant when emerging economies are considered. This might reflect the fact that to maintain export competitiveness, emerging market economies usually resort to a pricing-to-market strategy.

2. Projections on Renminbi Exchange Rates

We project the changes in the renminbi ERER with the following equation:

$$\Delta \log(RER)_{i,t} = b^{NFA} \Delta NFA_{i,t}^{alt} + b^{YD} \Delta \log(YD)_{i,t}, \quad (4)$$

where Δ stands for a change in a variable. We apply the regression coefficients from the emerging economies subsample to China, and assume that the terms of trade do not play a role since they are insignificant in our regression results. The projections of the net portfolio investment and official reserves positions are shown in Table 4. We assume that the growth differentials between China's real per capita GDP and its trading partners are the same as the real GDP growth differentials.³⁵ The reason is that the populations of China and its trading partners are expected to grow at a similar pace in the years ahead.³⁶

Our results show that capital account liberalization could only lead to a marginal depreciation in the ERER of the renminbi, and the impact of growth differentials between China and its major trading partners would dominate and support the ERER. Capital account liberalization alone would lead to a 1.0-percent depreciation in the renminbi ERER. When both capital account liberalization and future economic development are taken into account, however, the renminbi ERER would appreciate by 9.2 percent, with a 90-percent confidence

³⁴ Using OECD data, Chong *et al.* (2012) find that a 1-percent increase in relative per capita GDP results in an approximate 0.6-percent real appreciation against the US dollar. While Frankel (2006) and Genius and Tzouvelekas (2008) find similar results, they also find that the effects on Latin American and Asian economies are 0.2 and 0.3 percent real appreciation against the US dollar, respectively.

³⁵ Detailed information is available upon request.

³⁶ Population growth will be slow, or negative, in most of China's trading partners, including Europe, Japan and the USA, and even in some South-East Asian countries (see United Nations, 2004).

interval of between 6.8 and 11.6 percent.³⁷ This result is in line with the historical experiences of Japan and West Germany, whose currencies appreciated in real terms alongside capital account liberalization.³⁸

V. How would Renminbi Internationalization Affect Capital Flows and the Exchange Rates?

We conduct an alternative scenario analysis by assuming that the renminbi will become an international reserve currency. An economy's bond market has to be large and liquid enough for its currency to become a reserve currency. For instance, the US bond market has absorbed around 60 percent of global foreign exchange reserves as of 2011. To predict how China's capital flows would evolve with the renminbi as a major reserve currency, we re-estimate the empirical model of portfolio flows in Equation (1) by including bond market development. In particular, we incorporate bond market development as an explanatory variable to gauge the general impact of bond market size and liquidity on capital flows.³⁹ We also consider the reserve-currency-specific effect through the development of the private market by including another variable (the product of the private bond market size and a reserve currency dummy).⁴⁰ The dynamic panel regression results in Table 6 show that an increase in the private bond market size helps to better facilitate portfolio transactions, while the status of being a reserve currency country would further boost portfolio flows.⁴¹

We project China's capital flows by assuming that the renminbi will become a major reserve currency by 2030 such that China's bond market capitalization in terms of GDP will reach the average OECD level.⁴² Specifically, China's private and total bond market capitalizations

³⁷ As a reference, the renminbi REER appreciated by 21 percent between 2005 and 2011.

³⁸ For reference, the German deutschmark REER appreciated by 10 percent between 1961 and 1975, while the Japanese yen REER appreciated by almost 60 percent between 1964 and 1980; the periods represent the timing of establishing capital account convertibility for each currency, respectively.

³⁹ Data on private and public bond market sizes are from respective national sources and the Bank for International Settlement.

⁴⁰ Countries whose currencies are major reserve currencies include the USA (US dollar), the UK (British pound), Japan (Japanese yen), Germany and France (euro, and deutschmark and French franc before 1998).

⁴¹ The coefficient estimates on the capital account liberalization index, the stock market development indicator and the national savings rate are largely in line with the results in Table 3. As for the inward and outward FDI equations, bond market development is insignificant so the results in Table 3 suffice.

⁴² The timing of the renminbi becoming a major reserve currency is supported by, for instance, the Deutsche Bank Research Report "Are the BRIC currencies set to become reserve currencies?" published on 28 November 2011.

Table 6. Determinants of Capital Flows: Reserve Currency Scenario

	Dependent variables	
	Outward portfolio investment	Inward portfolio investment
Lagged capital flows	0.32 (6.46)***	0.12 (2.42)**
Capital account liberalization index		-0.003 (-2.75)***
Stock market development indicator	0.004 (7.75)***	0.005 (6.43)***
Bond market capitalization-to-GDP ratio	0.02 (2.63)***	0.02 (2.30)**
Bond market capitalization (reserve currencies)	0.03 (2.00)**	0.05 (2.59)***
National savings rate		-0.15 (-2.82)***
AR(2) (<i>p</i> -value)	0.7025	0.1544
Sargan test (<i>p</i> -value)	0.5931	0.6051
Observations	267	281

Sources: IMF International Financial Statistics, World Bank World Development Indicators, Bank for International Settlement, Korea Exchange, Bank Negara Malaysia, Thailand Securities and Exchange Commission, Hong Kong Monetary Authority, Monetary Authority of Singapore, Reserve Bank of Australia, Central Reserve Bank of Peru, Chilean Securities and Insurance Supervisor, Deutsche Bundesbank, Bank of Finland, De Nederlandsche Bank, National Bank of Belgium, Japan Securities Dealers Association, US SIFMA, CEIC and authors' estimates.

Notes: The Z-statistics are in parentheses. ***, ** and * denote significance at the 1, 5 and 10-percent level, respectively.

are assumed to increase from 15 and 52 percent of GDP in 2010 to 59 and 116 percent of GDP, respectively, in 2030. We adjust the current account balances from those under the baseline scenario by adjusting the changes in net investment income induced by the changes in the private sector NFA position accordingly. The national savings rates are also adjusted according to the changes in current account balances for consistency.

If the renminbi becomes a major reserve currency, the net FDI position would be virtually the same as that under the baseline scenario, but the net portfolio investment position would be smaller. As shown in Table 7, foreign portfolio assets and liabilities could reach 35 and 31 percent of GDP by 2020, compared with the baseline projections of 29 and 20 percent, respectively. In other words, more foreign portfolio liabilities will be accumulated, and this could result in a smaller net foreign portfolio investment position of 4.1 percent of GDP, with the private sector staying as a net debtor (5.4 percent of GDP). The official reserves will reach around US\$6950bn in 2020, and will decline as a share of GDP to

Table 7. Projections of International Investment Positions: Reserve Currency Scenario

US\$bn (% of GDP in parentheses)	2010 (actual)		2015		2020	
Foreign direct investment assets	311	(5.3)	1347	(11.7)	5142	(26.8)
Foreign direct investment liabilities	1476	(25.1)	3,395	(29.6)	6,959	(36.3)
Foreign portfolio investment assets	257	(4.4)	1907	(16.6)	6,725	(35.1)
Foreign portfolio investment liabilities	222	(3.8)	1762	(15.4)	5,940	(31.0)
Net foreign direct investment position	-1166	(-19.8)	-2048	(-17.8)	-1817	(-9.5)
Net foreign portfolio investment position	36	(0.6)	145	(1.3)	785	(4.1)
Official reserves	2847	(48.4)	5341	(46.5)	6951	(36.3)
Net foreign assets (excluding other assets)	1717	(29.2)	3438	(30.0)	5920	(30.9)
Mainland's nominal GDP	5879		11 477		19 152	

Sources: IMF International Financial Statistics, CEIC and authors' estimates.

36 percent, compared with 33 percent in the baseline case.⁴³ However, due to the accumulation of smaller current account surpluses, the NFA position will be slightly smaller, being 31 percent of GDP in 2020 versus 32 percent in the baseline scenario.

Projections of the renminbi ERER are similar to those under the baseline scenario. Capital account liberalization alone would only lead to a 1.1-percent depreciation in the renminbi ERER by the end of this decade, compared with 1.0 percent under the baseline scenario. If China's growth differential against its trading partners is also taken into account, the renminbi ERER would appreciate by 9.1 percent, compared with 9.2 percent under the baseline scenario.

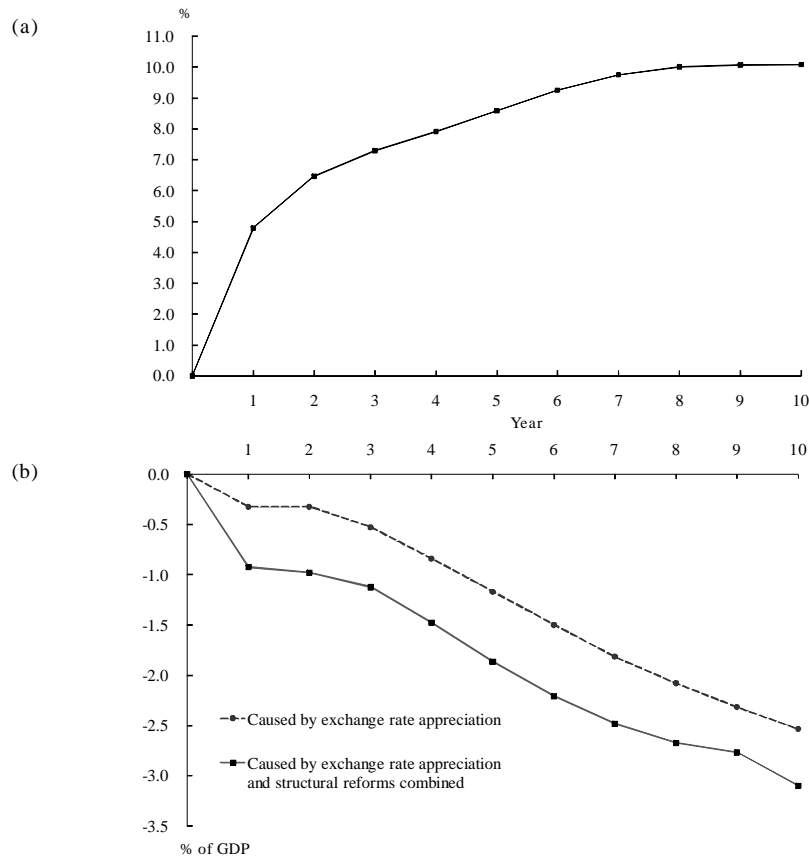
VI. Is the Projection of the Renminbi Real Exchange Rate Consistent with the Path of the Trade Balance?

In estimating the NFA position and, hence, the ERER of the renminbi, we have projected that China's trade balance will trend downwards to 1.7 percent of GDP by 2020 (based on a World Bank study). As the trade balance is an endogenous variable and could be affected by exchange rate movements, it is necessary to study whether our projection of the trade balance path is consistent with the projections of the ERER of the renminbi. Here, we use

⁴³ China's current account surplus as a share of GDP would decline from 5.2 percent in 2010 to 2.9 percent in 2020, compared with a decline to 3.2 percent in 2020 under the baseline scenario.

the Global Integrated Monetary and Fiscal (GIMF) model developed at the IMF and calibrated by the authors to study to what extent the trade balance would deviate from its equilibrium along with a shock to the real exchange rate of the renminbi. The GIMF is a dynamic stochastic general equilibrium multi-country model with overlapping generations that integrates domestic supply, demand, trade and international asset markets in a single theoretical structure, thereby allowing transmission mechanisms to be fully articulated. The GIMF model contains rich layers of demand and supply and is well suited to analyzing the effects of monetary policy, fiscal policy and structural reforms.⁴⁴

Figure 3. The Renminbi Real Exchange Rate and Trade Balance: (a) Appreciation of the Renminbi Real Exchange Rate and (b) Trade Balance Adjustments Induced by RMB Appreciation and Structural Reforms



Source: Authors' estimates.

⁴⁴ A detailed description of the model can be found in Kumhof and Laxton (2009), and calibration of the model for the Asia-Pacific region is demonstrated in N'diaye *et al.* (2010).

Assuming the renminbi real exchange rate appreciates by 10 percent in 10 years (Figure 3a), simulations by the GIMF model show that imports would increase by nearly 10 percent on a cumulative basis in real terms, while exports would drop by approximately 7 percent over the same period. The ratio of the trade surplus to GDP would decline by approximately 2.5 percentage points in the 10th year (dashed line in Figure 3b).

As pointed out in the IMF Article IV report of 2011, the ongoing structural reforms in China to rebalance its growth pattern will also affect the trade balance. Using the GIMF model, N'diaye *et al.* (2010) study how such reforms would affect China's major economic variables, including output and trade balance. These reforms would include further opening up the economy, leveling the playing field between the tradable and non-tradable sector (e.g. by removing subsidies or tax rebates to exporters and unifying the tax treatment of domestic and foreign firms), developing the domestic financial market, liberalizing the capital account and the service sector, and promoting R&D spending. The reform package could also include increased government spending on items such as health care and education, which, with all the above measures, would lower households' saving rates. Their analysis shows that these reforms would reduce the ratio of trade balance to GDP by less than 1 percentage point per year, on average.

In sum, the trade balance-to-GDP ratio would drop by approximately 3.2 percentage points in 10 years from its equilibrium, should there be a cumulative 10-percent appreciation in the renminbi real exchange rate with the abovementioned structural reforms, as shown by the solid line in Figure 3b. Taking the 10-year average trade balance-to-GDP ratio of 2001–2010 of 4.8 percent as the proxy for the current equilibrium trade balance of China, this suggests China's trade surplus would gradually drop to 1.6 percent of GDP by the end of this decade. This is consistent with the path we have projected for the trade balance in the previous sections where the ratio of trade balance to GDP is expected to decrease gradually to 1.7 percent of GDP in 2020.

VII. Conclusions

In this paper we have studied the possible impact of capital account liberalization on China's international investment positions and the renminbi exchange rates. Assuming China will fully liberalize its capital account by 2020, the main findings of our research based on the international experiences of major advanced and emerging market economies are summarized as follows.

We find that China's outward FDI would increase significantly, partly reflecting that a deeper domestic financial market would help domestic corporations undertake cross-border mergers and acquisitions. However, the FDI in net terms would maintain a liability position

due to a large initial stock of inward FDI.

The outward portfolio investment position would increase at a fast pace, reflecting domestic investors' intention of diversifying portfolio risks. The inward portfolio position would increase at a relatively slower pace, because the positive impacts from financial market deepening would be partly offset by the adverse effect from the decreasing returns on domestic investments relative to global investments along with a more open capital account. The foreign exchange reserves would continue to rise to around US\$6300bn in 2020, but would decline as a share of GDP.

The private sector's net liability position would move to a balanced position, and the official sector's net asset position would be reduced significantly, relative to the country's GDP. Because of the increasing importance of private sector foreign claims and the decreasing importance of official foreign reserves, China would be able to earn higher net investment incomes from abroad. Overall, China would continue to be a net creditor, with the NFA position as a share of GDP remaining largely stable over the next 10 years.

Our research further shows that the renminbi exchange rates are not particularly sensitive to capital account liberalization as the NFA position would be largely stable. The impact of the expected growth differential between China and its trading partners would dominate and continue to support the renminbi against downward pressure. As a result, the renminbi could appreciate by around 9.2 percent in real terms by 2020. If the renminbi becomes a major reserve currency, more foreign portfolio liabilities will be accumulated. This could result in a smaller net foreign portfolio investment position, but the renminbi ERER will likely continue to be on a moderate appreciation trend owing to the better economic outlook.

Our analysis should be interpreted with the following caveats. First, the relationship between international investment positions and their respective determinants is based on the average experience across different countries. As each economy has its own special characteristics, deviations of these relationships from the average experience can be significant. From this perspective, the specific results presented in this paper should be considered an educated guess rather than forecasts of the future path of China's international investment position. Second, our research focuses on the real exchange rates of the renminbi from a long-term perspective. They should not be interpreted as projections of the near-term movements of the nominal exchange rates of the renminbi.

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