



Macroeconomics Case Study:
Chinese Macroeconomic Policy
Position Paper¹

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¹This project aims at providing policy recommendations to the Chinese authorities as if the project team held an IMF Article IV consultation discussions with them. The IMF Article IV consultation discussion is an actual policy review provided by the IMF. It requires member countries' officials to exchange opinions with the IMF staff on the short- to medium-term macro economic issues. It is conducted on a regular basis and China currently holds such discussion once a year.

²We wish to thank Mr. Ichiro Otani and Professor Takatoshi Ito for there comments on drafts of this paper.

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1 Executive Summary

China's current macroeconomic conditions are sound, with promising prospects for the future. However, there are a few points that must be taken into consideration.

Given signs of inflationary pressure, the central bank should raise policy interest rates. Independence of the central bank from the government is also necessary, since the government was deciding credit allocations in the past.

New fiscal revenue resources must be introduced to finance increasing expenditure. A comprehensive value added tax system will be an effective revenue source. Expenditures are expected to increase in pension payments and the clearance of non-performing loans. Also, expenditure in human capital investment should be increased to raise labor productivity and to smoothly move labor across industries. Expenditure on the social security system should be increased to mitigate social instability.

The central bank should stop intervening in the foreign exchange market excessively, fully implement their announced exchange rate regime, and let the exchange rate fluctuate within the 0.3% band in the short run. . In the long run, the exchange rate regime should shift to a free float in order to gain the independence of monetary policy.

Reform of the banking sector must be given high priority. Internal management, audit, and corporate governance should be improved, combined with a stronger supervisory regime. This is necessary not only to increase competitiveness of the Chinese economy, but to prevent non-performing loans to increase.

Implicit restrictions are still present in the labor market, causing income disparities and inefficient allocation of labor resources. The household registration system needs to be further liberalized, especially in large cities. Infrastructure investment in the urban area will be crucial to support the labor inflow. Education and job opportunities need to be equally offered to immigrants from the rural areas as well.

Income disparity is rising, which may trigger social instability. The inter-governmental transfer system needs to be reformed to favor low income provinces. Also, income taxes should become further progressive. The gains are expected to be larger than the costs of tax distortions.

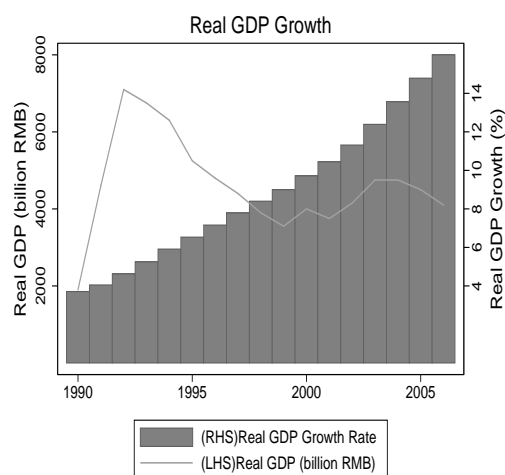
2 Economic Developments During the Past Decade

2.1 High GDP Growth

Overview of GDP Growth

Real GDP has grown steadily since 1990. The average annual real growth rate during 1990-2004 was 8.5%. In the first half of 2005, real GDP growth rate is projected to be 9% by the IMF. This is 0.5%pts lower than the one for 2004. Slowdown in investment has contributed to lower GDP growth.

Figure 1: Real GDP Growth



Source: WEO Database

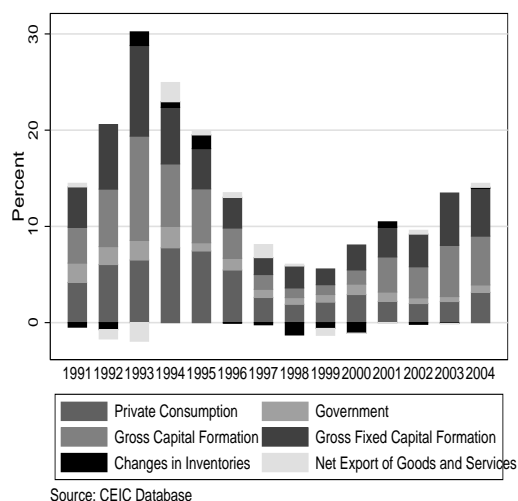
Recent GDP growth by expenditures¹

¹As of now, there are no data on components of GDP by expenditure in real terms.

Nominal GDP increased at 13.5% in 2004, up by 2.1%pts from 2003. Household consumption in nominal terms grew at 10.8% in 2004, up by 3.6%pts from 2003. Fixed capital formation in nominal terms increased at 16.4% in 2004, down by 1.9%pts from 2003. The investment boom has slowed down due to the tightening of monetary policy in 2004. Government consumption in nominal terms rose at 9.6% in 2004, up by 3.6%pts from 2003 after two years of a decline in 2002 and 2003.

Net exports in nominal terms increased at 23.8% in 2004, up by 28%pts from 2003. In 2005, net export growth slowed down from 2004. While the year-on-year growth rate of exports(in U.S. dollar terms) stayed around 32% from January to July of 2005, that of imports (in U.S. dollar terms) gradually fell during the same period. Therefore, the overall trade surplus increased.

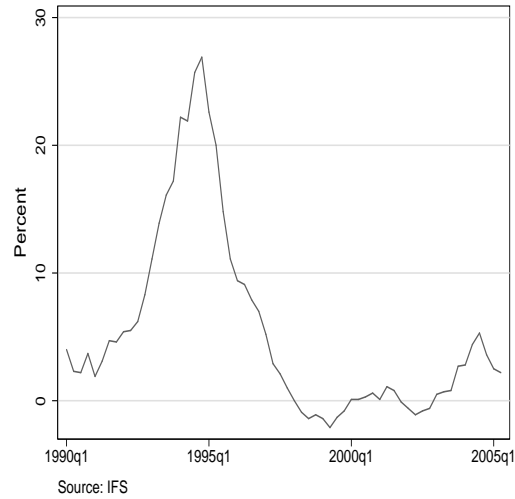
Figure 2: Nominal GDP Growth by Expenditure



Inflation

Following the two digit inflation period in the mid 1990's, inflation has become considerably low and stable. There has even been two periods of deflation, a phenomenon that is unusual for a country with such rapid growth. Most prices were controlled until 1993. Currently, prices are not controlled with exceptions in certain sectors, such as education and pharmaceuticals. Inflation has started to trend upward

Figure 3: CPI



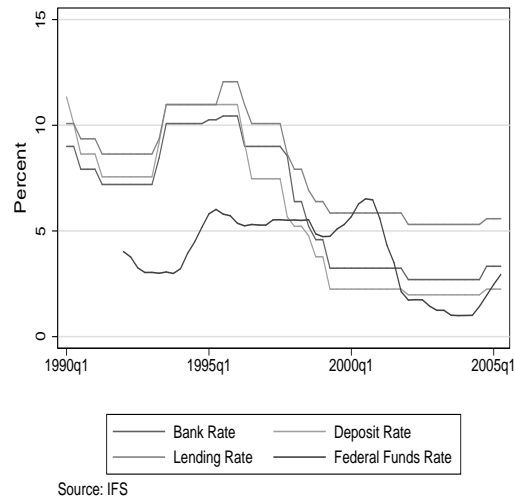
since 1999.

2.2 Money and Credit Growth

As for the first and second quarters of 2005, the Peoples Bank of China(PBC) took a view that there are indications of overinvestment, and has been implementing a contractionary monetary policy. Presently, main policy instruments are reserve requirement ratio, re-discounting, open market operations and the policy interest rates.

The time series labeled “bank rate” in figure(4) is the interest rate on loans from the PBC to financial institutions, with a maturity date of 20 days. It is one of the policy interest rates that the central bank has direct control over, and the PBC lowered the interest rate from 1995 to 2004. The bank rate fluctuates very little, and the PBC has not been using this instrument frequently. Currently, the bank rate has been increased since 2004, and has become 3.2%. The interest rate spread between the Federal Funds Rate and the bank rate has been negative in the period between 2002 and 2004.

Figure 4: Interest Rates



The interest rate on required reserves has not changed since 2002, but the required reserves ratio has been increased to 7.9%.

As for money growth, the average growth rate of narrow money has been around 17%. Although the exchange rate has been pegged to the dollar, the implementation of capital controls, especially on capital outflows, has allowed the PBC to conduct a fairly independent monetary policy. These observations suggest that the contractionary monetary policy has succeeded in decreasing money growth, and keeping inflation low.

Although the money market is still under considerable restrictions, reforms are taking place. China had adopted a credit plan prior to 1998, where the government established credit quotas. This is now abolished. The PBC also restricts various interest rates. These restrictions will be lifted, making the determination of interest rates in the market. The control over broad money by the PBC will become weaker, and new roles for indirect policies will arise. The PBC is intending to strengthen the role of interest rates as a monetary policy instrument (“China Monetary Report” Quarter 2, 2005).

Figure 5: Monetary Instruments

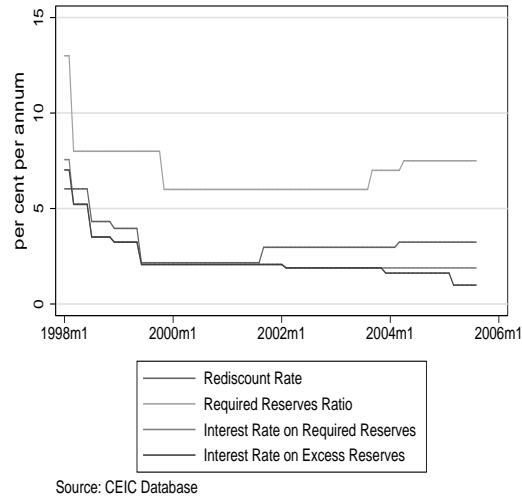
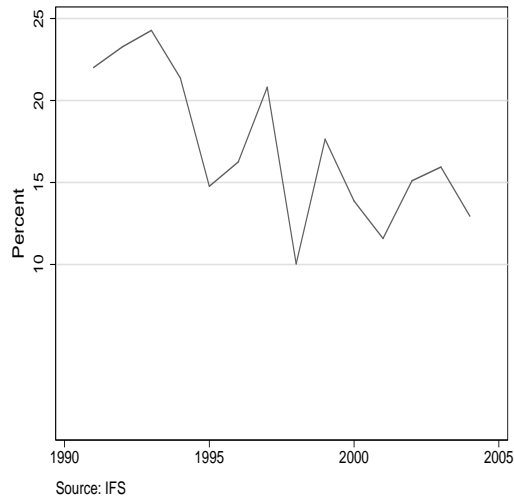


Figure 6: M2 Growth, year on year

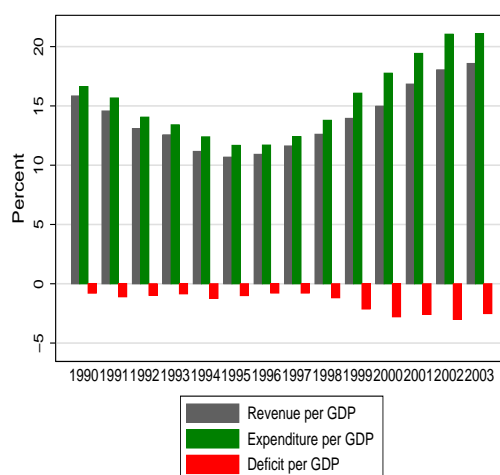


2.3 Features of Fiscal Policy

Overview of Chinese Expenditure

China's fiscal condition is currently sound, although both revenue and expenditures have been rising since the mid 1990s. The deficit proportional to GDP is less than 5%, with the help of a high GDP growth rate.

Figure 7: Budget Revenue, Expenditure, and Deficits per GDP



Source: IFS

Since 1999, the deficit has been gradually increasing. In 1998, when the negative shock of the Asian financial crisis prolonged, China faced deflation and unemployment rate rose. The Chinese government decided to take an aggressive fiscal policy and issued long term government bonds(100 billion RMB). Treasury bills were also issued to recapitalize state owned enterprises(SOEs) after the crisis.

Overview of Chinese Revenue

The Chinese government has been taking necessary steps to raise revenue while implementing tax reforms in 1994 and 2004. The 1994 tax reform was aimed at building a rule-based intergovernmental transfer system. The target of this reform was to ensure higher revenue shares against GDP. Figure(7) shows the success of the 1994 tax reform, which shows that revenue has quickly recovered through the mid 1990s.

The 2004 tax reform was targeted on corporate taxes, VAT, income taxes and tariffs. The Chinese authorities cut income taxes while shifting reliance on VAT.

2.4 External Sector Performance

External Sector Performance

For the first time, China replaced Japan as the third largest exporter of merchandise exports in 2004². The WTO reports that the most dynamic product category in China's export was office and telecom equipment, which increased by 45% to \$171 billion in 2004. Clothing exports were far less dynamic, increasing by 19% to \$62 billion. Chinese merchandise imports rose by 36% in 2004, somewhat faster than its exports. The total of current account and capital account balances was \$206 billion in 2004. About two third of the surplus was due to the current account surplus, while the rest was due to the capital account.

The current account balance has been in surplus since 1990 except for the year 1993. Especially after 2001, the surplus in percent of GDP has been growing steadily. The current account surplus accounted for \$68.7 billion in 2004, representing a growth rate of 49.6% from 2003. According to the IMF(2005) it is projected that the value of the current account would continue to increase in 2005 and 2006. However, the ratio of the current account surplus to GDP would slightly fall in 2006. Since trade balance, which account for a large part of current account, is projected to fall in 2006.

Foreign direct investment(FDI) has been steadily increasing except for a stagnant period from 1999 to 2001. This may be a lagged effect of the Asian financial crisis, yet we need to carefully examine the causality. FDI inflows have increased steadily to \$54.9 billion in 2004. They are expected to continue increasing as the Chinese economy grows. This would contribute to the development of the Chinese economy.

Foreign reserves have been increasing since 2001, due to the rapid increases in capital account surpluses. Among capital account surpluses, increases in residuals and omissions have been significant since 2002.

Residuals and omissions of balances of payments(BOP) have been positive since

²WTO "World Trade Report 2005" pp.12

Figure 8: Current Account Balance

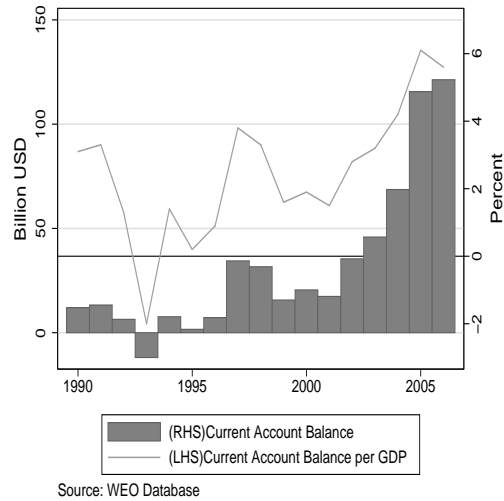
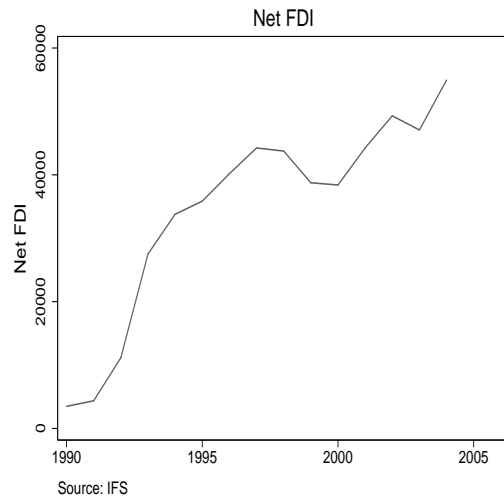
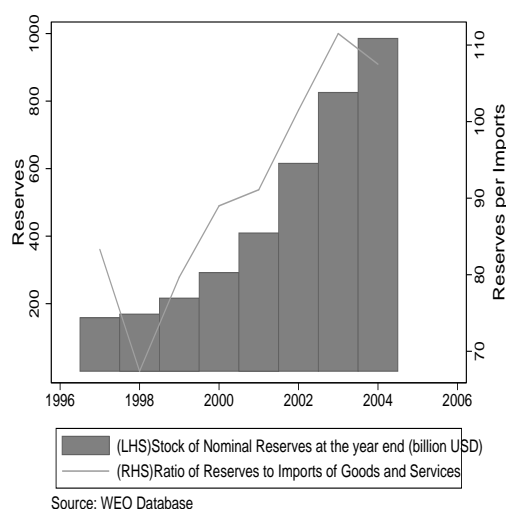


Figure 9: Net FDI



2002, and they accounted for \$7.5 billion in 2002. The illegal inflow of capital is thought to fall into this category. This indicates that speculative money has flowed into China since 2002 and this trend is still continuing at this point of time. Residuals and omissions of the BOP accounted for \$27.0 billion in 2004, which is about a half the amount of FDI. If residuals and omissions decrease in the near future due to the recent revaluation, the exchange regime policy change had certain effects to calm

Figure 10: Foreign Reserves



down speculative movements.

2.5 Developments in Exchange Rate Regime

Developments in Exchange Rate Regime

In 1994, the Chinese exchange rate regime was reformed. The multiple exchange rates of the RMB vis-a-vis the U.S. dollar were unified. Since then, the RMB has been pegged to the U.S. dollar at a relatively stable rate until July 21st 2005. Following the 2% revaluation on July 21st, the Chinese authorities have let the RMB fluctuate within 0.3% for both sides in a day. The rate has cumulatively appreciated by 0.3% (from the level prevailing on Jul 22) in the three months.

Real effective exchange rate (REER) appreciated over the first quarter to the second quarter of 2005³. If REER continuously appreciate in the future, the nominal RMB rate will further appreciate within the decided daily fluctuation. However, the Chinese authorities continue to intervene in the exchange market; the fluctuations of the nominal RMB will be limited for a while.

³REER data are annual averages. For the period of a dual exchange rate system, nominal exchange rate used in the calculation is a combination of both the official and swap center exchange rates, weighted by the transaction volumes.

Figure 11: Spot Rate of RMB to USD

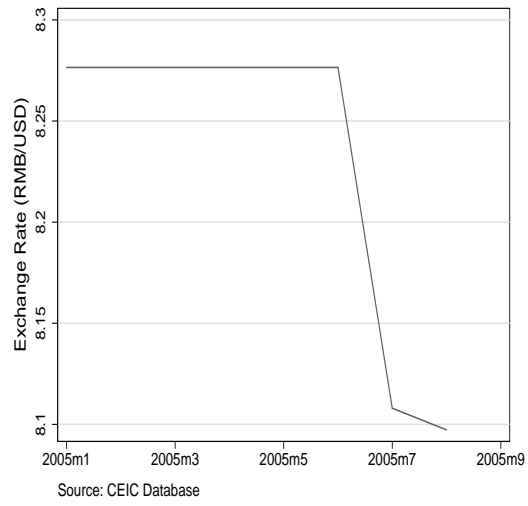
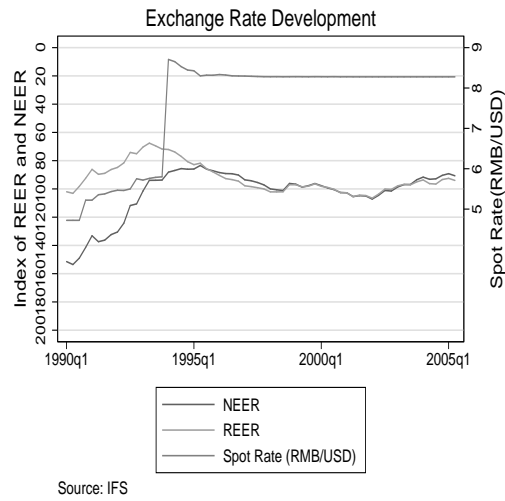


Figure 12: Exchange Rate Development



3 Macroeconomic Objectives

Based on the observations done in the previous section, we believe China's main macroeconomic objective should be aimed at continuing to achieve economic growth, while keeping inflation at a minimum.

Economic growth is important in order to create job opportunities. A growth rate of 8% is thought to create 7 million job opportunities a year, while 10 to 12 million jobs are needed to keep the current rate of unemployment. Excess labor will be supplied from the rural areas, as well as from restructuring SOEs. The rise in unemployment will make the economy vulnerable to social instability. Low inflation will be necessary for a funded pension system to function.

At the same time, the country is facing major changes as well. China's accession to the WTO means opening up the economy by reducing trade barriers, and the financial sector will be opened to foreign financial institutes for business with Chinese enterprises, starting from 2006. The "gradual reform" policy stance may have been one of the reasons for success, but at the same time, this has left the hard problems unsolved. To name a few, income disparities and non-performing-loan problems need to be tackled with determination, and insufficient disclosure of statistical data makes accurate assessment of the problems difficult.

In the proceeding sections, we focus our discussion to monetary policies, fiscal policies, and exchange rate policies, as we think these three are the most effective policies to obtain this goal.

4 Macroeconomic Policy Issues

4.1 Monetary and Credit Policy

The PBC should further raise policy interest rates, given signs of an upward trend in inflation. Among the main policy instruments, interest rates seem to be the most effective instrument for controlling inflation, compared to quantitative measures. The use of interest rates as a policy instrument should become more important, as the

development of the financial market progresses⁴.

Independence from the central government is a task that is not being dealt with much. Monetary policy is conducted under the leadership of the State Council. The nomination and dismissal of the board is also done by the State Council. Since government projects are still being financed by the PBC indirectly, further independence should prove necessary.

4.2 Fiscal Policy

Future increase in expenditure is inevitable, but at the same time, it is necessary to keep deficits at a minimum. Further increase in NPL related expenditures, education, and the expansion of the social safety net is recommended.

NPL problem is a major element that may slow economic growth. From 1999 to 2000, four asset management companies were created to clean up NPLs. 1.4 trillion RMB worth of NPLs were purchased from the four state owned commercial banks(SCBs) and China Development Bank. The cleaning up of NPLs will be a fiscal challenge, yet as the Korean case after the Asian financial crisis shows, it is effective to take drastic approaches against this issue. Drastic measures include disclosure of total NPLs, improvement of internal management and corporate governance.

Expenditure on upper secondary education should be strengthened. The Chinese literacy rate was 90.9% in 2000⁵. This high literacy rate is attractive to foreign investors, which promotes economic growth and international trade. Further investment in human capital is necessary to gain competitiveness in high value-added products.

The share of primary industry is still very high at almost 50% in the Chinese labor market. To smoothly shift labor across sectors, the authorities should provide sufficient training opportunities. A higher level of education will also smooth the shift of labor across sectors.

⁴For a further discussion, look in Annex 2

⁵Data source: UNESCO

The coverage of the social safety net should be widened. Over the past twenty years, a market-oriented labor market has emerged. On the other hand, SOEs have been downsized. The social safety net is also necessary to smoothly shift labor across industries and reduce social instability.

How should the Chinese authorities raise their revenue to finance increasing expenditure requirements discussed above? An adoption of a comprehensive tax VAT system is recommended for the following reasons. First, administrative costs are low compared to introducing a new tax system. VAT was introduced in China in the 1980s, and shifted the share of revenue from income taxes to VAT in 2004. Second, the VAT is a stable revenue source since it does not fluctuate as much as income tax during economic boom and busts. Despite these reforms, there is still room to widen the coverage of VAT.

The best timing of VAT introduction is in a early phase of economic development⁶. European countries succeeded to introduce regressive taxes in the 1960s, while economic growth was still low. On the contrary, Japan and Canada faced hardships. In the Japanese case, the VAT proposal was blocked by strong opposition in late 1970s and mid 1980s. VAT was introduced in Japan in 1989, but the tax rate was low. Japan has compensated their deficit by VAT and suffered a looming deficit with stagnated tax revenue during the lost decade. In addition, the Japanese continued to suspect tax increases when the economy boomed. The difference which aparts success and failure of VAT adoption is whether the authorities introduce the system during or after a period of high economic growth. We recommend that China should widen the coverage of the VAT system now, given that China is still at a early stage of economic development.

⁶Junko Kato "Regressive Taxation and the Welfare State: Path Dependence and Policy Diffusion" 2003 Cambridge University Press

4.3 Exchange Rate and Regime Policy

On July 21st, 2005, the PBC has announced to revalue the RMB against the dollar by 2% in nominal terms while limiting the daily fluctuation against the dollar to 0.3%⁷. In the market, many had thought the appreciation was not sufficient. Within a week after the first revaluation announcement, the PBC denied a further revaluation of the RMB in order to halt appreciation expectation in the market. In August, they announced that they would refer to the basket of major currencies, US dollar, the Euro, the Yen, the Won, and some other currencies of Asian and Western countries. However, estimation suggests that the RMB is still tightly pegged to the dollar.

Appreciation pressure on the RMB

According to IMF estimates of equilibrium RMB rates, it is uncertain if the RMB is overvalued or undervalued in the medium run(IMF 2004). However, in the long run, the RMB has been undervalued based on the Balassa-Samuelson approach (Frankel 2005 and Goldstein 2005). This indicates that the appreciation pressure on the RMB would build up as economic growth continues. If the appreciation of the nominal rate lags behind the real rate appreciation, inflation pressure would increase instead. In order to secure price stability, it is unavoidable to further appreciate the RMB. Given this long-term goal, we will come back to the question of how to adjust the RMB.

The current Chinese exchange rate regime has two drawbacks. One is the tradeoff between independence of monetary policy and a fixed exchange rate regime. In order to promote the independence of monetary policy and liberalization of the capital market, the economy needs to give up stability of the exchange rate.

Another drawback is the accumulation of foreign reserves, which amount to about

⁷On September 23rd, the PBC announced that they would allow 3% daily fluctuations for other currencies except the U.S. dollar. This announcement is thought to be a simple adjustment to the recent fluctuations of dollar against the Euro.

40% of GDP. This is a result of continuous market interventions to keep the RMB against USD rate stable mainly against the speculative inflows which expect future appreciation of the exchange rate.

The large amount of foreign reserves in China contains three major risks: interest rate risks, exchange rate risks, and excess-liquidity risks⁸. Increasing liquidity in the domestic financial market due to the incompleteness of sterilization accelerated investment, which induced inflation.

The implementation of what the Chinese authorities announced on July 21st will result in greater benefits than costs. Benefits of a floating rate regime are simple: gaining the independence of monetary policy and reducing three risks due to the further accumulating foreign exchange reserves.

Costs of a floating rate regime are rather uncertain. Increase of exchange rate volatility and possible loss of price competitiveness may cause a negative effect on domestic employment and financial sector stability. However, magnitude of the net impact on the Chinese economy is far from certain.

Should the RMB float freely? In the long run, yes. However, in the medium run, the answer is no. The Chinese authorities should avoid heavy intervention in the foreign exchange market too much as they do now and let the RMB fluctuate within the announced band. Also, the Chinese authorities should actually diversify the reference currencies beside the U.S. dollar in order to lower exchange rate risks.

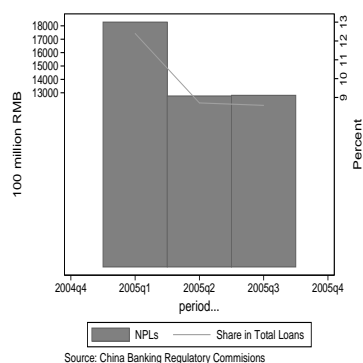
⁸Interest rate risks: $\text{Gains/Losses} = (\text{US bond interest rate} - \text{Chinese bond interest rate}) * \text{Foreign reserves}$, Exchange rate risks: $\text{Actual Gains/Losses} = (\text{spot rate when bought} - \text{spot rate when sold}) * \text{Foreign reserves}$

5 Structural Issues

5.1 Banking Sector Reforms

In order to keep sustainable economic growth in China, banking sector reforms are essential to promote efficient allocation of financial resources.

Figure 13: NPL of Official Statistic and Ratio to Total Loans



In China, the banking sector is dominated by State Owned Commercial Banks(SCBs). The SCBs focus on financial resource allocation to the SOEs based on government credit plans. However many SOEs were unable to repay their loans, and these loans became non-performing. These debts are not fully recorded in the official statistics. If the authorities leave the NPL problem unsolved, and the balance sheet of banks do not improve, then these NPLs will become sources of potential fiscal liabilities. Although the authorities tried to clean up NPLs after the Asian financial Crisis, these steps were not enough.

In 2006, the implementation of the WTO rules will open the banking sector to foreign participants. However, the Chinese financial sector remains in a fragile financial condition. In December 2003, the authorities injected \$45 billion to recapitalize two SCBs, Bank of China and China Construction Bank as seen in figure(13), yet this capital injection was not effective enough to clean up the NPLs.

Learning from other Asian countries, NPLs should be recognized and disclosed with

accuracy. The Korean case shows that drastic approaches are effective. On the contrary, the Japanese case shows taking a long time to resolve NPLs worsens the problem.

As for the solution of NPLs problems, the Chinese financial sector should improve internal management, audit, and corporate governance. In the past, they lacked sense of cooperate governance. It was not only an issue of the banking sector, but also of Chinese corporations as a whole. Many Chinese enterprises, SOEs, lacked responsibility of borrowing, and many loans became bad loans. These elements have a minus effect on FDI.

In addition, the Chinese government should improve legal systems for financial activities, such as banking mergers and closures, deposit protection, and the court system. Also the authorities should strengthen their supervisory regime in terms of financial management. In 2003, the authorities set the China Banking Regulatory Commissions and transferred the regulatory responsibilities from the PBC. However its activities is needs further improvement.

These financial institutional reforms have been aimed at expediting competitiveness and efficiency of Chinese banks in the global market. Moreover, since the Chinese authorities are heading toward a more flexibility exchange regime, SWAP and futures markets should be developed to hedge against risks due to foreign exchange transactions. Some progress has been made in strengthening and modernizing the Chinese banking system, however key areas like the improvement of supervisory regime, implementation of corporate governance, and legal systems still remain .

The Origin of NPLs

NPLs are a legacy of China's planned economy. The SOEs could not promptly adopt to the market-oriented economy after the opening up of the economy about 25 years ago. They were not efficient in terms of management. In addition, many foreign companies entered the market from the 1980s through 2000, competing against domestic companies. Many of the SOEs could not survive among the

competition and their management deteriorated. Accordingly, SOEs could not repay their loans owed to SCBs.

The potential losses from NPLs of SCBs could amount to about 13% in GDP . However, much smaller banks like banks in the rural areas must have more NPLs, and the ratio of NPLs may be higher than the SCBs . Why does China have such high levels of NPLs? One of the reasons is nested to their management. Chinese banks have small incentives to monitor their borrowers, and properly lend to profiting projects. Such distortion is historically inherited from the central planning system. Prior to 1984, China had a mono-bank system(In 1984, China established a two-tier banking system, separating commercial banking operations from the PBC. The Central Bank Law and the Commercial Bank Law was enacted in 1994.), and this bank allocated credits decided by the government to SCBs. After 1984, the Chinese government established commercial and policy banks(e.g: Agricultural Bank of China, Bank of China, The China Construction Bank, , Industrial and Commercial Bank of China, and Export-Import Bank of China). However, these banks lacked the knowledge to asses project profitability. The second reason is that borrowers tended to lack sense of obligation to repay their loans. They had a sense of implicit grantee by the government. Therefore, banks had little incentives to monitor their loans.

5.2 Labor Market Reforms

In order to sustain high GDP growth and mitigate income disparity, the Chinese authorities should reduce restrictions on labor mobility and increase higher investment in human capital ⁹.

Further liberalization of the household registration system, especially in large cities, will decrease restrictions on labor mobility significantly¹⁰. Surplus labor in the rural

⁹The true rate of return to education in China is estimated to be 30 to 40%. Thus the current level of investment in human capital relative to physical capital is lower than efficient level (Heckman J. James "China's Investment in Human Capital." NBER Working Paper 9296).

¹⁰50% of middle to small sized cities have already eased household registration system by 2003.

area will further immigrate into the urban area for higher wages and it will enhance efficient allocation of labor resources. Income disparity may widen in the short run; however, improvement in labor market efficiency will enhance higher economic growth for the economy as a whole.

In principle, higher wages are a signal of a higher rate of return on education. If labor mobility is further liberalized, less productive rural workers will be motivated to invest in education facing the opportunities to earn higher wages in other sectors than current occupation¹¹. The more productive rural labor becomes, the faster they will be able to adapt to new technology. Accumulation of such labor forces will enhance technological changes in the industrial sectors and will fuel further economic growth in the long run.

Concrete steps to achieve the above policy targets are as follows. First, construct infrastructure in urban areas to respond to the increase of residents. Second, provide social security to the immigrants from rural areas. Lack of social security has been another restriction on labor mobility besides household registration system. Third, provide education and job training services equally to the children of the immigrants from rural areas. Education opportunity affects location decisions of immigrant labor. As a policy instrument, the central government could subsidize local governments for public education expenditure. Along with direct public support, the Chinese authorities could support the development of a capital market for tuition¹².

Shenzhen city of Guang dong province, Chong ging city, and Shandong province have eased the restrictions of household registration system (The Japan Institute for Labor Policy and Training “Migration and Development of Family Registration System.” <http://www.jil.go.jp/foreign/jihou/2005.3/china.01.htm>).

¹¹Chinese labor productivity in agriculture is lower than other Asian countries (Brooks, Ray. “Labor Market Performance and Prospects” IMF Occasional Paper 232, pp55-56.).

¹²Another policy to finance education is to promote ties between industries and universities. It will provide means to finance research and education expenditures as well as enhance universities to respond to practical problems(Heckman).

5.3 Income Redistribution Policies

The Gini coefficient was 0.45 in 2001, according to the most recent estimate by the World Bank. This is 37th out of 127 countries in the Gini coefficient ranking in the United Nations Development Program(UNDP). This figure has been steadily increasing since the reform of the economy starting from 1978, although part of this outcome was predictable due to the egalitarianism nature of the socialist economy prior to the reform. Income disparity is also a multidimensional problem, with dimensions such as urban-rural disparities, inter-regional disparities(i.e. coastal-central-western) and inter-industrial disparities. A decomposition of the Gini coefficient shows that income disparities are prominent between rural-urban areas and between industries.

The budget transfer system should be reformed to favor low income provinces to decrease inter-regional disparities. The current transfer system is highly regressive, with transfers consisting of revenue returned, specific-purpose, general-purpose, and fixed subsidies. The revenue returned component is the main source of transfer, which is proportional to the tax collected by the provinces. This system was implemented in the 1984 fiscal reform where revenues were centralized, and revenue return was introduced to alleviate objections by high tax collecting provinces. 10 years after the reform, the political costs should be much lower than the benefits gained by social stability.

Inter-industrial disparities should be dealt with by strengthening a comprehensive tax system on high productivity industries, and lowering the tax rate on low productivity industries, especially agriculture. The decomposition of the Gini coefficient suggest that the main source in inter-industrial disparity is non-wage income, which is not taxed. The benefits of social stability should be significantly larger than the costs of distorting taxes.

Investment in the rural areas should be strengthened for further industrialization. Ease of migration should also alleviate this problem, although the effects may be limited due to the increase in laid-off workers from SOEs in the urban areas.

6 Appendix/Annex: Quantification of Monetary Policy

6.1 Summary

The monetary transmission mechanism of China is estimated using a structural vector autoregression (SVAR) model. A 5 variable system is estimated, identifying the contemporaneous structure of the endogenous variables via a Cholesky decomposition of the covariance matrix. Estimation results suggest that the response of the economy to unexpected policy shocks are significant.

A forecast with a time period of 16 quarters is also done. The forecast projects China's real growth may slow down.

6.2 Introduction

The recent literature quantifies the effect of monetary policies utilizing a structural vector autoregression (SVAR) estimation procedure. Although there are many empirical works on the US and other G7 countries, analysis of developing countries such as China are still few. For developing countries, the modeling of an open-economy create difficulties, combined with the lack of data, both in quantity and quality.

The estimation results of a SVAR estimation is often summarized in forms of an impulse response function and forecast error variance decomposition. An impulse response function is the response of the whole system, given a specific realization of the random variables of the system (shock). The choice of the realization is somewhat ambiguous, making the interpretation of the shocks difficult. If this is not done with care, the estimation results in puzzling outcomes. Most developments in the SVAR literature are done in identifying the contemporaneous structure of the endogenous variables or fundamental shocks. The estimation here utilizes the standard Cholesky identification strategy, justified by the planned nature of the Chinese economy.

6.3 Model

A general representation of the SVAR model is as follows.

$$A \begin{bmatrix} \mathbf{X}_t \\ \mathbf{M}_t \end{bmatrix} = B(L) \begin{bmatrix} \mathbf{X}_{t-1} \\ \mathbf{M}_{t-1} \end{bmatrix} + D\mathbf{Z}_t + C\boldsymbol{\epsilon}_t \quad (1)$$

where \mathbf{X}_t is the economy block, \mathbf{M}_t is the monetary block, and \mathbf{Z}_t are exogenous variables. $\boldsymbol{\epsilon}_t$ are shocks which are fundamental in the sense that these random variables are not functions of any other random variables. The matrix A expresses the contemporaneous structure of the endogenous variables, while C expresses the contemporaneous structure of the fundamental random variables.

The actual model that is estimable is the following reduced form.

$$\begin{bmatrix} \mathbf{X}_t \\ \mathbf{M}_t \end{bmatrix} = F(L) \begin{bmatrix} \mathbf{X}_{t-1} \\ \mathbf{M}_{t-1} \end{bmatrix} + G\mathbf{Z}_t + \mathbf{u}_t \quad (2)$$

The relation between the two models are,

$$A^{-1}B(L) = F(L), \quad A^{-1}D = G \quad (3)$$

$$A^{-1}C\boldsymbol{\epsilon}_t = \mathbf{u}_t \quad (4)$$

All structures with a nonsingular matrix A result in the same reduced form, making them observationally equivalent. Further a priori information is necessary in order to identify the structure.

In this work, a 5 variable system was estimated using the following endogenous variables.

$$\mathbf{X}_t = \begin{bmatrix} \text{GDP Growth}_t \\ \text{CPI}_t \\ \text{REER}_t \end{bmatrix}, \quad \mathbf{M}_t = \begin{bmatrix} \Delta\text{M2}_t \\ \text{Bank Rate}_t \end{bmatrix} \quad (5)$$

Interest rate spread of the Federal Funds Rate and the Bank Rate was included as an exogenous variable.

$$\mathbf{Z}_t = \text{FFR-Bank Rate}_t \quad (6)$$

Quarterly data was collected from the IFS database for the period 1990Q2 to 2002Q3, except for GDP growth data. There are no national statistics for quarterly GDP data prior to 1999. As a proxy, the industrial production index from the CEIC database was used instead.

Lag length was set to 2 using AIC and BIC criterions.

The contemporaneous structure is identified as being lower triangular.

$$\begin{bmatrix} a_{11} & & & & \\ a_{21} & a_{22} & & & \\ a_{31} & a_{32} & a_{33} & & \\ a_{41} & a_{42} & a_{43} & a_{44} & \\ a_{51} & a_{52} & a_{53} & a_{54} & a_{55} \end{bmatrix} \begin{bmatrix} \text{GDP Growth}_t \\ \text{CPI}_t \\ \text{REER}_t \\ \Delta M2_t \\ \text{Bank Rate}_t \end{bmatrix} = \epsilon_t \quad (7)$$

with $\text{Var}(\epsilon_t)$ being diagonal.

This implies that the bank rate is determined with contemporaneous feedback from all variables in the system. In other words, the central bank's decision of the policy interest rate is done using full information of the system. $\Delta M2$ is determined with contemporaneous feedback other than the bank rate. At the other extreme, there is no contemporaneous feedback to GDP growth from other variables. The slow responding, recursive structure of the economy can be justified by the somewhat planned nature of the economy.

6.4 Estimation Results

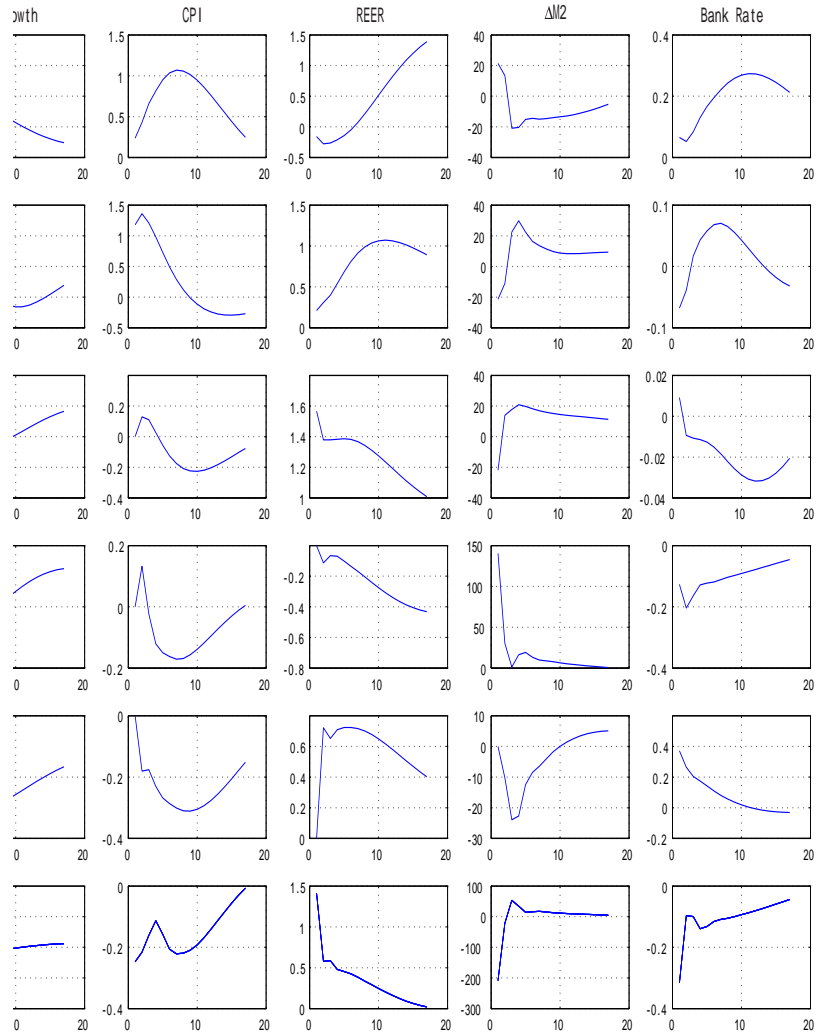
Figure(14) is the estimated impulse response function with a time horizon of 16 quarters. The confident intervals were estimated by bootstrapping(Runkle, 1987).

Only the impulse response function of the bank rate has the luxury of interpreting the shocks as fundamental, exogenous shocks. The contemporaneous feedback of the policy equation is as follows.

$$0.065 \text{GDP_growth}_t - 0.068 \text{CPI}_t + 0.009 \text{REER}_t - .127 \Delta M2 + 0.371 \text{Bank_Rate}_t = \epsilon_{mt}$$

The impulse response of bank rate shock(policy innovation) shows a one standard deviation shock, which is equivalent to a 0.371 increase in bank rate. The signs of response are consistent with theory. CPI steadily decreases 30 basis points for the proceeding 8 quarters. This result is useful, not only that is shows the magnitude of CPI decrease, but also the length of the monetary transmission lag. M2 also

Figure 14: Impulse Response Function

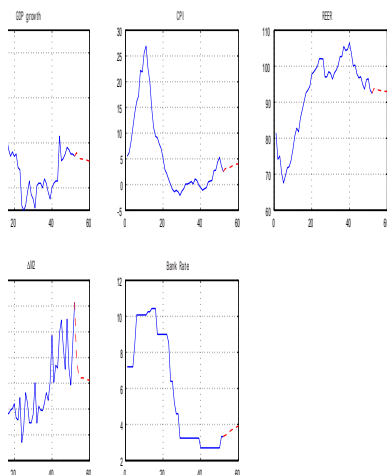


decreases, a cumulative amount of 273 billion RMB. There is also persistence in own response, evidence of interest rate smoothing. There is a minus impact on GDP growth, although the level of impact is 5 basis points and small. REER also appreciates approximately 0.7 units. Summarizing, the effect of slowing GDP is small, at the same time being an effective instrument at controlling inflation.

Figure(15) is a 4 quarter forecast, using the last 2 periods of the data. The

interest rate spread was set to zero for all periods of the forecast horizon.

Figure 15: 4 Quarter Forecast



The results show an upward trend for inflation. GDP growth is also projected to slow down. This result suggests that the monetary authorities further increase the bank rate to bring inflation down.

The estimation results show that the bank rate is a good policy instrument. But this promising result may not hold in the future due to reforms in the financial market.

References

- [1] IMF:www.imf.org
- [2] Brooks, Ray "Labor Market Performance and Prospects" IMF Occasional Paper 232
- [3] China Monetary Report, Quarter 2, 2005
- [4] Junko Kato "Regressive Taxation and the Welfare State: Path Dependence and Policy Diffusion" 2003, Cambridge University Press
- [5] Heckman J. James "China's Investment in Human Capital" NBER Working Paper 9296

- [6] Frankel, Jeffrey, 2005, "On the Renminbi: The Choice Between Adjustment Under A Fixed Exchange Rate and Adjustment Under A Flexible Rate." (NBER Working Paper Series. 11274)
- [7] Goldstein, Morris, 2004, "Adjusting China's Exchange Rate Policies." (Institute for International Economics.)
- [8] World Bank:www.worldbank.org
- [9] Prasad, Eswar, 2004, "China's Growth and Integration into the World Economy Prospects and Challenges"(Washington: IMF occasional paper 232)
- [10] People's Bank of China : www.pbc.gov.cn
- [11] State Administration of foreign Exchange: www.safe.gov.cn
- [12] National Bureau of Statistics: www.stats.gov.cn
- [13] Ministry of Finance: www.mof.gov.cn
- [14] CIA: <http://www.cia.gov/cia/>
- [15] CEIC Data Company Ltd: <http://www.ceicdata.com>
- [16] IMF, International Financial Statistics, 2005 Sep.
- [17] <http://www.chinaepayments.com/resource/info/info08.asp>
- [18] WTO "World Trade Report 2005"
- [19] UNESCO http://www.uis.unesco.org/ev.php?URL_ID=5204&URL_D0=DO.TOPIC&URL_SECTION=201