Chinese Renminbi Exchange Rate and the Capital Account

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Seminar Series on Chinese Economy

• China’s Foreign Trade
  • Dr. Kwok, Yun-kwong
  • Senior Lecturer, Department of Economics, HKBU
  • 2 May 2017 (Tuesday), 2:00-5:00

• China’s Financial Reforms and Future Challenges
  • Dr. Cheng, Yuk-shing
  • Head & Associate Professor, Department of Economics, HKBU
  • 12 May 2017 (Friday), 2:00-5:00

• Chinese Exchange Rate and Capital Account Liberalisation
  • Dr. Luk, Sheung-kan Paul
  • Assistant Professor, Department of Economics, HKBU
  • 25 May 2017 (Thursday), 2:00-5:00
Summary

1. Exchange rate regime classification and the international Trilemma
2. History of Renminbi exchange rate liberalisation
3. Foreign exchange reserves accumulation
4. Benefits and risks of opening the capital account
CNY/USD exchange rate fixed from 1995-2005. From 2005 until recently, the trend is appreciating.

Source: bloomberg
CNY VS EUR ex-rate
EUR/CNY

Rate

Date
CNY VS GBP ex-rate
GBP/CNY

Rate

Date

CNY VS JPY ex-rate

JPY/CNY

Rate

Date

0

Exchange rate regimes:

- **Fixed (pegged) exchange rate system**
  - The exchange rate of the domestic currency is pegged to a foreign currency or a precious metal (gold/silver), with a very narrow fluctuation of trading value. It can be a formal or a *de facto* peg.
  - The central bank must be ready to intervene in the foreign exchange market by buying or selling reserves or by increasing or reducing the interest rate (to affect the direction of capital flows).

- **Floating (flexible) exchange rate system**
  - The central bank does not intervene in the foreign exchange market and allows the currency to freely appreciate or depreciate in response to changes in market demand and supply.
Other possible regimes

Fixed
- Dollarization
- Monetary Union
- Currency board

Intermediate
- Target zone/band
  - Basket peg
- Crawling peg
- Adjustable peg

Flexible
- Managed float
- Free flow

• *De facto VS De jure*
The “impossible trinity”

- Also known as the “Trilemma” in international finance.
- Impossible to have all three:
  - Free capital mobility
  - Fixed exchange rate
  - Independent monetary policy
The “Impossible Trinity”

- E.g. China before 2000
- Independent Monetary Policy
- Fixed exchange rate
- E.g. US
- Perfect capital mobility
- E.g. Hong Kong
• Advantages of flexible exchange rate
  • Can have independent monetary policy
• Advantages of open capital account
  • Capital mobility
  • More investment choice for residents
  • Renminbi internationisation.
## History

<table>
<thead>
<tr>
<th>Time</th>
<th>Rate / Event</th>
</tr>
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<tbody>
<tr>
<td>1994</td>
<td>Exchange rates unified. Adjusted to RMB 8.5/USD</td>
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<tr>
<td>Apr 1994</td>
<td>National market of foreign exchange established</td>
</tr>
<tr>
<td>1996 – 2005</td>
<td>RMB 8.28/USD de facto</td>
</tr>
<tr>
<td>1 Dec 1996</td>
<td>Current account convertibility achieved, but NO capital account convertibility</td>
</tr>
<tr>
<td>1997 – 1998 (Asian financial crisis)</td>
<td>Pledged not to devaluate its exchange rate</td>
</tr>
<tr>
<td>Early 2000s</td>
<td>RMB was undervalued</td>
</tr>
<tr>
<td>21 Jul 2005</td>
<td>Exchange rate reform</td>
</tr>
<tr>
<td>2005 – early 2014</td>
<td>Gradual appreciation</td>
</tr>
<tr>
<td>2008 – 2009 (Global financial crisis)</td>
<td>Firm fix rate</td>
</tr>
<tr>
<td>From 2014 onwards</td>
<td>Depreciation began</td>
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</table>
Policy changes after 1994

• Official Renminbi Exchange rate in 1980s is not very meaningful. The official rate was 5.8 CNY/USD. Very few transactions. People used the black market.
• The Chinese government unified the exchange rates in 1994 and adjusted the official rate to about 8.5 CNY/USD).
• In April 1994, China started to establish a national market of foreign exchange.
• From 1996-2005, the Renminbi exchange is fixed de facto with the USD at 8.28 CNY/USD. The Chinese authority called this a managed floating exchange rate system.
Policy changes after 1994

• China achieved current account convertibility in 1 December 1996.
  • That means the Chinese government no longer controls the transactions of renminbi related to current account items (including goods and services trade, remittance of profits by foreign invested firms, etc.)

• But no capital account convertibility.
  • Residents cannot freely buy foreign assets.
  • Non-residents cannot freely buy Chinese assets.
Policy changes after 1994

- During the Asian financial crisis of 1997-98, China pledged not to devaluate its exchange rate. This move had been regarded as conducive to the stabilisation of the currencies of other crisis-inflicted countries.
  - The Chinese government further tightened the control over the floating band of RMB, which has since been so narrow that the system works like a fixed exchange rate. Indeed, the International Monetary Fund (IMF) has classified RMB as a fixed exchange rate.
Undervaluation of renminbi

• By early 2000s, it was *clear* that the renminbi was undervalued.

• A political issue as well as economic issue.
  • Is China a “currency manipulator”?
  • “Many members of Congress lay blame on China's exchange rate policy for explaining the decline in U.S. competitiveness as well as the loss of “American jobs” to places overseas, and in particular, to China.”
Current account

• Exchange rate depreciation:
  ⇒ More exports, less imports.

• Exchange rate undervaluation:
  ⇒ Persistent trade surplus.
  ⇒ Current account surplus.

• Current account = change in net foreign assets.
Current account and FX reserves

Figure 2.C2  China’s current account and foreign exchange reserves, 1985–2006

Current account  = trade balance + net interest income,
Trade balance is assumed to increase when domestic exchange rate depreciates.

Source: Author’s calculations based on the International Monetary Fund, International Financial Statistics and World Economic Outlook databases.
Japan Experience

External balance on goods & services (% of GDP) and Exchange rate

% of GDP

Year

Exchange Rate  % of GDP
Undervaluation of renminbi

- The Purchasing Power Parity (PPP) approach:
- The Big Mac Index (Economist)
- Price of a Big Mac in January 2017:
  - US: $5.06.
  - China: RMB 19.4.
- Market exchange rate is 6.87CNY/USD.
- Big Mac in China costs only $2.83 at market exchange rate!
- So the "raw" Big Mac index says that the yuan was undervalued by \((2.83-5.06)/5.06 = 44\%\) at that time.
Undervaluation of renminbi

Prices of Big Mac in PRC (¥) and in US ($)

- Local price (¥)
- Price in US ($)
Undervaluation of renminbi

Prices (in USD) of Big Mac in PRC & in US

- Price in PRC ($)
- Price in US ($)
Undervaluation of CNY

dollar valuation (%)
Undervaluation of CNY

- Using the Big Mac Index is unfair for several reasons.
  - Local preferences, GST, local substitutes and so on.
  - How about other goods?
  - Some goods and services are not traded. (Balassa-Samuelson effect)

- To deal with 1 and 2, use the composite price of a bundle of goods, hence PPP method.
Balassa-Samuelson effect

- Traded (say computer) and non-traded goods (say haircut) are demanded by an economy, rich and poor.
- Productivity of traded goods is higher in rich economy and lower in poor economy. Productivity of non-traded goods are same in rich and poor economy.
- Non-traded goods in rich economy more expensive than in poor economy.
- Both traded and non-traded goods are in the consumption bundle, so the bundle in a rich economy should be more expensive than in a poor economy.
RMB exchange rate is undervalued even after taking into account Balassa-Samuelson effect
Table 4.1 Estimates of renminbi appreciation needed to eliminate undervaluation (percent)

<table>
<thead>
<tr>
<th>Study</th>
<th>Year</th>
<th>REER range</th>
<th>Bilateral dollar rate range</th>
<th>Approach</th>
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<td>Bénassy-Quéré et al. (2004)</td>
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<td>41 to 44</td>
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<td>Bénassy-Quéré et al. (2006)</td>
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<td>31 to 45</td>
<td>30 to 59</td>
<td>BEER</td>
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<td>Big Mac</td>
<td>2007</td>
<td>—</td>
<td>138</td>
<td>PPP-S</td>
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<td>Cheung, Chinn, and Fujii (2007)</td>
<td>2007</td>
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<td>~100</td>
<td>PPP-E</td>
</tr>
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<td>Cline (2005)</td>
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<td>45</td>
<td>FEER</td>
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<tr>
<td>Cline (2007)</td>
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<td>11 to 18</td>
<td>34 to 39</td>
<td>FEER</td>
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<tr>
<td>Coudert and Couharde (2005)</td>
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<td>—</td>
<td>41 to 50</td>
<td>PPP-E</td>
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<td></td>
<td>2002</td>
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<td>18</td>
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<td>2002–03</td>
<td>23 to 30</td>
<td>44 to 54</td>
<td>FEER</td>
</tr>
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<td>Frankel (2006)</td>
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<td>56</td>
<td>PPP-E</td>
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<td>Funke and Rahn (2005)</td>
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<td>3 to 6</td>
<td>12 to 14</td>
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<td>Goldstein (2004)</td>
<td>2004</td>
<td>15 to 30</td>
<td>—</td>
<td>FEER</td>
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<tr>
<td>Goldstein and Lardy (2006)</td>
<td>2004</td>
<td>20 to 35</td>
<td>—</td>
<td>FEER</td>
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<td>Goldstein and Lardy (chapter 1)</td>
<td>2007</td>
<td>30 to 55</td>
<td>—</td>
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<td>MacDonald and Dias (2007)</td>
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<td>Stolper and Fuentes (2007)</td>
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<tr>
<td></td>
<td>2007b</td>
<td>—</td>
<td>15</td>
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</tr>
<tr>
<td></td>
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<td>0 to 5</td>
<td>—</td>
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<td>0 to –5</td>
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<tr>
<td>Average</td>
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<td>19</td>
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<td></td>
</tr>
<tr>
<td>Average A</td>
<td>2000–2004</td>
<td>17</td>
<td>42c</td>
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</tr>
<tr>
<td>Average B</td>
<td>2005–07</td>
<td>26</td>
<td>38c</td>
<td></td>
</tr>
</tbody>
</table>

BEER = behavioral equilibrium exchange rate  
FEER = fundamental equilibrium exchange rate  
PPP = purchasing power parity  
REER = real equilibrium exchange rate  
-S = simple  
-E = enhanced  
a. Goldman Sachs dynamic equilibrium exchange rate (GSDEER) model.  
b. Elasticities model.  
c. Excluding Big Mac.

Exchange rate reform in 2005

- On 21 July 2005, PBoC
  - revaluate the RMB by appreciating the currency by 2.1%.
  - Switch the exchange rate regime to a management float regime “with reference to a basket of currencies”.

- Governor Zhou Xiaochuan (周小川) disclosed that the major currencies are the US dollar, the euro, the yen, the Korean won and 7 other currencies.
  - weights are unknown.
The basket peg

• If the basket weights do not change, we only need to observe the exchange rate changes for a few days to retrieve the weights.
• This method is due to Frankel and Wei (1994).
A simplified model

- Suppose CNY is valued by USD, EUR and JPY with unknown weights $w_1$, $w_2$ and $w_3$ where $w_1 + w_2 + w_3 = 1$.
- We observe the prices for 3 times to solve the 3 unknowns.
- In day 1, CNY=0.79, USD=0.8, EUR=0.7 & JPY=90
- In day 2, CNY=0.89, USD=0.9, EUR=0.8 & JPY=85
- In day 3, CNY=0.72, USD=0.7, EUR=0.9 & JPY=95

\[
\begin{align*}
0.1 &= 0.1w_1 + 0.1w_2 - 5w_3 \quad (1) \\
0.07 &= 0.1w_1 - 0.2w_2 - 5w_3 \quad (2) \\
1 &= w_1 + w_2 + w_3 \quad (3)
\end{align*}
\]
A simplified model

\[
\begin{align*}
0.1 &= 0.1w_1 + 0.1w_2 - 5w_3 \quad (1) \\
0.07 &= 0.1w_1 - 0.2w_2 - 5w_3 \quad (2) \\
1 &= w_1 + w_2 + w_3 \quad (3)
\end{align*}
\]

- \( w_1 = 0.9, \ w_2 = 0.1 \) and \( w_3 = 0. \)
- By similar argument, if CNY is valued by \( n \) currencies with \( n \) unknown weights where \( w_1 + w_2 + \ldots + w_n = 1. \)
- We observe the prices for \( n \) times to solve the \( n \) unknowns by similar operations.
## Results

Evolution of RMB Basket Weights from 2-22-2006, 3-month windows, ending on the month shown

<table>
<thead>
<tr>
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<tbody>
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<td>0.932***</td>
<td>0.929***</td>
<td>0.895***</td>
<td>0.905***</td>
<td>0.895***</td>
<td>0.939***</td>
<td>0.965***</td>
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<tr>
<td></td>
<td>(0.020)</td>
<td>(0.021)</td>
<td>(0.022)</td>
<td>(0.031)</td>
<td>(0.033)</td>
<td>(0.045)</td>
<td>(0.033)</td>
<td>(0.028)</td>
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<tr>
<td>eur</td>
<td>0.003</td>
<td>0.005</td>
<td>0.007</td>
<td>-0.020</td>
<td>-0.031</td>
<td>-0.007</td>
<td>-0.033</td>
<td>0.047</td>
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<td>(0.015)</td>
<td>(0.018)</td>
<td>(0.023)</td>
<td>(0.032)</td>
<td>(0.029)</td>
<td>(0.034)</td>
<td>(0.031)</td>
<td>(0.035)</td>
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<tr>
<td>jpy</td>
<td>0.008</td>
<td>0.009</td>
<td>0.020</td>
<td>0.051*</td>
<td>0.078***</td>
<td>0.037</td>
<td>0.041</td>
<td>-0.060</td>
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<td>(0.014)</td>
<td>(0.017)</td>
<td>(0.020)</td>
<td>(0.028)</td>
<td>(0.023)</td>
<td>(0.031)</td>
<td>(0.030)</td>
<td>(0.036)</td>
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<td>0.000</td>
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<td>0.000</td>
<td>0.000**</td>
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<td>R-squared</td>
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<td>0.075</td>
<td>0.053</td>
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Evolution of RMB Basket Weights from 6-22-2007, 3-month windows, ending on the month shown

<table>
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<tr>
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<tbody>
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<td>0.843***</td>
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<td>(0.060)</td>
<td>(0.042)</td>
<td>(0.078)</td>
<td>(0.061)</td>
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<td>eur</td>
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<td>0.045</td>
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<td>R-squared</td>
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<td>0.076</td>
<td>0.087</td>
<td>0.054</td>
<td>0.059</td>
<td>-0.001</td>
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Exchange rate reform in 2005

- Daily exchange rate band against the USD.
  - Jul 2005 (unpegged) +/- 0.3.
  - May 2007 +/- 0.5%.
  - April 2012 +/- 1%.
  - Mar 2014 +/- 2%.

- In fact the exchange rate is still tightly managed so that the daily band is seldom hit.
Exchange rate appreciation after 2005

- Gradual appreciation from 2005 to early 2014.
- During the global financial crisis 2008-09, the CNY exchange rate returned to a firm fix with the USD.
Exchange rate appreciation after 2005

- However, from 2014 onwards, the exchange rate began to depreciate.
  - The highest point was around CNY6.1/USD
- In particular, China’s central bank shocked markets on 11th August 2015 by devaluing the CNY by 1.62%.
- However the devaluation did not stop to depreciation expectations.
FX reserve accumulation

- There’s a long period (2001-2014) of Renminbi exchange rate undervaluation.
  - Low price level in China potentially hurt welfare.
  - Speculative money inflow into China.
  - Investors are driven by Renminbi *appreciation expectation*.
- Even though capital account remains relatively closed. There are ways to get through capital controls.
  - Hot money inflow under the veil of FDI.
  - Over-invoicing exports.
  - Under-invoicing imports.
- Restrictions to capital account also created incentives for corruption.
Current account and FX reserves

PRC FX Reserves & CNY X-Rate

Amount (100M USD) vs. Year

CNY X-Rate vs. Amount (100M USD)


CNY X-Rate range: 6.0 to 8.5

Amount (100M USD) range: 0 to 45000

Legend:
- Amount (100M USD)
- CNY X-Rate
Problems associated with an undervalued exchange rate

• To prevent RMB appreciation, PBoC has to issue renminbi at the current exchange rate to buy up the foreign currency.
  • FX intervention increases the foreign exchange reserves. FX reserves are mainly used to by low-yielding risk-free bonds. (Some were more actively managed by China Investment Corporation (中投))
  • FX intervention increases renminbi liquidity and is inflationary. This interferes with monetary policy.
Sterilisation (沖銷干預)

- Typically, sterilisation is used to mop up the excess liquidity created by the foreign exchange intervention. The central bank issues domestic bonds in exchange for foreign bonds.
  - Private banks buy the PBoC bills at low interest rates.
- The sterilisation cost is the interest rate difference.
  - After 2008, the renminbi VS USD interest rate differential becomes positive. That means it becomes costly to sterilise.
  - Also hampers banking sector reform, which has inefficiencies such as hurting depositors and credit rationing.
But we know what happens after 2008... the US interest rate drops to near zero.
More considerations behind 2005 exchange rate reform

• A large step revaluation would hurt competitiveness for Chinese exporters, causing unemployment and economic instability.
  • China’s export to GDP ratio in 2005 was 37%. (WB)
• But if the step revaluation is small, that means the appreciation has to occur over time.
  • This creates easy profit opportunity for international investors, provided that funds can enter China.
  • Large (speculative) capital inflow after 2005.
The one-way bet

- The one-way bet is created by CNY *appreciation expectations*.
  - Indeed, from 2005-2008, CNY/USD exchange rate rises by about 15%.
  - From 2010 to 2012, the exchange rate rises further by about 10%.
- Continuous capital inflow means that both capital account and current account have big surpluses. FX reserves hit record high.
- Capital account has to be kept relatively closed.
One-way bet or two-way bet?

- By 2013, some believe that the renminbi exchange rate is close to its equilibrium level. (Debatable)
- In 2014, renminbi exchange rate shows two-way fluctuation.

March 2014, daily fluctuation band widens to plus and minus 2%.
End of 2015

• One-way bet on depreciation side ??
• Controlled exchange rate, rapidly declining FX reserves, *depreciation* expectations.
  • Reminiscent of 1997-98 Asian financial crisis ?
Capital account liberalisation – an ongoing project

- The goal of “gradually realising convertibility of the capital account” is explicit in the 12 Five-Year Plan.
- In 2012, PBoC proposes a roadmap towards liberalisation with a span of 10 years.
- 中国人民银行调查统计司课题组 (2012) : 《我国加快资本账户开放的条件基本成熟》
China’s external balance sheet

Source: Lane and Milesi-Ferretti (2007) and CEIC.
## Capital account policies

<table>
<thead>
<tr>
<th>Inflow</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Foreign Direct Investment (FDI)</strong></td>
</tr>
<tr>
<td>- FDI inflows began to liberalise since 1990s. Now mostly liberalised except for strategic industries such as telecommunications.</td>
</tr>
<tr>
<td><strong>Financial Flows</strong></td>
</tr>
<tr>
<td>- Now rather restricted.</td>
</tr>
<tr>
<td>- Shanghai and Shenzhen stock exchange trade <code>A shares’ and </code>B shares’. A shares are closed to foreign investors and B shares are only open to foreigners. B share is small.</td>
</tr>
<tr>
<td>- Qualified Foreign Institutional Investor (QFII) scheme, began in 2002, allows foreign residents to invest in Chinese equity and bonds through collective investment schemes. Subject to quota and restrictions. In 2012, the quota was only USD 80billion.</td>
</tr>
<tr>
<td>- Foreign investors cannot invest in domestic debt securities or hold bank deposits otherwise.</td>
</tr>
</tbody>
</table>
## Capital account policies

<table>
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<th>Outflow</th>
</tr>
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<tbody>
<tr>
<td><strong>Foreign Direct Investment (FDI)</strong></td>
</tr>
<tr>
<td>• Government announced a “Go Global” (走出去) policy back in 1999.</td>
</tr>
<tr>
<td>• Gradual removal of project approval restrictions.</td>
</tr>
<tr>
<td>• Size of ODI remained small, only around 5% of GDP in 2001.</td>
</tr>
<tr>
<td><strong>Financial Flows</strong></td>
</tr>
<tr>
<td>• Now rather restricted.</td>
</tr>
<tr>
<td>• Qualified Domestic Institutional Investor (QDII) programme was introduced in 2006. This allows domestic financial institutions to invest abroad using a structure similar to QFII. Investments include fixed-income instruments and equities. Subject to quota, which is about 2% of Chinese households savings deposits.</td>
</tr>
<tr>
<td>• After GFC, QDII became unpopular because returns in China was higher than ROW. QDII remained unpopular as of today.</td>
</tr>
<tr>
<td>• Policy banks in China do some cross-border lending, mainly to assist SOEs with their ODI.</td>
</tr>
</tbody>
</table>
Benefits of open capital account

• Diversify investment options, diversify risk.
  • “Don’t put all your eggs in one basket”.
  • Economics agents are in general *risk averse*.

• In theory, developing economies may need more capital to speed up growth and development.

• Capital control may not be very effective over time.
Benefits of open capital account – The Chinese context

• Chinese households have few domestic investment options. Savings are largely in the form of bank deposits.

• Some Chinese private firms are unable to borrow from domestic banks. Foreign lending may help?

• There are known loopholes in Chinese capital account. (hide capital inflow under the name of current account transactions of FDI)
  • Capital controls may encourage corruption.
Preconditions for capital account convertibility

• A strong domestic banking system
  • Opening capital account means households have more investment opportunities. Depositors may withdraw their deposits from banks and convert to foreign currencies.
  • Sharp outflow may lead to currency depreciation. If there are currency mismatches, firm and household debt servicing cost may rise, which lead to a financial crisis.
Preconditions for capital account convertibility

• A sufficient level of financial market development
  • Capital markets can provide an additional source of funding.
  • Large capital inflow and outflow can lead to large swings in asset prices, creating asset bubbles in local markets. Deep financial market can absorb a lot of funds without large price changes.
  • If local financial markets are underdeveloped, domestic firms may borrow abroad, creating risks of currency mismatches.
Preconditions for capital account convertibility

- Exchange rate flexibility/ near the equilibrium level
  - Otherwise, opportunities of one-way bet can lead to large capital inflow, creating asset bubbles.
Preconditions for capital account convertibility – The Chinese context

- The macro-economy is stable and controllable.
- Banks appear healthy after rounds of capital injection and reform.
- Bank liabilities are mainly denominated in RMB. Little risk of currency mismatch.
- However, banks are highly reliant on deposits for funding.
  - Deposit rate ceiling may lead to large deposit outflows,
  - On the other hand, allowing a rise in deposit rate may hurt bank profitability, affecting the robustness of the banking sector.
Preconditions for capital account convertibility – The Chinese context

- China has large stock of FX reserves, and can resist exchange rate depreciation induced by capital outflow.
- Corporate bond market developed rapidly over recent years, but small compared with banks.
- Exchange rate was undervalued in early 2000s and has over the years move closer to equilibrium.
  - But is the equilibrium exchange rate meaningful without capital account openness?
Principals of capital account liberalisation.

- Gradualism.
- Liberalise inflows before outflows (先流入，後流出)
- Liberalise FDIs before financial flows (先直接後間接)
- Liberalise institutional flows before households (先機構後個人)
Sequencing of reform

• Should capital account liberalisation go *along with* domestic financial liberalisation, interest rate liberalisation and exchange rate liberalisation, or go *after*?

• Still under debate.
Reference


Reference

Reference


Reference


Reference
