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A SMALL MACROECONOMETRIC MODEL OF THE PEOPLE’S REPUBLIC OF CHINA

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FOREWORD

The ERD Working Paper Series is a forum for ongoing and recently completed research and policy studies undertaken in the Asian Development Bank or on its behalf. The Series is a quick-disseminating, informal publication meant to stimulate discussion and elicit feedback. Papers published under this Series could subsequently be revised for publication as articles in professional journals or chapters in books.
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ABSTRACT

This paper describes a quarterly macroeconometric model of the economy of People’s Republic of China. The model comprises household consumption, investment, government, trade, production, prices, money, and employment blocks. The equilibrium-correction form is used for all the behavioral equations and the general→simple dynamic specification approach is adopted in order to ensure the best possible blend of *a priori* long-run theories with *a posteriori* identified short-run factors, as well as country-specific features. The tracking performance of the model is evaluated. Forecasting and empirical investigation of a number of topical macroeconomic issues utilizing model simulations have shown the model to be immensely useful.
I. INTRODUCTION

This paper outlines key features of an Asian Development Bank (ADB) model of the economy of People’s Republic of China (PRC), which is adapted and augmented from China_QEM, a quarterly macroeconometric model built by the Institute of World Economics and Politics (IWEP), Chinese Academy of Social Sciences.¹ First started in early 2004, model adaptation and augmentation have taken more than a year due primarily to the inherent difficulty in modeling a highly vibrant economy like the PRC as well as major revisions in the country’s historical data, particularly the revision on the sectoral components of gross domestic product (GDP) in early 2005.²

The scale of the model is essentially based on the Asian Development Outlook (ADO) data sheet as well as data availability, since the primary purpose of the modeling project is to strengthen preparation of the ADO publication.³ To facilitate the need for forecasting and policy simulation, the model is guided by the main criteria that all behavioral equations should be economically meaningful; all parameter estimates relatively robust and time-invariant; dummy variables used as rarely as possible; and variables representing policy instruments have valid properties of exogeneity. The model has the following main characteristics:

(i) Economic structure. The model reflects the essence of a transitional economy. This is achieved by extending economic theories purely for market economies to incorporate certain institutional factors pertaining to a mixed economy. Many equations are demand-oriented to reflect a high degree of marketization. It also contains a number of supply-side equations. In particular, the supply side of GDP plays a central role in the real-sector part of the model, a feature absent in most of the existing macroeconometric models in the PRC.

(ii) Econometric methods. The Equilibrium/Error Correction Model form is used for all behavioral equations to embed long-run economic theories into adequately specified dynamic equations following the dynamic specification approach (see Hendry 1995). To ensure within-sample coefficient constancy, we used recursive estimation methods and/or parameter constancy tests extensively. We also minimized the use of dummy variables, except for seasonal dummies, as imposition of occasional dummies often indicates lack of super exogeneity and significantly reduces the policy simulation capacity of the model.

¹ China_QEM was first built in 2002 and became relatively settled in 2004 (see He et al. 2005).
² The model has had several earlier versions, including the one used for the ADO 2004 Update (ADB 2004).
³ The purpose of the modeling project is spelled out in the 2004 ADO Regional Technical Assistance Report (RETA: OTH 37423; see ADB 2004): “To improve the content and quality of ADO and ADO Update by developing quantitative tools/econometric models in support of ADB’s short- and medium-term country economic analysis.” The RETA also specifies the required basic functions of the models: “to generate the short- and medium-term economic forecasts” and “to improve the analytical content of ADO and ADO Update through quantitative analysis of economic policy.”
Section II sketches the PRC macroeconomy, data, and literature on the existing models. Section III describes the main behavioral equations of the model. Section IV summarizes the model performance results. Section V concludes. Appendix 1 contains the definition of variables and their data sources. A list of the equations and the key diagnostic test results of the estimated equations are given in Appendix 2.

II. ECONOMY, DATA, AND EXISTING MODELS

A. The PRC Economy

The PRC economy has experienced tremendous transformation and record-high growth during the last two decades since the start of economic reforms in 1978. The reforms progressed gradually from farming to commerce, to state-owned enterprises, then to government finance and banking. A so-called “socialist market economic system” was established in the early- to mid-1990s. For instance, over 80% of the agricultural products and most industrial products have been trading at market prices since 1993 (see Cai and Lin 2004, Wang 2002). The Law of the People’s Bank of China (PBC) and the Law of Commercial Banks of China were also released in 1995, making PBC a central bank independent of commercial bank loans and fiscal controls (see Shang 2000). In 1994, the managed floating regime was adopted, and the foreign trade sector became self-managed.4

B. Data

In order to make the ADB model useful for policy analysis, we choose a quarterly frequency, as this is the highest frequency at which GDP is accounted, and because much of the short-run dynamic adjustments of an economy to policy shocks occur within one to a few quarters.

Collection of a quarterly data set with an adequate sample size is quite challenging for the PRC case, especially for the GDP components. Experiments to convert the national accounting system from the material product system under the old centrally planned regime to the system of national accounts began in 1985. Although the system of national accounts was formally adopted in 1993, published statistical series are few, short, and infrequent.5

The data set was collected by the IWEP in collaboration with the National Bureau of Statistics of China. Most of the time series start from 1992, the year from which the National Bureau of Statistics of China released quarterly GDP from the production side. Due to various constraints, these quarterly series are not seasonally adjusted and are often significantly readjusted after annual data is published to make them consistent with the annual accounts. When quarterly data are unavailable, annual series are interpolated into quarterly series. Appendix 1 gives a full list of all the series used in the model and the data sources.

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4 See He et al. (2005, chapter 3) for a detailed review of the PRC’s economic dynamics during the last two decades.

5 For a detailed description of the evolution of the PRC national accounting systems, see Xu (2000).
C. Existing Models

Macroeconometric research started in the PRC in the early 1980s. Early models were built in close association with Project LINK. The models are commonly large and based on annual data series. As annual series have to go back to the prereform period for estimation purposes, many of the equations carry significant features of the old centrally planned regime. Models built using quarterly series and following the dynamic specification approach were first experimented on by the Institute of Quantitative and Technical Economics of CASS. However, their models are currently out of maintenance. The PBC has recently developed a small quarterly model mainly for analyzing the interaction between the macroeconomy and monetary policy (see Liu 2003). In terms of econometrics, these quarterly models have given greater attention to the time-series properties of data than those earlier annual models.  

III. BASIC STRUCTURE OF THE PRC MODEL

The PRC model is roughly divided into the following blocks: income and consumption, labor and employment, investment, government, foreign trade, GDP sectors, price and wage, and monetary. There are 73 endogenous variables and 16 exogenous variables. Specification and estimation of all

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6 See He et al. (2005, chapter 4) for a detailed review of the major existing macroeconometric models in the PRC.
the behavioral and linking equations is carried out using PcGive and PcGets (see Doornik and Hendry 2001 and Hendry and Krolzig 2001). Model forecasts and simulations are performed in WinSolve (see Pierse 2001). Figure 1 depicts a simple flow chart of the model. The following briefly describes the key equation structure of each block.

A. Household Income and Consumption Block

Household income and consumption are modeled separately for urban and rural areas. Per capita income of urban households is explained mainly by average earnings per urban employee. Unemployment rate also exerts a negative effect on per capita urban income. Per capita cash income of rural households is modeled via the total income of rural households, which depends on the output of the three sectors and unemployment rate in the long run. Urban per capita consumption is explained in the long run by urban household income and real interest rate while also affected by inflation in the short run. Rural per capita consumption is explained by rural household income in the long run while in the short run, inflation exerts some effect. Aggregation of the two consumption series via population leads to the aggregate private consumption component in GDP.

B. Labor and Employment Block

Labor force depends mainly on population. Total Employment is explained by real GDP and urban wage rate. These two variables define unemployment rate. Secondary sector employment and tertiary sector employment are determined mainly by their sector real output and urban wage rate respectively, whereas primary sector employment is derived from total employment net of the employment of the other two sectors.

C. Production Block

A long-run GDP is specified as following a standard production function with constant returns to scale. This variable enables us to define a “GDP gap” variable as the deviation of GDP from long-run GDP.

Real output of both the primary and tertiary sectors are demand-driven, whereas the secondary sector real output follows a production function with constant returns to scale in the long run. The degree of openness is also found to affect the secondary sector real output.

Nominal output of the three sectors is modeled via their price deflators. These deflators are mainly linked with various price indices modeled in the price block.

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7 A detailed description of an early version of these two equations is in He and Qin (2004). However, as the investment data series have been redefined after the publication of that paper, the equation specification is now somewhat different. See also Qin and Song (2003) and Qin, Cagas, Quising, and He (2005) for more discussions of the investment issue.
D. Investment Block

The total domestic investment in fixed assets is disaggregated into government investment and business-sector investment. Government investment, measured by fiscal expenditure on capital construction and innovation, serves mainly as a fiscal policy instrument targeted at reducing unemployment and smoothening the GDP gap (see the Production block). Changes in government investment are found to impact on business-sector investment, which otherwise follows a factor-demand equation with real GDP and real lending rate playing the key explanatory roles. FDI (foreign direct investment) is modeled separately and determined primarily by GDP, relative factor prices, and interest rate differentials.

E. Government Block

Government expenditure comprises government investment and noninvestment expenditure, the latter being mainly explained by government revenue and linked to government consumption on the expenditure side of GDP. Government revenue is explained by tax revenue, which is composed of tariffs on trade, agricultural tax, and business tax mainly from the secondary and tertiary sectors.

F. Trade Block

Imports is explained in the long run by domestic demand and exports whereas inflation in the investment price is also found to exert certain short-run impact. Exports is simply linked to a world import demand variable, which is computed from a trade matrix comprising imports from the PRC by 30 countries and regions that historically have accounted for over 90% of the PRC’s exports.

G. Price and Wage Block

Consumer price index is expressed simply as retail markup of industrial output price and import price indices in the long run. In addition, wage rate changes and the GDP gap are found to impact on inflation. The latter factor provides us with a useful macro measure of “overheating.” Industrial output price is dependent mainly on import price index, investment price index, and ratio of wage earnings per urban employee over per capita output from the secondary sector. Fixed investment price index is mainly explained by the secondary sector deflator, import price index, and bank lending rate. Import price index follows the world price index and exchange rate while also being affected by export price dynamics. In fact export and import price indices are mutually dependent.8

Urban wage rate is explained by labor productivity in the secondary and tertiary sectors.

H. Monetary Block

This block of the model follows the fundamental ideas of the Polak (1957 and 1997) model, which is based on the key entries of two balance sheets: the balance sheet of the total banking

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8 When endogenous variables are found to be mutually dependent, simultaneous-equation estimation is performed to check for simultaneity bias.
sector and the balance sheet of the monetary authority (see Qin, He, Liu, and Quising 2005 for a detailed description of this block).

The total banking sector balance sheet is linked to the real economy via broad money, $M_2$, and net foreign assets. $M_2$ is explained via its two components: $M_1$ and quasi-money. $M_1$ follows a demand-driven equation with real GDP and real interest rate being the key long-run explanatory variables. Quasi-money is mainly explained by potential savings, i.e., household income less household consumption, and deposit interest rate. Net foreign assets is explained mainly by foreign trade balance and foreign direct investment.

The purpose of modeling the balance sheet of the monetary authority is to identify how monetary policies affect the economy. A key policy instrument identified is the imbalance between the monetary base and the base money supply, since the PBC has rarely adjusted interest rates on lending and deposits over the sample period. Monetary base comprises currency issue and reserve money. Currency issue is explained by $M_1$ and a gradual downward trend reflecting the impact of technological progress such as electronic transactions on cash demand. Reserve money is modeled via excess reserves in terms of the excess reserve ratio. This ratio depends mainly on the required reserves ratio, the ratio of money supply to the monetary base, and the lending rate. Base money supply is modeled via the ratio of its excess supply to monetary base, which is found to be dependent on inflation.

IV. MODEL PERFORMANCE

The model is evaluated for both within-sample and out-of-sample predictive performance. Empirical studies of a number of macroeconomic issues by means of model simulations have also demonstrated the usefulness of the model.

(i) Within-sample performance: Using historical data, static solutions of the model are generated. Figure 2 depicts the static simulations versus the actual values of four key macroeconomic variables in terms of their year-on-year growth rates: GDP, $M_1$, inflation in terms of the consumer price index, and unemployment. The fitted and actual values would be too close to be visually differentiable if they are plotted in levels. In addition, conventional statistics such as the root mean square percentage errors (RMSPE) and the mean percentage errors (MPE) are also calculated. Table 1 presents these statistics for a number of key variables. As seen from the table, the model tracks these major macro indicators reasonably well.

(ii) Out-of-sample performance: We evaluate out-of-sample performance through stochastic simulations. The McCarthy method is used here to generate random shocks from individual equation residuals for a specified sample period. Five hundred stochastic simulations are carried out and quantiles are computed to characterize the distribution of the simulated results. Figure 3 presents the stochastic forecasts of eight selected...
variables. Three curves are plotted for each variable: the simulated values at 2% quantile, 50% quantile, and 97% quantile. We regard the series at the 50% quantile as the approximate mean forecast, and the series at the 2% quantile and at the 97% quantile approximately as forming the 95% confidence interval.\(^\text{10}\)

In addition to the above, the model has proved to be immensely useful in assisting in-depth analysis of topical macroeconomic issues. For example, Qin, He, Liu, and Quising (2005) carry out various simulations to show how monetary policy impacts on the economy via different instruments; Qin, Cagas, Quising, and He (2005) apply impulse analysis to investigate how much and in what ways investment and output affect each other; Qin, Cagas, Ducanes, and He (2005) extend the household block of the model to incorporate income inequality indices into the consumption equations to study the impact of increasing income inequality on growth.

\(^{10}\) For the detailed description of the stochastic simulations, see Pierse (2001).
Table 1  
Prediction Statistics of the PRC Model, 1994Q1–2005Q2

<table>
<thead>
<tr>
<th>VARIABLE</th>
<th>RMSPE</th>
<th>MPE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Primary sector real output</td>
<td>0.0095</td>
<td>-0.0010</td>
</tr>
<tr>
<td>Secondary sector real output</td>
<td>0.0241</td>
<td>-0.0035</td>
</tr>
<tr>
<td>Tertiary sector real output</td>
<td>0.0094</td>
<td>-0.0017</td>
</tr>
<tr>
<td>Per capita income of urban households</td>
<td>0.0301</td>
<td>-0.0043</td>
</tr>
<tr>
<td>Per capita income of rural households</td>
<td>0.1047</td>
<td>0.0118</td>
</tr>
<tr>
<td>Per capita consumption of urban households</td>
<td>0.0321</td>
<td>0.0150</td>
</tr>
<tr>
<td>Per capita consumption of rural households</td>
<td>0.0497</td>
<td>-0.0073</td>
</tr>
<tr>
<td>Business sector real investment</td>
<td>0.1819</td>
<td>0.0077</td>
</tr>
<tr>
<td>Government real investment</td>
<td>0.1187</td>
<td>0.0177</td>
</tr>
<tr>
<td>Government expenditure</td>
<td>0.0897</td>
<td>0.0046</td>
</tr>
<tr>
<td>Government revenue</td>
<td>0.0141</td>
<td>0.0009</td>
</tr>
<tr>
<td>Narrow money (M1)</td>
<td>0.0180</td>
<td>0.0015</td>
</tr>
<tr>
<td>Broad money (M2)</td>
<td>0.0082</td>
<td>-0.0014</td>
</tr>
<tr>
<td>Consumer price index</td>
<td>0.0099</td>
<td>-0.0003</td>
</tr>
<tr>
<td>Producer price index</td>
<td>0.0104</td>
<td>0.0012</td>
</tr>
<tr>
<td>Investment price index</td>
<td>0.0157</td>
<td>0.0000</td>
</tr>
</tbody>
</table>

Note: The RMSPE and MPE are computed as follows:

$$RMSPE = \sqrt{\frac{1}{T} \sum_{t=1}^{T} \left( \frac{Y_t^s - Y_t^a}{Y_t^a} \right)^2}$$
$$MPE = \frac{1}{T} \sum_{t=1}^{T} \left( \frac{Y_t^s - Y_t^a}{Y_t^a} \right)$$

where $Y^s$ and $Y^a$ are the simulated and actual values of an endogenous variable, respectively and $T$ is the number of simulation periods.
FIGURE 3
STOCHASTIC FORECASTING: KEY VARIABLES

Real GDP

Business investment

M1

Consumer price index

Rural household per capita consumption

Urban household per capita consumption

Solid line: forecasts (at 50% quantile); dotted line: confidence interval (at 2% and 97% quantiles).
Note: The simulated GDP is calculated as the sum of the simulated real output of the three sectors.
V. CONCLUSION

Although considerable changes have occurred in the PRC economy over the last two decades, we are able to build a fairly robust econometric model to capture the main macro dynamics and to forecast major macroeconomic indicators of the economy. Real-time forecasts and empirical investigation of a number of topical macroeconomic issues have proven the model to be immensely useful. Further improvements of the model are expected with its continued application to the analysis of the PRC macroeconomy.
## APPENDIX 1

### VARIABLE LIST

<table>
<thead>
<tr>
<th>VARIABLE NAME</th>
<th>DEFINITION</th>
<th>HOW TO GENERATE IN THE MODEL</th>
<th>DATA SOURCES</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 BINV_PRC</td>
<td>Business Sector Fixed Capital Formation (million yuan, Total investment in fixed assets less GINV)</td>
<td>Identity</td>
<td>Total investment in Fixed Assets net of GINV, CMEI</td>
</tr>
<tr>
<td>2 BINVc_PRC</td>
<td>Business Sector Fixed Capital Formation (million yuan, in 1992Q1 price)</td>
<td>Endogenous</td>
<td>BINV deflated by P#INV</td>
</tr>
<tr>
<td>3 CAB$_PRC</td>
<td>Current Account Balance (million US$)</td>
<td>Endogenous</td>
<td>CSY</td>
</tr>
<tr>
<td>4 DC_PRC</td>
<td>Domestic Credit (billion yuan)</td>
<td>Endogenous</td>
<td>IMF</td>
</tr>
<tr>
<td>5 DEPK%.PRC</td>
<td>Annual Depreciation Rate of Fixed Assets (%)</td>
<td>Exogenous</td>
<td>IWEP</td>
</tr>
<tr>
<td>6 EMP_PRC</td>
<td>Total Employment (million)</td>
<td>Endogenous</td>
<td>Interpolated from CSY</td>
</tr>
<tr>
<td>7 EMP1_PRC</td>
<td>Primary Sector Employment (million)</td>
<td>Identity</td>
<td>Interpolated from CSY</td>
</tr>
<tr>
<td>8 EMP2_PRC</td>
<td>Secondary Sector Employment (million)</td>
<td>Endogenous</td>
<td>Interpolated from CSY</td>
</tr>
<tr>
<td>9 EMP3_PRC</td>
<td>Tertiary Sector Employment (million)</td>
<td>Endogenous</td>
<td>Interpolated from CSY</td>
</tr>
<tr>
<td>10 ER_PRC</td>
<td>Exchange Rate (RMB/1US$, end of period)</td>
<td>Exogenous</td>
<td>CMEI</td>
</tr>
<tr>
<td>11 FD_PRC</td>
<td>Foreign Deposits</td>
<td>Exogenous</td>
<td>QB</td>
</tr>
<tr>
<td>12 FDI$_PRC</td>
<td>Foreign Direct Investment in PRC (Actually Utilized, million US$)</td>
<td>Endogenous</td>
<td>FDI$ converted by ER</td>
</tr>
<tr>
<td>13 FDI_PRC</td>
<td>Foreign Direct Investment in PRC (Actually Utilized, million yuan)</td>
<td>Identity</td>
<td>Interpolated from CSY by NSBC</td>
</tr>
<tr>
<td>14 GCON_PRC</td>
<td>Government Consumption (million yuan)</td>
<td>Endogenous</td>
<td>CMEI</td>
</tr>
<tr>
<td>15 GCONc_PRC</td>
<td>Government Consumption (million yuan, in 1992Q1 price)</td>
<td>Identity</td>
<td>GCON deflated by P#C</td>
</tr>
<tr>
<td>16 GDEF_PRC</td>
<td>Government Deficit (million yuan)</td>
<td>Identity</td>
<td>Computed from GEXP and GREV</td>
</tr>
<tr>
<td>17 GDP$_PRC</td>
<td>Gross Domestic Product (million US$)</td>
<td>Identity</td>
<td>GDP converted by ER</td>
</tr>
<tr>
<td>18 GDP_PRC</td>
<td>Gross Domestic Product (million yuan)</td>
<td>Identity</td>
<td>CMEI</td>
</tr>
<tr>
<td>19 GDPc_PRC</td>
<td>Gross Domestic Product (million yuan, in 1992Q1 price)</td>
<td>Identity</td>
<td>CMEI</td>
</tr>
<tr>
<td>20 GDPCSD_PRC</td>
<td>Statistical Discrepancy between Supply Side and Demand Side</td>
<td>Identity</td>
<td>Computed by identity</td>
</tr>
<tr>
<td>21 GDPe_PRC</td>
<td>Effective Domestic Demand (million yuan)</td>
<td>Identity</td>
<td>Computed by identity</td>
</tr>
<tr>
<td>22 GDPDLR_PRC</td>
<td>Long-run supply trend of GDP (million yuan)</td>
<td>Endogenous</td>
<td>CMEI</td>
</tr>
<tr>
<td>23 GEXP_PRC</td>
<td>Government Expenditures (million yuan)</td>
<td>Endogenous</td>
<td>CMEI</td>
</tr>
<tr>
<td>24 GINV_PRC</td>
<td>Government Fixed Capital Formation (million yuan, Sum of Expenditure for capital construction and Innovation funds of enterprises)</td>
<td>Identity</td>
<td>CMEI</td>
</tr>
<tr>
<td>25 GINVc_PRC</td>
<td>Government Fixed Capital Formation (million yuan, in 1992Q1 price)</td>
<td>Endogenous</td>
<td>GINV deflated by P#INV</td>
</tr>
<tr>
<td>26 GIR$_PRC</td>
<td>Gross International Reserves (million US$)</td>
<td>Endogenous</td>
<td>CSY</td>
</tr>
<tr>
<td>27 GNP_PRC</td>
<td>Gross National Product (million yuan)</td>
<td>Endogenous</td>
<td>CSY</td>
</tr>
<tr>
<td>28 GREV_PRC</td>
<td>Government Budgetary Revenue (million yuan)</td>
<td>Endogenous</td>
<td>CMEI</td>
</tr>
<tr>
<td>29 GTAX_PRC</td>
<td>Government Tax Revenues (million yuan)</td>
<td>Endogenous</td>
<td>CMEI</td>
</tr>
<tr>
<td>30 INV_PRC</td>
<td>Fixed Capital Formation (million yuan)</td>
<td>Identity</td>
<td>Interpolated from CSY</td>
</tr>
<tr>
<td>VARIABLE NAME</td>
<td>DEFINITION</td>
<td>HOW TO GENERATE IN THE MODEL</td>
<td>DATA SOURCES</td>
</tr>
<tr>
<td>---------------</td>
<td>------------</td>
<td>-----------------------------</td>
<td>--------------</td>
</tr>
<tr>
<td>31 INVc_PRC</td>
<td>Fixed Capital Formation (million yuan, in 1992 price)</td>
<td>Endogenous</td>
<td>by CMEI</td>
</tr>
<tr>
<td>32 IRCB%_PRC</td>
<td>Central Bank Rediscount Rate (%)</td>
<td>Exogenous</td>
<td>INV deflated by P#INV</td>
</tr>
<tr>
<td>33 IRD%_PRC</td>
<td>One Year Interest Rate of Deposit (%)</td>
<td>Endogenous</td>
<td>QB</td>
</tr>
<tr>
<td>34 IRDD%_PRC</td>
<td>Interest Rate on Demand Deposits (%)</td>
<td>Endogenous</td>
<td>QB</td>
</tr>
<tr>
<td>35 IRL%_PRC</td>
<td>One Year Interest Rate of Lending (%)</td>
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<tr>
<td>36 IRL%_USA</td>
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<td>Exogenous</td>
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<tr>
<td>37 K_PRC</td>
<td>Stock of Fixed Investment Assets (million yuan)</td>
<td>Identity</td>
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<tr>
<td>38 LF_PRC</td>
<td>Economically Active Population (million)</td>
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<tr>
<td>39 M$_PRC</td>
<td>Imports (million US$)</td>
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</tr>
<tr>
<td>40 M_PRC</td>
<td>Imports (million yuan)</td>
<td>Identity</td>
<td>M$ converted by ER</td>
</tr>
<tr>
<td>41 Mc_PRC</td>
<td>Imports (million yuan, in 1992 price)</td>
<td>Identity</td>
<td>M deflated by P#M</td>
</tr>
<tr>
<td>42 MO_PRC</td>
<td>PBC currency issue (million yuan)</td>
<td>Endogenous</td>
<td>QB</td>
</tr>
<tr>
<td>43 M1_PRC</td>
<td>Narrow Money (million yuan)</td>
<td>Endogenous</td>
<td>QB</td>
</tr>
<tr>
<td>44 M2_PRC</td>
<td>Broad Money (million yuan)</td>
<td>Endogenous</td>
<td>QB</td>
</tr>
<tr>
<td>45 MB_PRC</td>
<td>Base Money (million yuan, M0 plus RSV)</td>
<td>Identity</td>
<td>Computed from QB</td>
</tr>
<tr>
<td>46 MBS_PRC</td>
<td>Base Money Supply (million yuan, net foreign assets plus net government claims and borrowed reserve by financial institutions at PBC)</td>
<td>Endogenous</td>
<td>Computed from QB</td>
</tr>
<tr>
<td>47 MSP_PRC</td>
<td>Money Supply Policy</td>
<td>Exogenous</td>
<td></td>
</tr>
<tr>
<td>48 NFA_PRC</td>
<td>Net Foreign Assets of the Banking Sector (billion yuan)</td>
<td>Endogenous</td>
<td>QB</td>
</tr>
<tr>
<td>49 NFI_A_PRC</td>
<td>Net Factor Income from Abroad (million yuan)</td>
<td>Endogenous</td>
<td>CSY</td>
</tr>
<tr>
<td>50 PhC_PRC</td>
<td>Consumer Price Index (1992Q1=1)</td>
<td>Exogenous</td>
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<tr>
<td>51 PhGDP_PRC</td>
<td>GDP Deflator (1992Q1=1)</td>
<td>Endogenous</td>
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<tr>
<td>52 PhINV_PRC</td>
<td>Price Index of Investment in Fixed Assets (1992Q1=1)</td>
<td>Endogenous</td>
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<tr>
<td>53 PhM_PRC</td>
<td>Import Price Index (1992Q1=1)</td>
<td>Endogenous</td>
<td>Computed by IWEP</td>
</tr>
<tr>
<td>54 PhP_PRC</td>
<td>Producers Price Index; proxied by Ex-factory Price Index of Industrial Products (1992Q1=1)</td>
<td>Endogenous</td>
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<tr>
<td>55 PhWX$</td>
<td>World Export Price Index (1992Q1=1)</td>
<td>Exogenous</td>
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<td>56 PhX_PRC</td>
<td>Export Price Index (1992Q1=1)</td>
<td>Endogenous</td>
<td>Computed by IWEP</td>
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<tr>
<td>57 PCCONr_PRC</td>
<td>Per Capita Living Expenditure of Rural Household in Cash (yuan)</td>
<td>Endogenous</td>
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<tr>
<td>58 PCCONu_PRC</td>
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<td>59 PCGDP_PRC</td>
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<td>60 PCINC_PRC</td>
<td>Per Capita Income in Cash of Rural Household (yuan)</td>
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<tr>
<td>61 PCINCu_PRC</td>
<td>Per Capita Disposable Income of Household, Urban (yuan)</td>
<td>Endogenous</td>
<td>CMEI</td>
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<tr>
<td>62 PCON_PRC</td>
<td>Household Consumption Expenditure (million yuan)</td>
<td>Endogenous</td>
<td>Interpolated from CSY by NSBC</td>
</tr>
<tr>
<td>63 PCONc_PRC</td>
<td>Household Consumption Expenditure (million yuan, in 1992 price)</td>
<td>Identity</td>
<td>PCON deflated by P#C</td>
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<tr>
<td>64 POP_PRC</td>
<td>Total Population (million)</td>
<td>Exogenous</td>
<td>Interpolated from CSY</td>
</tr>
<tr>
<td>VARIABLE NAME</td>
<td>DEFINITION</td>
<td>HOW TO GENERATE IN THE MODEL</td>
<td>DATA SOURCES</td>
</tr>
<tr>
<td>--------------</td>
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<td>------------------------------</td>
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</tr>
<tr>
<td>65 POPr_PRC</td>
<td>Population, Rural (million)</td>
<td>Identity</td>
<td>Interpolated from CSY</td>
</tr>
<tr>
<td>66 POPu_%_PRC</td>
<td>Urban Population Over Total Population (%)</td>
<td>Exogenous</td>
<td>Computed by Identity</td>
</tr>
<tr>
<td>67 POPu_PRC</td>
<td>Population, Urban (million)</td>
<td>Identity</td>
<td>Interpolated from CSY</td>
</tr>
<tr>
<td>68 PSAV_PRC</td>
<td>Potential Saving Deposit (million yuan)</td>
<td>Identity</td>
<td>Interpolated from CSY</td>
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<tr>
<td>69 RR_%_PRC</td>
<td>Required Reserves Ratio</td>
<td>Exogenous</td>
<td>QB</td>
</tr>
<tr>
<td>70 RSY_PRC</td>
<td>Deposits by Financial Institutions at PBC (million yuan)</td>
<td>Endogenous</td>
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</tr>
<tr>
<td>71 STK_PRC</td>
<td>Changes in Inventories (million yuan)</td>
<td>Identity</td>
<td>Computed by identity</td>
</tr>
<tr>
<td>72 STKc_PRC</td>
<td>Changes in Inventories (million yuan, in 1992Q1 price)</td>
<td>Identity</td>
<td>Computed by identity</td>
</tr>
<tr>
<td>73 TAX%_PRC</td>
<td>Tax Rate (%)</td>
<td>Identity</td>
<td>Exogenous</td>
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<tr>
<td>74 TAX1_PRC</td>
<td>Proportion of Agriculture Tax</td>
<td>Exogenous</td>
<td>Computed from CSY</td>
</tr>
<tr>
<td>75 TB$_PRC</td>
<td>Trade Balance (in million US$)</td>
<td>Endogenous</td>
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<tr>
<td>76 TRF_PRC</td>
<td>Proportion of Tariff in Tax</td>
<td>Exogenous</td>
<td>Computed from CSY</td>
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<tr>
<td>77 UCC%_PRC</td>
<td>User Cost of Capital (%)</td>
<td>Identity</td>
<td>Computed by identity</td>
</tr>
<tr>
<td>78 UEMP%_PRC</td>
<td>Unemployment Rate (%)</td>
<td>Identity</td>
<td>Computed by identity</td>
</tr>
<tr>
<td>79 VA1_PRC</td>
<td>Value Added from Primary Industry (million yuan)</td>
<td>Endogenous</td>
<td>CMEI</td>
</tr>
<tr>
<td>80 VA1c_PRC</td>
<td>Value Added from Primary Industry (million yuan, in 1992Q1 price)</td>
<td>Endogenous</td>
<td>CMEI</td>
</tr>
<tr>
<td>81 VA2_PRC</td>
<td>Value Added from Secondary Industry (million yuan)</td>
<td>Endogenous</td>
<td>CMEI</td>
</tr>
<tr>
<td>82 VA2c_PRC</td>
<td>Value Added from Secondary Industry (million yuan, in 1992Q1 price)</td>
<td>Endogenous</td>
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<tr>
<td>83 VA3_PRC</td>
<td>Value Added from Tertiary Industry (million yuan)</td>
<td>Endogenous</td>
<td>CMEI</td>
</tr>
<tr>
<td>84 VA3c_PRC</td>
<td>Value Added from Tertiary Industry (million yuan, in 1992Q1 price)</td>
<td>Endogenous</td>
<td>CMEI</td>
</tr>
<tr>
<td>85 WAGEu_PRC</td>
<td>Average Earnings of Urban Employed Persons (yuan)</td>
<td>Endogenous</td>
<td>CMEI</td>
</tr>
<tr>
<td>86 WTS_PRC</td>
<td>World Imports from PRC (million US$)</td>
<td>Exogenous</td>
<td>Computed by ADB</td>
</tr>
<tr>
<td>87 X$_PRC</td>
<td>Export (million US$)</td>
<td>Endogenous</td>
<td>CMEI</td>
</tr>
<tr>
<td>88 X_PRC</td>
<td>Export (million yuan)</td>
<td>Identity</td>
<td>X$ converted by ER</td>
</tr>
<tr>
<td>89 Xc_PRC</td>
<td>Export (million yuan, in 1992 price)</td>
<td>Identity</td>
<td>M deflated by P#M</td>
</tr>
</tbody>
</table>

Note: CMEI means China Monthly Economic Indicators
CSY means China Statistics Yearbook
IFS means International Financial Statistics
QB means Quarterly Banking
IWEP means Institute of World Economics and Politics
## APPENDIX 2
### EQUATION LIST

### APPENDIX 2A. ESTIMATED EQUATIONS

#### 1. Income and Consumption

##### 1.1 Income: Urban

\[
\Delta \ln(\text{PCINC}_u_{PRC}) = -0.4213 \times \Delta \ln(\text{PCINC}_u_{PRC} - 1) + 0.0254 + 0.2561 \times \Delta \ln(\text{WAGE}_u_{PRC}) - 0.1265 \times \Delta \text{UEMP}\%_{PRC}
\]

\[
\begin{bmatrix}
0.0399 \\
0.0139 \\
0.0608 \\
0.0749 \\
0.0780 \\
0.0512 \\
0.0324 \\
0.0542 \\
0.1127 \\
0.1561
\end{bmatrix}
\]

\[B11\]

\[
\text{PCINC}_{ECM}_{PRC} = \ln(\text{PCINC}_{u_{PRC}}) - \ln(\text{WAGE}_{u_{PRC}}) + 0.27 \times \text{UEMP}\%_{PRC} - 1
\]

**Residual Diagnostics**

- \(\text{sigma} = 0.03214\)
- \(\text{variance} = 0.1851\)
- \(R^2 = 0.9560\)
- \(\text{joint parameter constancy} = 1.0307\)
- No autocorrelation \(F(4, 35) = 0.8715 [0.4907]\)
- No ARCH \(F(4, 31) = 0.2334 [0.9174]\)
- Normality \(\text{Chi}^2(2) = 13.554 [0.0011]**\)
- Homoscedasticity \(F(9, 29) = 0.7352 [0.6739]\)
- \(\text{RESET} = F(1, 38) = 0.0158 [0.9007]\)

##### 1.2 Income: Rural

\[
\Delta \ln(\text{PCINC}_r \times \text{POP}_r_{PRC}) = -6.7149 - 0.2400 \times \Delta \text{UEMP}\%_{PRC} - 0.1730 \times \Delta \ln(\text{VA}_3_{PRC}) - 0.25 \times \ln(\text{VA}_3_{PRC}) + 0.45 \times \ln(\text{VA}_2_{PRC} - 1) - 0.13 \times \text{SQ}_3
\]

\[
\begin{bmatrix}
0.0148 \\
0.2138 \\
0.1184 \\
0.0168 \\
0.0511 \\
0.0567 \\
0.0618 \\
0.0261 \\
0.2961
\end{bmatrix}
\]

\[B12\]

\[
\begin{align*}
\text{PCINC}_{ECM}_{PRC} &= \ln(\text{PCINC}_{r \times \text{POP}_r_{PRC} / 10000}) - 0.3 \times \ln(\text{VA}_1_{PRC}) - 0.45 \times \ln(\text{VA}_2_{PRC} - 1) - 0.25 \times \ln(\text{VA}_3_{PRC}) + 0.42 \times \text{SQ}_2 + 0.13 \times \text{SQ}_3 \\
\text{PCINC}_r_{PRC} &= \text{Per Capita Income in Cash of Rural Household} \\
\text{POP}_r_{PRC} &= \text{Population, Rural} \\
\text{UEMP}\%_{PRC} &= \text{Unemployment Rate} \\
\text{VA}_1_{PRC} &= \text{Value Added from the Primary Industry}
\end{align*}
\]
### Residual Diagnostics & Stability

<table>
<thead>
<tr>
<th>Residual Diagnostics</th>
<th>Stability</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>sigma</strong></td>
<td>0.0643</td>
</tr>
<tr>
<td><strong>R²</strong></td>
<td>0.9661</td>
</tr>
<tr>
<td><strong>No autocorrelation</strong></td>
<td>F(3,36) = 0.7543 [0.5271]</td>
</tr>
<tr>
<td><strong>No ARCH</strong></td>
<td>F(3,33) = 0.4236 [0.7373]</td>
</tr>
<tr>
<td><strong>Normality</strong></td>
<td>Chi²(2) = 0.8760 [0.6453]</td>
</tr>
<tr>
<td><strong>Homoscedasticity</strong></td>
<td>F(6,32) = 1.2704 [0.2985]</td>
</tr>
<tr>
<td><strong>RESET</strong></td>
<td>F(1,38) = 0.1240 [0.7267]</td>
</tr>
</tbody>
</table>

### Consumption: Urban

\[
\Delta_2 \ln(\text{PCCONu}_\text{PRC}) = -0.433765^* \Delta_2 \ln(\text{PCCONu}_\text{PRC}_2) - 0.0570 - 0.03373^* (\text{SQ1} + \text{SQ2}) - 0.2142^* \Delta_2 \ln(\text{PCINCu}_\text{PRC}) + 0.536864^* \Delta_4 \ln(\text{PCINCu}_\text{PRC}) - 0.49138^* \ln(\text{PCINCu}_\text{ECM}_\text{PRC} - 0.005^* [\text{IRDD}\%_\text{PRC} - 100^* \Delta_\text{ln}(\text{PCINCu}_\text{PRC})])
\]

**Residual Diagnostics**

- **sigma**: 0.0248
- **R²**: 0.9232
- **No autocorrelation**: F(3,33) = 2.5124 [0.0755]
- **No ARCH**: F(3,30) = 2.7165 [0.0622]
- **Normality**: CHI²(2) = 0.7686 [0.6809]
- **Homoscedasticity**: F(9,26) = 0.9385 [0.5097]
- **RESET**: F(1,35) = 0.8442 [0.3645]

### Consumption: Rural

\[
\Delta \ln(\text{PCCONr}_\text{PRC}) = -0.2162^* \Delta \ln(\text{PCCONr}_\text{PRC}_1) - 0.2600 + 0.1000^* \text{SQ1} - 0.1500^* \text{SQ2} - 0.0700^* \text{SQ3} (0.0950) (0.1190) (0.0535) (0.0647) (0.0638)
\]

**Residual Diagnostics**

- **sigma**: 0.0418
- **R²**: 0.9801
- **No autocorrelation**: F(3,27) = 0.7066 [0.5565]
- **No ARCH**: F(3,24) = 2.4427 [0.0888]

---

**APPENDIX**

**VA2_PRC** = Value Added from the Secondary Industry

**VA3_PRC** = Value Added from the Tertiary Industry

**PCCONu_PRC** = Per Capita Living Expenditures of Urban Household in Cash

**PCINCu_PRC** = Per Capita Income of Urban Households

**IRDD%_PRC** = Demand Deposit Interest Rate

**P#C_PRC** = Consumer Price Index

**PCCONr_PRC** = Per Capita Living Expenditure of Rural Households in Cash

**PCINCr_PRC** = Per Capita Income in Cash of Rural Household

**P#C_PRC** = Consumer Price Index (1992Q1=1)
### 1.5 Consumption

\[
\Delta \ln(\text{PCON}_\text{PRC}) = 0.1162 \cdot \text{DST92Q1990Q4} + 0.0930 \cdot \text{DST00010100Q4} + 0.0470 \cdot \text{DST2002Q2} + 0.028617 \cdot \text{SQ1} \\
(0.0263) \\
+ 0.7778 \cdot \Delta \ln[(\text{PCCONu}_\text{PRC} \cdot \text{POPu}_\text{PRC}) + (\text{PCCONr}_\text{PRC} \cdot \text{POPr}_\text{PRC})] \\
(0.0198) \\
+ 0.180484 \cdot \Delta \ln(\text{PCCONr}_\text{PRC} \cdot \text{POPr}_\text{PRC}) - 0.3978 \cdot \text{PCONECM}_\text{PRC} - 1 \\
(0.1023)
\]

\[
\text{PCONECM}_\text{PRC} = \ln(\text{PCON}_\text{PRC}) - \ln[(\text{PCCONu}_\text{PRC} \cdot \text{POPu}_\text{PRC}) + \ln(\text{PCCONr}_\text{PRC} \cdot \text{POPr}_\text{PRC})]
\]

**Residual Diagnostics**

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<thead>
<tr>
<th>Statistic</th>
<th>Value</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sigma</td>
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</tr>
<tr>
<td>R-squared</td>
<td>0.9991</td>
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<tr>
<td>No autocorrelation</td>
<td>F(3,25) = 0.5115 [0.6780]</td>
<td></td>
</tr>
<tr>
<td>No ARCH</td>
<td>F(3,22) = 0.0390 [0.9894]</td>
<td></td>
</tr>
<tr>
<td>Normality Chi^2(2)</td>
<td>2.0344 [0.3616]</td>
<td></td>
</tr>
<tr>
<td>Homoscedasticity F(11,18)</td>
<td>0.4988 [0.8799]</td>
<td></td>
</tr>
</tbody>
</table>

**Sample Period** 1995(1) to 2003(4)

### 2. Investment

#### 2.1 Investment: Business Sector Investment, constant price

\[
\Delta \ln(\text{BINVc}_\text{PRC}) = -5.8367 + 0.235 \cdot \text{SQ3} - 0.2765 \cdot \Delta \ln(\text{BINVc} \cdot \text{PRC} \cdot 1) - 0.35154 \cdot \Delta \text{IRL}\% \cdot \text{PRC} \\
(0.0396) \\
+ 0.1887 \cdot 0.1123 \cdot 0.0931 \\
+ 0.0857 \\
- 0.1384 \cdot \Delta \text{IRL}\% \cdot \text{PRC} - 3 + 6.7900 \cdot \Delta \ln(\text{GDPc}_\text{PRC} \cdot 2) + 0.0836 \cdot \Delta \ln(\text{GINVc}_\text{PRC} \cdot 5) \\
(0.0781) \\
+ 2.1630 \cdot 0.0353 \cdot 0.0205 \\
+ 0.0327 \\
- 3.7987 \cdot \Delta \ln(\text{P#INV}_\text{PRC} \cdot 3 / \text{P#GDP}_\text{PRC} \cdot 3) - 0.5473 \cdot \Delta \ln(\text{P#M}_\text{PRC}) \\
(0.9110) \\
+ 0.1937 \\
+ 0.6194 \cdot 0.0845 \\
+ 0.0384
\]

\[
\text{BINVcECM}_\text{PRC} = \ln(\text{BINVc}_\text{PRC} / \text{GDPc}_\text{PRC}) + 0.01 \cdot \text{IRL}\% \cdot \text{PRC} - 100 \cdot \text{P#INV}_\text{PRC} \\
- \ln(\text{GINVc}_\text{PRC} \cdot 2)
\]

**Variables**

- BINVc_PRC = Business Sector Investment
- IRL%_PRC = One-year Interest Rate on Lending (%)
- GDPc_PRC = Gross Domestic Product, in 1992Q1 Price
- GINVc_PRC = Government Budgetary Investment
- P#INV_PRC = Investment Price Index (1992Q1=1)
\[ \frac{\Delta_4 \text{ln(GINVc_PRC)}}{\text{PRC}} = 4.73494 - 0.3944 \times \Delta_4 \text{ln(GINVc_PRC)}_4 - 1.9814 \times \Delta_4 \text{ln(GDP_PRC)_3}/\text{GDPLR_PRC}_3 \]\n
\[ + 0.5825 \times 0.0598 \begin{bmatrix} 0.2363 \\ 0.22396 \end{bmatrix} + 1.5481 \times \text{SQ1} - 0.7009 \times \text{GINVcECM_PRC}_4 \]

\[ \text{GINVcECM_PRC} = \text{ln(GINVc_PRC)} - 0.35 \times \text{ln(GREV_PRC/PRC)} - 0.25 \times \text{UEMP%_PRC}_1 + 0.9 \times \text{ln(GDP_PRC/GDPLR_PRC)} \]

\[ \Delta_4 \text{ln(FDI$$_P$$RC)} = 0.2091 \times \text{DST02Q204Q4}_2 - 1.1387 + 0.878 \times \Delta_4 \text{ln(GDPS$$_P$$RC)} + 0.0418 \times (\text{IRL%_PRC}_1 - \text{IRL%_USA}_1) \]

\[ + 0.15175 \times \text{SQ2} + 4.1333 \times \Delta_4 \text{ln(P#INV_PRC)}_4 - 0.5481 \times \text{FDI$$_{ECM_PRC}$$4} \]

\[ \text{FDI$$_{ECM_PRC}$$} = \text{ln(FDI$$_P$$RC)} - \text{ln(GDPS$$_P$$RC)} + \text{ln(P#WX$$_S$$*ER_PRC/P#INV_PRC)} \]
A SMALL MACROECONOMETRIC MODEL OF THE PEOPLE'S REPUBLIC OF CHINA
Duo Qin, Marie Anne Cagias, Geoffrey Ducanes, Nedelyn Magtibay-Ramos, Xin-Hua He, Rui Liu, Shi-Guo Liu

\[
P#\text{INV} \_\text{PRC} = \text{Investment Price Index} \\
P#\text{WX$} = \text{World Export Price Index} \\
\]

<table>
<thead>
<tr>
<th>Residual Diagnostics</th>
<th>Stability</th>
</tr>
</thead>
<tbody>
<tr>
<td>sigma 0.1107</td>
<td>variance 1.1021**</td>
</tr>
<tr>
<td>R² 0.8357</td>
<td>joint parameter constancy 2.0159*</td>
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<tr>
<td>No autocorrelation F(4,37) = 1.6231 [0.1890]</td>
<td></td>
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<tr>
<td>No ARCH F(4,33) = 1.8591 [0.1411]</td>
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</tr>
<tr>
<td>Normality Chi²(2) = 4.3979 [0.1109]</td>
<td></td>
</tr>
<tr>
<td>Homoscedasticity F(10,30) = 2.2113 [0.0455]*</td>
<td></td>
</tr>
<tr>
<td>RESET F(1,40) = 0.1422 [0.7081]</td>
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</tr>
</tbody>
</table>

Sample Period 1993(2) to 2004(4)

2.4 Gross Fixed Capital Formation

\[
\Delta_{4} \_\text{PRC} = \begin{bmatrix} 6497.91 & 0.6926 \end{bmatrix} \Delta_{3} (\text{BINV} \_\text{PRC} + \text{GINV} \_\text{PRC} + \text{FDI} \_\text{PRC}) - \begin{bmatrix} 0.0570 \\ 0.14893 \\ 0.0626 \\ 0.3469 \end{bmatrix} \begin{bmatrix} 0.2576 \\ 0.33820.4 \end{bmatrix} T2
\]

\[
\text{INV} \_\text{PRC} = \text{INV} \_\text{PRC} - 1.3*\text{BINV} \_\text{PRC} + \text{GINV} \_\text{PRC} + \text{FDI} \_\text{PRC}
\]

<table>
<thead>
<tr>
<th>Residual Diagnostics</th>
<th>Stability</th>
</tr>
</thead>
<tbody>
<tr>
<td>sigma 33820.4</td>
<td>variance 0.2876</td>
</tr>
<tr>
<td>R² 0.8057</td>
<td>joint parameter constancy 0.8362</td>
</tr>
<tr>
<td>No autocorrelation F(3,27) = 1.4835 [0.2413]</td>
<td></td>
</tr>
<tr>
<td>No ARCH F(3,24) = 0.34245 [0.7948]</td>
<td></td>
</tr>
<tr>
<td>Normality Chi²(2) = 5.1150 [0.0775]</td>
<td></td>
</tr>
<tr>
<td>Homoscedasticity F(4,25) = 14.384 [0.000]*</td>
<td></td>
</tr>
<tr>
<td>RESET F(1,29) = 2.8853 [0.1001]</td>
<td></td>
</tr>
</tbody>
</table>

Sample Period 1995(4) to 2003(4)

3. Government Sector

3.1 Government Revenue

\[
\Delta \ln(\text{GREV} \_\text{PRC}) = \begin{bmatrix} 0.0626 & -0.0700 & 0.0146 & 0.0120 & 0.0490 & 0.9547 \end{bmatrix} \text{GREV} \_\text{ECM} \_\text{PRC} \_1 + \text{T2}
\]

\[
\text{GREV} \_\text{ECM} \_\text{PRC} = \ln(\text{GREV} \_\text{PRC}) - \ln(\text{GTAX} \_\text{PRC})
\]

\[
\text{GREV} \_\text{PRC} = \text{Government Budgetary Revenue} \\
\text{GTAX} \_\text{PRC} = \text{Government Tax Revenue}
\]

<table>
<thead>
<tr>
<th>Residual Diagnostics</th>
</tr>
</thead>
<tbody>
<tr>
<td>sigma 0.1117</td>
</tr>
<tr>
<td>R² 0.9980</td>
</tr>
<tr>
<td>No autocorrelation F(3,18) = 0.2319 [0.8730]</td>
</tr>
<tr>
<td>No ARCH F(3,15) = 0.1371 [0.9363]</td>
</tr>
<tr>
<td>Normality Chi²(2) = 4.0680 [0.1306]</td>
</tr>
</tbody>
</table>
3.2 Tax Revenue

\[ \text{GTAX}_\text{PRC} = 0.722718^* (1 - \text{TRF}_\text{PRC} \cdot 1 - \text{TAX1}_\text{PRC} \cdot 1) \cdot \text{GTAX}_\text{PRC} \cdot 1 + 0.1110 \cdot (\text{VA2}_\text{PRC} + \text{VA3}_\text{PRC}) \]
\[ (0.0902) \]
\[ -0.0655234^* (\text{VA2}_\text{PRC} \cdot 3 + \text{VA3}_\text{PRC} \cdot 3) + 9572.33^* \cdot \text{TAX%}_\text{PRC} - 10153 \cdot \text{TAX%}_\text{PRC} \cdot 3 \]
\[ (0.0156) \]
\[ + 12135.6^* \cdot \text{TAX%}_\text{PRC} \cdot 4 \]
\[ (2860.0) \]
\[ + 0.2095^* (\text{TAX1}_\text{PRC} \cdot 1 \cdot \text{VA1}_\text{PRC} \cdot 1) + 0.2876^* (\text{TAX1}_\text{PRC} \cdot 4 \cdot \text{VA1}_\text{PRC} \cdot 4) + 0.0161^* \cdot \text{VA1}_\text{PRC} \]
\[ (0.0746) \]
\[ + 0.6220^* \cdot (\text{TRF}_\text{PRC} \cdot 1 \cdot (\text{X}_\text{PRC} \cdot 1 \cdot \text{M}_\text{PRC} \cdot 1)) - 0.01376^* \cdot (\text{X}_\text{PRC} \cdot 1 + \text{M}_\text{PRC} \cdot 1) \]
\[ (0.0054) \]
\[ 0.1132 \quad 0.0051 \quad 0.0434 \]
\[ + 0.0196^* \cdot (\text{X}_\text{PRC} \cdot 2 + \text{M}_\text{PRC} \cdot 2) + 452.658^* \cdot [100 \cdot (\text{GTAX}_\text{PRC} \cdot 3 / \text{GDP}_\text{PRC} \cdot 3) - \text{TAX%}_\text{PRC} \cdot 3] \]
\[ (0.0047) \]
\[ 0.0051 \quad 194.30 \quad 0.0435 \]
\[ -119700 - 65473.8^* \cdot \text{SQ1} + 23561^* \cdot \text{DST2004Q1} \]

\[ \text{GTAX}_\text{PRC} = \text{Government Tax Revenue} \]
\[ \text{TRF}_\text{PRC} = \text{Tariff Rate} \]
\[ \text{TAX1}_\text{PRC} = \text{Tax Rate for Primary Industries} \]
\[ \text{VA2}_\text{PRC} = \text{Value Added from the Secondary Industry} \]
\[ \text{VA3}_\text{PRC} = \text{Value Added from the Tertiary Industry} \]
\[ \text{TAX%}_\text{PRC} = \text{Tax Rate} \]
\[ \text{VA1}_\text{PRC} = \text{Value Added from the Primary Industry} \]
\[ \text{GINV}_\text{PRC} = \text{Government Fixed Capital Formation} \]
\[ \text{INV}_\text{PRC} = \text{Gross Fixed Capital Formation} \]
\[ \text{X}_\text{PRC} = \text{Exports} \]
\[ \text{M}_\text{PRC} = \text{Imports} \]
\[ \text{GDP}_\text{PRC} = \text{Gross Domestic Product} \]

Residual Diagnostics (for the aggregate of sectors 2 and 3)

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>sigma</td>
<td>16790.9</td>
</tr>
<tr>
<td>$R^2$</td>
<td>0.9885</td>
</tr>
<tr>
<td>No autocorrelation</td>
<td>F(4,31) = 0.8534 [0.5026]</td>
</tr>
<tr>
<td>No ARCH</td>
<td>F(4,27) = 0.6743 [0.6156]</td>
</tr>
<tr>
<td>Normality</td>
<td>Chi²(2) = 1.8861 [0.3894]</td>
</tr>
<tr>
<td>Homoscedasticity</td>
<td>F(15,19) = 1.4642 [0.2142]</td>
</tr>
<tr>
<td>RESET</td>
<td>F(1,34) = 1.1286 [0.2956]</td>
</tr>
<tr>
<td>Sample Period</td>
<td>1993(2) to 2004(2)</td>
</tr>
</tbody>
</table>

Residual Diagnostics (for sector 1)

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
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</thead>
<tbody>
<tr>
<td>sigma</td>
<td>1055.0</td>
</tr>
<tr>
<td>$R^2$</td>
<td>0.9786</td>
</tr>
<tr>
<td>No autocorrelation</td>
<td>F(4,34) = 2.6243 [0.0517]</td>
</tr>
<tr>
<td>No ARCH</td>
<td>F(4,30) = 0.9433 [0.4526]</td>
</tr>
<tr>
<td>Normality</td>
<td>Chi²(2) = 1.4867 [0.4755]</td>
</tr>
<tr>
<td>Homoscedasticity</td>
<td>F(10,27) = 1.4209 [0.2241]</td>
</tr>
</tbody>
</table>
### Government Consumption

\[
\Delta_4 \ln(GCON\_PRC) = 0.3900 + 0.1350 \times \Delta_3 \ln(GEXP\_PRC\_1 - GINV\_PRC\_1) - 0.1875 \times \ln(GCONEM\_PRC\_4) - 0.0608 \times 0.0503 \times 0.0388 \times 0.3477 \times 0.3681 \times 0.3683 \times 1.3280 \times 0.2565
\]

**Residual Diagnostics**

<table>
<thead>
<tr>
<th>Stability</th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>sigma</td>
<td>213.18</td>
<td>variance</td>
<td>0.2946</td>
<td></td>
</tr>
<tr>
<td>R²</td>
<td>0.9207</td>
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<td></td>
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<tr>
<td>No autocorrelation</td>
<td>F(4.35) = 0.5587 [0.6941]</td>
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</tr>
<tr>
<td>No ARCH</td>
<td>F(4.31) = 0.3837 [0.8186]</td>
<td></td>
<td></td>
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<tr>
<td>Normality</td>
<td>Chi²(2) = 4.9080 [0.0859]</td>
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</tr>
<tr>
<td>Homoscedasticity</td>
<td>F(10,28) = 1.2283 [0.3163]</td>
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</tr>
<tr>
<td>RESET</td>
<td>F(1,38) = 0.5752 [0.4529]</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Sample Period** 1993(1) to 2004(2)

### Government Expenditure

\[
GEXP\_PRC = \ln(GEXP\_PRC\_2 - GINV\_PRC\_2) + 0.3250 - 0.7561 \times SQ1 - 0.3183 \times \ln(GEXPECM\_PRC\_2) + 0.01 \times UEMP\%\_PRC\_2
\]

**Residual Diagnostics**

<table>
<thead>
<tr>
<th>Stability</th>
<th></th>
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</thead>
<tbody>
<tr>
<td>sigma</td>
<td>0.0837</td>
<td>variance</td>
<td>0.2222</td>
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<tr>
<td>R²</td>
<td>0.3922</td>
<td></td>
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<td></td>
</tr>
<tr>
<td>No autocorrelation</td>
<td>F(3,37) = 0.0917 [0.9642]</td>
<td></td>
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<td></td>
</tr>
<tr>
<td>No ARCH</td>
<td>F(3,34) = 0.3079 [0.8195]</td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Normality</td>
<td>Chi²(2) = 1.9423 [0.3787]</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Homoscedasticity</td>
<td>F(4,35) = 0.6937 [0.6014]</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>RESET</td>
<td>F(1,39) = 1.0410 [0.3139]</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Sample Period** 1993(2) to 2003(4)
4. Trade

4.1 Exports, in US Dollars

\[
\Delta \ln(X\_PRC) = -0.436146 \times \Delta \ln(X\_PRC\_1) + 0.07940 \times \Delta \ln(WT\_PRC) - 0.415278 \times X\_ECM\_PRC
\]

\[
\begin{bmatrix}
0.0716 \\
0.0762 \\
0.1228
\end{bmatrix}
\begin{bmatrix}
\Delta \ln(WT\_PRC) \\
\Delta \ln(X\_PRC\_1)
\end{bmatrix}
\]

\[
X\_ECM\_PRC = \ln(X\_PRC) - \ln(WT\_PRC\_1) - 0.2 \times \ln(TIME)
\]

**Residual Diagnostics**

- **Stability**
  - sigma: 0.0454
  - variance: 0.1592
  - joint parameter constancy: 0.6031

**Sample Period** 1995(2) to 2005(2)

4.2 Imports, in US Dollars

\[
\Delta \ln(M\_PRC) = 0.8337 \times \Delta \ln(X\_PRC) - 0.3399 \times \Delta \ln(M\_PRC\_1) + 0.0700 \times SQ1 + 1.9955 \times \Delta^2 \Delta \ln(P\#INV\_PRC)
\]

\[
\begin{bmatrix}
0.0592 \\
0.0516 \\
0.0923
\end{bmatrix}
\begin{bmatrix}
\Delta \ln(M\_PRC\_1) \\
\Delta \ln(X\_PRC\_1) \\
\Delta \ln(P\#M\_PRC\_1/P\#GDP\_PRC\_1)
\end{bmatrix}
\]

\[
M\_ECM\_PRC = \ln(M\_PRC) - 0.7 \times \ln(X\_PRC\_1) - 0.3 \times \ln(GDP\_PRC\_1 - X\_PRC\_1) - 2 \times \ln(P\#M\_PRC\_1/P\#GDP\_PRC\_1)
\]

**Residual Diagnostics**

- **Stability**
  - sigma: 0.0554
  - variance: 0.0884
  - joint parameter constancy: 1.3866

**Sample Period** 1993(3) to 2004(4)
4.3 Trade Balance

\[ TBS_{PRC} = (1 - SQ1 - SQ2 - SQ3) \cdot [(X$_{PRC} - M$_{PRC}) + (X$_{PRC} - 1 - M$_{PRC} - 1) + (X$_{PRC} - 2 - M$_{PRC} - 2)] + 7286.7 \cdot (1 - SQ1 - SQ2 - SQ3) + 2232.8 \cdot (1 - SQ1 - SQ2 - SQ3) \cdot DST1999Q4 \]

\[ (986.5) \]

\[ (880.6) \]

\[ \text{TBS}_{PRC} = \text{Trade Balance, in million US$} \]
\[ X$_{PRC} = \text{Exports, in million US$} \]
\[ M$_{PRC} = \text{Imports, in million US$} \]

**Residual Diagnostics**

\[ \text{sigma} = 2784.65 \]
\[ R^2 = 0.6810 \]

Sample Period 1994(4) to 2004(3)

4.4 Current Account Balance

\[ CAB_{PRC} = 0.6800 \cdot TBS_{PRC} \]

\[ (0.0241) \]

\[ \text{CAB}_{PRC} = \text{Current Account Balance, in million US$} \]
\[ \text{TBS}_{PRC} = \text{Trade Balance, in million US$} \]

**Residual Diagnostics**

\[ \text{sigma} = 2481.71 \]
\[ R^2 = 0.9440 \]

Sample Period 1992(3) to 2004(3)

4.5 Gross International Reserves

\[ \Delta \ln(GIR$_{PRC}) = 0.2173 \cdot \Delta_3 \ln(GIR$_{PRC} / ER$_{PRC}) + 0.09968 + 0.64240 \cdot \Delta \ln(NFA$_{PRC} / ER$_{PRC}) + 0.0224 \cdot DST2001Q2 \]

\[ (0.0254) \]

\[ (0.0353) \]

\[ (0.0782) \]

\[ (0.0079) \]

\[ - 0.1140 \cdot GIRES_CECM$_{PRC}$ \]

\[ (0.0365) \]

\[ \text{GIR}_{ECM,P} = \ln(GIR$_{PRC}) - 0.9 \cdot \ln(1000 \cdot NFA$_{PRC} / ER$_{PRC}) \]
\[ \text{GIR$_{PRC} = \text{Gross International Reserves, in million US$} \]
\[ \text{NFA$_{PRC} = Net Foreign Assets of the Banking Sector} \]
\[ \text{ER$_{PRC} = Exchange Rate} \]

**Residual Diagnostics**

\[ \text{sigma} = 0.0225 \]
\[ R^2 = 0.7986 \]

No autocorrelation \[ F(3,31) = 0.4032 \]
No ARCH \[ F(3,28) = 0.8274 \]
Normality \[ Chi^2(2) = 6.807 \]
Homoscedasticity \[ F(7,26) = 0.7517 \]
X-Homoscedasticity \[ F(13,20) = 0.4900 \]
RESET \[ F(1,33) = 7.5850 \]

Sample Period 1994(4) to 2004(2)

5. GDP and the 3 Sectors

5.1 Long-run Supply Trend of GDP

\[ GDPLR$_{PRC} = \exp[-0.9241 + 0.85 \cdot \ln(K$_{PRC}) + 0.15 \cdot \ln(EMP$_{PRC})] \]

\[ \text{GDPLR$_{PRC} = \text{Long-run Supply Trend of GDP} \]
\[ \text{K$_{PRC} = \text{Stock of Fixed Investment Assets} \]
\[ \text{EMP$_{PRC} = \text{Total Number of Employed Persons} \]

4.3 Trade Balance

\[ TBS_{PRC} = (1 - SQ1 - SQ2 - SQ3) \cdot [(X$_{PRC} - M$_{PRC}) + (X$_{PRC} - 1 - M$_{PRC} - 1) + (X$_{PRC} - 2 - M$_{PRC} - 2)] + 7286.7 \cdot (1 - SQ1 - SQ2 - SQ3) + 2232.8 \cdot (1 - SQ1 - SQ2 - SQ3) \cdot DST1999Q4 \]

\[ (986.5) \]

\[ (880.6) \]

\[ \text{TBS}_{PRC} = \text{Trade Balance, in million US$} \]
\[ X$_{PRC} = \text{Exports, in million US$} \]
\[ M$_{PRC} = \text{Imports, in million US$} \]

**Residual Diagnostics**

\[ \text{sigma} = 2784.65 \]
\[ R^2 = 0.6810 \]

Sample Period 1994(4) to 2004(3)

4.4 Current Account Balance

\[ CAB_{PRC} = 0.6800 \cdot TBS_{PRC} \]

\[ (0.0241) \]

\[ \text{CAB}_{PRC} = \text{Current Account Balance, in million US$} \]
\[ \text{TBS}_{PRC} = \text{Trade Balance, in million US$} \]

**Residual Diagnostics**

\[ \text{sigma} = 2481.71 \]
\[ R^2 = 0.9440 \]

Sample Period 1992(3) to 2004(3)

4.5 Gross International Reserves

\[ \Delta \ln(GIR$_{PRC}) = 0.2173 \cdot \Delta_3 \ln(GIR$_{PRC} / ER$_{PRC}) + 0.09968 + 0.64240 \cdot \Delta \ln(NFA$_{PRC} / ER$_{PRC}) + 0.0224 \cdot DST2001Q2 \]

\[ (0.0254) \]

\[ (0.0353) \]

\[ (0.0782) \]

\[ (0.0079) \]

\[ - 0.1140 \cdot GIRES_CECM$_{PRC}$ \]

\[ (0.0365) \]

\[ \text{GIR}_{ECM,P} = \ln(GIR$_{PRC}) - 0.9 \cdot \ln(1000 \cdot NFA$_{PRC} / ER$_{PRC}) \]
\[ \text{GIR$_{PRC} = \text{Gross International Reserves, in million US$} \]
\[ \text{NFA$_{PRC} = Net Foreign Assets of the Banking Sector} \]
\[ \text{ER$_{PRC} = Exchange Rate} \]

**Residual Diagnostics**

\[ \text{sigma} = 0.0225 \]
\[ R^2 = 0.7986 \]

No autocorrelation \[ F(3,31) = 0.4032 \]
No ARCH \[ F(3,28) = 0.8274 \]
Normality \[ Chi^2(2) = 6.807 \]
Homoscedasticity \[ F(7,26) = 0.7517 \]
X-Homoscedasticity \[ F(13,20) = 0.4900 \]
RESET \[ F(1,33) = 7.5850 \]

Sample Period 1994(4) to 2004(2)

5. GDP and the 3 Sectors

5.1 Long-run Supply Trend of GDP

\[ GDPLR$_{PRC} = \exp[-0.9241 + 0.85 \cdot \ln(K$_{PRC}) + 0.15 \cdot \ln(EMP$_{PRC})] \]

\[ \text{GDPLR$_{PRC} = \text{Long-run Supply Trend of GDP} \]
\[ \text{K$_{PRC} = \text{Stock of Fixed Investment Assets} \]
\[ \text{EMP$_{PRC} = \text{Total Number of Employed Persons} \]
5.2 Value Added from the Primary Sector via deflator

\[
\Delta_4 \ln (VA1c_{\text{PRC}}) = \Delta_4 \ln (VA1_{\text{PRC}}) + 0.0800 + 0.0750 \times \text{DST 2004Q1} + 0.03947 \times SQ1 + 0.1374 \times SQ2
\]

\[
+ 1.0880 \times \Delta_4 \ln (P\#C_{\text{PRC}}) - 0.6777 \times \frac{[VA1c_{\text{PRC}} - 3/(VA2c_{\text{PRC}} - 3 + VA3c_{\text{PRC}})]}{\text{DST} \times Q} \times 0.1677
\]

\[
- 0.6332 \times [\Delta (P#P_{\text{PRC}} - 3) - \Delta (P#C_{\text{PRC}} - 3)] - 0.4167 \times VA1ECM_{\text{PRC}} + 4
\]

\[
\begin{bmatrix}
0.0533 \\
0.0225 \\
0.0658
\end{bmatrix}
\begin{bmatrix}
0.0187 \\
0.0992 \\
0.0724
\end{bmatrix}
\]

\[
VA1ECM_{\text{PRC}} = \ln (VA1_{\text{PRC}}/VA1c_{\text{PRC}}) - \ln (P\#C_{\text{PRC}})
\]

VA1_{\text{PRC}} = Value Added from the Primary Sector

VA1c_{\text{PRC}} = Value Added from the Primary Sector, in 1992Q1 price

P\#C_{\text{PRC}} = Consumer Price Index (1992Q1=1)

Residual Diagnostics

| sigma | 0.0270 |
| R^2  | 0.9384 |
| No autocorrelation | F(3,32) = 0.2255 [0.8780] |
| No ARCH | F(3,29) = 0.0736 [0.9737] |
| Normality | Chisq(2) = 3.8019 [0.1649] |
| Homoscedasticity | F(11,23) = 0.7095 [0.7177] |
| RESET | F(1,34) = 2.5270 [0.1212] |

Sample Period 1994(1) to 2004(3)

5.3 Value Added from the Primary Sector, constant price

\[
\Delta \ln (VA1c_{\text{PRC}}) = -0.45868 \times \Delta \ln (VA1c_{\text{PRC}} - 2) + 2.90000 - 0.766867 \times SQ1 - 0.61065 \times SQ2
\]

\[
-0.0900 \times \Delta \ln \left(\frac{VA3_{\text{PRC}} - 1}{VA3c_{\text{PRC}} - 1}/(VA1_{\text{PRC}} - 1)/VA1c_{\text{PRC}} - 2\right)
\]

\[
+ 0.5700 \times \Delta \left(\frac{VA2_{\text{PRC}} - 1 + VA3_{\text{PRC}} - 1}{GDP_{\text{PRC}} - 1} - 0.37416 \times VA1cECM_{\text{PRC}} - 2\right)
\]

\[
\begin{bmatrix}
0.0580 \\
0.1730 \\
0.0176 \\
0.0825
\end{bmatrix}
\begin{bmatrix}
0.2751 \\
0.0275 \\
0.1995 \\
0.0801
\end{bmatrix}
\begin{bmatrix}
0.0861 \\
0.0706 \\
0.0766 \\
0.0801
\end{bmatrix}
\]

\[
VA1cECM_{\text{PRC}} = \ln (VA1c_{\text{PRC}}) - 0.33\ln [GDP_{\text{PRC}}/(VA1_{\text{PRC}}/VA1c_{\text{PRC}})] + 0.6 \times \ln [(VA3c_{\text{PRC}}/ VA3_{\text{PRC}})/(VA1_{\text{PRC}}/VA1c_{\text{PRC}})] - 1.25 \times [(VA2_{\text{PRC}} + VA3_{\text{PRC}} - 2)/GDP_{\text{PRC}} - 2] - 0.1 \times \ln [(VA2_{\text{PRC}} + VA2c_{\text{PRC}} - 2)/(VA1_{\text{PRC}} + VA1c_{\text{PRC}} - 2)]
\]

VA1c_{\text{PRC}} = Value Added from the Primary Sector, in 1992Q1 price

VA3_{\text{PRC}} = Value Added from the Tertiary Sector

VA3c_{\text{PRC}} = Value Added from the Tertiary Sector, in 1992Q1 price

VA1_{\text{PRC}} = Value Added from the Primary Sector

VA2_{\text{PRC}} = Value Added from the Secondary Sector

VA2c_{\text{PRC}} = Value Added from the Secondary Sector, in 1992Q1 price

GDP_{\text{PRC}} = Gross Domestic Product
Residual Diagnostics

<table>
<thead>
<tr>
<th>Stability</th>
<th>Value Added from the Secondary Sector via price deflator</th>
</tr>
</thead>
<tbody>
<tr>
<td>sigma 0.0068</td>
<td>( \Delta \ln(VA_2\text{PRC}) = \Delta \ln(VA_{2c}\text{PRC}) - 0.3762 \times \Delta \ln(VA_{2c}/VA_{2c-1}) - 0.1087 + 0.2976 \times \text{SQ1} )</td>
</tr>
<tr>
<td>variance 0.1622</td>
<td>( B53 )</td>
</tr>
<tr>
<td>R(^2) 1.0000</td>
<td>( F(4,35) = 1.4560 \times [0.2365] )</td>
</tr>
<tr>
<td>joint parameter constancy 0.9644</td>
<td>( F(4,31) = 0.7622 \times [0.5579] )</td>
</tr>
<tr>
<td>No autocorrelation</td>
<td>( \text{Chi}^2(2) = 2.0247 \times [0.3634] )</td>
</tr>
<tr>
<td>No ARCH</td>
<td>( \text{Chi}^2(2) = 0.8344 \times [0.6004] )</td>
</tr>
<tr>
<td>Normality</td>
<td>( \text{Chi}^2(2) = 0.2056 \times [0.5021] )</td>
</tr>
<tr>
<td>Homoscedasticity</td>
<td>( \text{Chi}^2(2) = 0.2056 \times [0.5028] )</td>
</tr>
<tr>
<td>RESET</td>
<td>( B53 )</td>
</tr>
</tbody>
</table>

### 5.4 Value Added from the Secondary Sector via price deflator

\[
\Delta \ln(VA_{2c}\text{PRC}) = \Delta \ln(VA_{2c}\text{PRC}) - 0.3762 \times \Delta \ln(VA_{2c}\text{PRC}/VA_{2c-1}) - 0.1087 + 0.2976 \times \text{SQ1} \\
\begin{bmatrix}
0.0856 \\
0.4574
\end{bmatrix}
\begin{bmatrix}
0.0870 \\
0.0579
\end{bmatrix}
\begin{bmatrix}
0.0101 \\
0.5021
\end{bmatrix}
\]

\[
+ 0.1085 \times \text{SQ2} + 0.2239 \times \Delta \ln(VA_{1}\text{PRC}/VA_{1c}\text{PRC}) + 1.6246 \times \Delta \ln(P\#\text{INV}_{\text{PRC}}) \\
\begin{bmatrix}
0.0214 \\
0.0293 \\
0.2835 \\
0.0923
\end{bmatrix}
\begin{bmatrix}
0.0298 \\
0.0578
\end{bmatrix}
\begin{bmatrix}
0.0256 \\
0.0528
\end{bmatrix}
\]

\[
- 0.2422 \times VA_{2ECM\_PRC} - 0.0682 \times \text{SQ2} - 0.7048 \times \text{SQ1} \\
\begin{bmatrix}
0.0856 \\
0.4574
\end{bmatrix}
\begin{bmatrix}
0.0870 \\
0.0579
\end{bmatrix}
\begin{bmatrix}
0.0101 \\
0.5021
\end{bmatrix}
\]

\[
VA_{2ECM\_PRC} = \ln(VA_{2c}\text{PRC}) - 0.55 \times (K_{\text{PRC}}/P\#\text{INV}_{\text{PRC}}) \times (VA_{2c}\text{PRC}/GDP_{\text{PRC}}) - 0.45 \times \ln(EMP_{\text{PRC}}) - 0.25 \times (X_{\text{PRC}} + M_{\text{PRC}})/GDP_{\text{PRC}} \\
\begin{bmatrix}
0.0884 \\
0.0076 \\
0.0236
\end{bmatrix}
\begin{bmatrix}
0.0079 \\
0.4334 \\
0.4580
\end{bmatrix}
\begin{bmatrix}
0.0713 \\
0.4062
\end{bmatrix}
\]

\[
+ 0.22867 \times \Delta \ln(K_{\text{PRC}/P\#\text{INV}_{\text{PRC}}}) \times (VA_{2c}\text{PRC}/GDP_{\text{PRC}}) \\
\begin{bmatrix}
0.0912 \\
0.0411
\end{bmatrix}
\begin{bmatrix}
0.0333 \\
0.0509
\end{bmatrix}
\begin{bmatrix}
0.4100 \\
0.1085 \\
0.02258 \\
0.0076 \\
0.0236
\end{bmatrix}
\begin{bmatrix}
0.0079 \\
0.4334 \\
0.4580
\end{bmatrix}
\begin{bmatrix}
0.0713 \\
0.4062
\end{bmatrix}
\]

\[
VA_{2cECM\_PRC} = \ln(VA_{2c}\text{PRC}) - 0.55 \times (K_{\text{PRC}}/P\#\text{INV}_{\text{PRC}}) \times (VA_{2c}\text{PRC}/GDP_{\text{PRC}}) - 0.45 \times \ln(EMP_{\text{PRC}}) - 0.25 \times (X_{\text{PRC}} + M_{\text{PRC}})/GDP_{\text{PRC}} \\
\begin{bmatrix}
0.0884 \\
0.0076 \\
0.0236
\end{bmatrix}
\begin{bmatrix}
0.0079 \\
0.4334 \\
0.4580
\end{bmatrix}
\begin{bmatrix}
0.0713 \\
0.4062
\end{bmatrix}
\]
VA2c_PRC = Value Added from the Secondary Sector, in 1992Q1 Price
VA3c = Value Added from the Tertiary Sector, in 1992Q1 Price
X_PRC = Exports
M_PRC = Imports
GDP_PRC = Gross Domestic Product
K_PRC = Stock of Fixed Investment Assets
P#INV_PRC = investment Price index
VA2_PRC = Value Added from the Secondary Sector
EMP2_PRC = Employment in the Secondary Sector

Residual Diagnostics

<table>
<thead>
<tr>
<th>sigma</th>
<th>0.0210</th>
<th>variance</th>
<th>0.2489</th>
</tr>
</thead>
<tbody>
<tr>
<td>No autocorrelation</td>
<td>F(3,34) = 2.5543 [0.0716]</td>
<td></td>
<td></td>
</tr>
<tr>
<td>No ARCH</td>
<td>F(3,31) = 2.7923 [0.0568]</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Normality</td>
<td>Chi2(2) = 0.9171 [0.6322]</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Homoscedasticity</td>
<td>F(9,27) = 2.9296 [0.0147]*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>X-Homoscedasticity</td>
<td>F(19,17) = 1.2091 [0.3494]</td>
<td></td>
<td></td>
</tr>
<tr>
<td>RESET</td>
<td>F(1,36) = 3.6097 [0.0655]</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

R² = 0.9917 joint parameter constancy 1.9469*

5.6 Value Added from the Tertiary Sector via Price Deflator

\[
\ln(\text{VA3}_\text{PRC}) = \ln(\text{VA3}_\text{PRC} / \text{VA3c}_\text{PRC}) - 0.75\ln(\text{P#C}_\text{PRC}) - 0.15\ln(\text{WAGEu}_\text{PRC}) - 0.1\ln(\text{P#M}_\text{PRC})
\]

VA3_PRC = Value Added from the Tertiary Sector
VA3c_PRC = Value Added from the Tertiary Sector, in 1992Q1 Price
P#C_PRC = Consumer Price index (1992Q1=1)
P#M_PRC = Import Price index
WAGEu_PRC = Average Earnings of Urban Employed Persons
GDP_PRC = Gross Domestic Product

Residual Diagnostics

<table>
<thead>
<tr>
<th>sigma</th>
<th>0.0075</th>
<th>variance</th>
<th>0.1228</th>
</tr>
</thead>
<tbody>
<tr>
<td>No autocorrelation</td>
<td>F(3,28) = 1.7362 [0.1824]</td>
<td></td>
<td></td>
</tr>
<tr>
<td>No ARCH</td>
<td>F(3,25) = 0.5736 [0.6378]</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Normality</td>
<td>Chi2(2) = 1.1380 [0.5661]</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Homoscedasticity</td>
<td>F(14,16) = 0.4648 [0.9216]</td>
<td></td>
<td></td>
</tr>
<tr>
<td>RESET</td>
<td>F(1,30) = 3.2889 [0.0798]</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Sample Period 1994(4) to 2004(3)
5.7 Value Added from the Tertiary Sector, constant price

\[ \Delta_{t} \ln(VA_{3c,PRC}) = 0.0330 - 0.3707 \times 0.0500 + 0.0370 \times 0.0100 - 0.1110 \times VA_{3cECM,PRC} + 0.0051 \times (VA_{2c,PRC} / VA_{3c,PRC}) + 0.0133 \times (VA_{3c,PRC} / VA_{1c,PRC}) + 0.0037 \times (VA_{3c,PRC} / VA_{3c,PRC}) \]

\[ = \ln(VA_{3c,PRC}) - \ln([PCINCr,PRC \times POPr,PRC + PCINCu,PRC \times POPu\% ,PRC \times 0.01]) / \ln(VA_{3,PRC} / VA_{3c,PRC}) \]

VA3cECM,PRC = \ln(VA3c,PRC) - \ln([PCINCr,PRC \times POPr,PRC + PCINCu,PRC \times POPu\% ,PRC \times 0.01]) / \ln(VA_{3,PRC} / VA_{3c,PRC})

VA3c,PRC = Value Added from the Tertiary Sector, in 1992Q1 Price
VA2c,PRC = Value Added from the Secondary Sector
VA3,PRC = Value Added from the Tertiary Sector
VA1c,PRC = Value Added from the Primary Sector
PCINCr,PRC = Per Capita Income in Cash of Rural Household
POPr,PRC = Population, Rural
PCINCu,PRC = Per Capita Income of Urban Households
POPu\%,PRC = Urban Population over Total Population

Residual Diagnostics

\[ \text{sigma} = 0.0079 \]
\[ \text{variance} = 0.2073 \]
\[ \text{R}^2 = 0.6833 \]
\[ \text{joint parameter constancy} = 1.5323 \]

No autocorrelation
\[ \text{F}(3,30) = 1.1587 \{0.3418\} \]
No ARCH
\[ \text{F}(3,27) = 0.3660 \{0.7781\} \]
Normality
\[ \text{Chi}^2(2) = 5.3315 \{0.0695\} \]
Homoscedasticity
\[ \text{F}(11,21) = 1.0275 \{0.4577\} \]
RESET
\[ \text{F}(1,32) = 4.0517 \{0.0526\} \]

Sample Period 1995(1) to 2004(4)

5.8 Gross National Product

\[ GNP_{PRC} = 1.0 \times (1 - SQ1 + SQ2 - SQ3) \times [GDP_{PRC} + GDP_{PRC,1} + GDP_{PRC,2} + GDP_{PRC,3}] + NFIA_{PRC} \]

GNP_{PRC} = Gross National Product
GDP_{PRC} = Gross Domestic Product
NFIA_{PRC} = Net Factor Income from Abroad

6. Price

6.1 Consumer Price Index

\[ \Delta \ln(P\#C,PRC) = 0.00197 + 0.00228 \times SQ1 + 0.4096 \times \Delta P\#P_{PRC} + 0.0523 \times \Delta P\#WAGEu_{PRC} \]

\[ + 0.0331 \times \Delta^2 \ln(P\#M_{PRC}) - 0.3128 \times P\#CECM_{PRC, -1} \]

\[ \begin{bmatrix} 0.00197 & 0.00228 & 0.4096 & 0.0523 & 0.0331 & 0.3128 & 0.00127 & 0.0533 \\ 0.1286 & 0.08760 ** & 0.0738 & 0.0050 & 0.0677 & 0.0504 & 0.1052 \end{bmatrix} \]

B61
\[ P_{ECM}^{PRC} = \ln(P_{C}^{PRC}) - 0.85 \ln(P_{P}^{PRC}) - 0.15 \ln(P_{M}^{PRC}) + 0.2 \ln(GDPLR_{PRC}/GDP_{PRC}) \]

\[ P_{C}^{PRC} = \text{Consumer Price Index (1992Q1=1)} \]
\[ P_{P}^{PRC} = \text{Ex-Factory Price Index of Industrial Products (1992Q1=1)} \]
\[ WAGE_{u}^{PRC} = \text{Average Earnings of Urban Employed Persons} \]
\[ P_{M}^{PRC} = \text{Import Price Index (1992Q1=1)} \]
\[ GDPLR_{PRC} = \text{Long-Run Supply Trend of GDP} \]
\[ GDP_{PRC} = \text{Gross Domestic Product} \]

**Residual Diagnostics**

<table>
<thead>
<tr>
<th>Residual Diagnostics</th>
<th>Stability</th>
</tr>
</thead>
<tbody>
<tr>
<td>( \sigma )</td>
<td>0.0085</td>
</tr>
<tr>
<td>( R^2 )</td>
<td>0.9280</td>
</tr>
<tr>
<td>No autocorrelation</td>
<td>( F(3,34) = 1.2935 ) [0.2924]</td>
</tr>
<tr>
<td>No ARCH</td>
<td>( F(3,31) = 0.2155 ) [0.8849]</td>
</tr>
<tr>
<td>Normality</td>
<td>( \text{Chi}^2(2) = 5.9130 ) [0.0520]</td>
</tr>
<tr>
<td>Homoscedasticity</td>
<td>( F(9,27) = 0.3486 ) [0.9493]</td>
</tr>
<tr>
<td>X-Homoscedasticity</td>
<td>( F(19,17) = 0.6461 ) [0.8216]</td>
</tr>
<tr>
<td>RESET</td>
<td>( F(1,36) = 3.3072 ) [0.0773]</td>
</tr>
</tbody>
</table>

Sample Period 1993(1) to 2003(3)

6.2 Industrial Products Price Index

\[ \Delta \ln(P_{P}^{PRC}) = 0.5459 \times \Delta \ln(P_{P}^{PRC}_1) + 0.02122 \times 0.4362 \times \Delta \ln(P_{INV}^{PRC}) - 0.1178 \times P_{ECM}^{PRC}_1 \]

\[ \Delta \ln(P_{P}^{PRC}) = \ln(P_{P}^{PRC}) - 0.2 \ln(P_{M}^{PRC}) - 0.05 \ln(WAGE_{u}^{PRC} \times EMP_{2}^{PRC}/VA_{2}^{PRC}) - 0.7 \ln(P_{INV}^{PRC}) - 0.05 \times \text{UCC}_{n}^{PRC}/100 \]

\[ P_{P}^{PRC} = \text{Ex-Factory Price Index of Industrial Products} \]
\[ P_{M}^{PRC} = \text{Import Price Index} \]
\[ WAGE_{u}^{PRC} = \text{Average Earnings of Urban Employed Persons} \]
\[ EMP_{2}^{PRC} = \text{Employment in the Secondary Sector} \]
\[ VA_{2}^{PRC} = \text{Value Added from the Secondary Sector} \]
\[ P_{INV}^{PRC} = \text{Investment Price Index} \]
\[ \text{UCC}_{n}^{PRC} = \text{User Cost of Capital} \]

**Residual Diagnostics**

<table>
<thead>
<tr>
<th>Residual Diagnostics</th>
<th>Stability</th>
</tr>
</thead>
<tbody>
<tr>
<td>( \sigma )</td>
<td>0.0069</td>
</tr>
<tr>
<td>( R^2 )</td>
<td>0.6126</td>
</tr>
<tr>
<td>No autocorrelation</td>
<td>( F(3,34) = 1.11433 ) [0.3488]</td>
</tr>
<tr>
<td>No ARCH</td>
<td>( F(3,31) = 0.1899 ) [0.9023]</td>
</tr>
<tr>
<td>Normality</td>
<td>( \text{Chi}^2(2) = 0.5816 ) [0.7477]</td>
</tr>
<tr>
<td>Homoscedasticity</td>
<td>( F(6,24) = 0.68322 ) [0.6648]</td>
</tr>
<tr>
<td>RESET</td>
<td>( F(1,30) = 0.07782 ) [0.7822]</td>
</tr>
</tbody>
</table>

Sample Period 1995(2) to 2003(4)
6.3 Export Price Index

\[
\Delta \ln(P\#X\_PRC) = -0.0400 + 0.2379 \times \Delta \ln(P\#M\_PRC) + 0.7550 \times \Delta \ln(P\#P\_PRC) - 0.3498 \times \Delta \ln(P\#XECM\_PRC) - 0.2379 \times \Delta \ln(P\#WXP\_ER\_PRC) - 0.0895 \times \Delta \ln(P\#WX\$\_PRC).
\]

\[
P\#XECM\_PRC = \ln(P\#X\_PRC) - 0.7*\ln(P\#M\_PRC) - 0.3*\ln(P\#P\_PRC) - 0.45*DSH1998Q1
\]

\[
P\#M\_PRC = \text{Import Price Index (1992Q1=1)}
\]

\[
P\#P\_PRC = \text{Ex-Factory Price Index of Industrial Products (1992Q1=1)}
\]

Residual Diagnostics:

- \(\sigma = 0.0301\)
- \(R^2 = 0.6345\)
- No autocorrelation: \(F(3,35) = 0.6470 [0.5901]\)
- No ARCH: \(F(3,32) = 0.6922 [0.5636]\)
- Homoscedasticity: \(F(6,31) = 0.5278 [0.7828]\)
- Normality: \(\chi^2(2) = 3.3971 [0.1829]\)
- Homoscedasticity: \(F(9,28) = 1.4585 [0.2118]\)
- RESET: \(F(1,37) = 0.0819 [0.7763]\)

Sample Period 1994(2) to 2004(3)

6.4 Import Price Index

\[
\Delta \ln(P\#M\_PRC) = -0.49818 \times \Delta \ln(P\#M\_PRC) - 0.0624 \times SQ1 + 0.0360 \times \Delta \ln(P\#X\_PRC) + 0.653423 \times \Delta \ln(P\#X\_PRC) - 0.3130 \times \Delta \ln(P\#WX\$\_PRC) - 0.0940 \times \Delta \ln(P\#WX\$\_PRC) - 0.0940 \times \Delta \ln(P\#WX\$\_PRC) - 0.0940 \times \Delta \ln(P\#WX\$\_PRC) - 0.0940 \times \Delta \ln(P\#WX\$\_PRC) - 0.0940 \times \Delta \ln(P\#WX\$\_PRC) - 0.0940 \times \Delta \ln(P\#WX\$\_PRC)
\]

\[
P\#MECM\_PRC = \ln(P\#M\_PRC) - 0.25*\ln(P\#WX\$\_PRC) - 0.75*\ln(P\#X\_PRC) + 0.2
\]

Residual Diagnostics:

- \(\sigma = 0.0426\)
- \(R^2 = 0.6345\)
- No autocorrelation: \(F(3,31) = 1.7487 [0.1775]\)
- No ARCH: \(F(3,28) = 0.7310 [0.5422]\)
- Homoscedasticity: \(\chi^2(2) = 4.4354 [0.1089]\)
- Normality: \(\chi^2(2) = 4.0528 [0.0728]\)
- RESET: \(F(1,33) = 0.2997 [0.5878]\)

Sample Period 1993(1) to 2002(4)
### 6.5 Investment Price Index

\[
\Delta_2 \ln(P\#\text{INV\_PRC}) = 0.2308 \Delta_2 \ln(P\#\text{INV\_PRC}_2) + 0.01522 + 0.0022 \times S01 
\]

\[
\begin{bmatrix}
0.03386 & 0.0091 & 0.0011 \\
0.02899 & 0.0736 & 0.0754 \\
\end{bmatrix}
\]

\[
+ 0.0043 \Delta_4 \ln(BINV\_PRC - GINV\_PRC) + 0.0606 \times [\Delta_2(P\#\text{P\_PRC}_1 - P\#\text{C\_PRC}_1)] 
\]

\[
\begin{bmatrix}
0.0020 & 0.1151 & 0.1235 \\
0.0383 & & \\
\end{bmatrix}
\]

\[
- 0.0032 \Delta^2 (\text{IRL\%\_PRC}) + 0.0465 \times \Delta(BINV\_PRC_1 + GINV\_PRC_1)/GDP\_PRC_1 
\]

\[
\begin{bmatrix}
0.0010 & 0.0048 \\
0.1646 & 0.0882 \\
\end{bmatrix}
\]

\[
+(BINVc\_PRC_2 + GINV\_PRC_2)/GDP\_PRC + (BINV\_PRC_3 + GINV\_PRC_3)/GDP\_PRC_3 
\]

\[
+(BINV\_PRC_4 + GINV\_PRC_4)/GDP\_PRC_4 - 0.4861 \times P\#\text{INVECM\_PRC}_2 
\]

\[
\begin{bmatrix}
0.0233 & \\
0.0822 \\
\end{bmatrix}
\]

\[P\#\text{INVECM\_PRC} = \ln(P\#\text{INV\_PRC}) - 0.35 \times \ln[0.25(VA2\_PRC/VA2c\_PRC + VA2\_PRC_1/VA2c\_PRC_1 + VA2\_PRC_2/VA2c\_PRC_2 + VA2\_PRC_3/VA2c\_PRC_3) - 0.05 \times \ln(P\#\text{M\_PRC}_1) + 0.003 \times \text{IRL\%\_PRC}]
\]

\[P\#\text{INV\_PRC} = \text{Price index of investments in Fixed Assets (1992Q1=1)}
\]

\[BINV\_PRC = \text{Business Sector Investment}
\]

\[GINV\_PRC = \text{Government Budgetary Investment}
\]

\[P\#\text{P\_PRC} = \text{Ex-Factory Price index of Industrial Products (1992Q1=1)}
\]

\[P\#\text{C\_PRC} = \text{Consumer Price Index (1992Q1=1)}
\]

\[VA2\_PRC = \text{Value Added from Secondary Sector}
\]

\[VA2c\_PRC = \text{Value Added from Secondary Sector in 1992Q1 price}
\]

\[P\#\text{M\_PRC} = \text{Import Price Index (1992Q1=1)}
\]

\[\text{IRL\%\_PRC} = \text{One-year Interest Rate on Deposits (%)}
\]

#### Residual Diagnostics

- **Sigma**: 0.0029
- **R²**: 0.9915
- **Joint parameter constancy**: 1.2004

- **No autocorrelation**: F(3,31) = 2.0645 [0.1252]
- **No ARCH**: F(3,28) = 0.6056 [0.6169]
- **Normality test**: Chi^2(2) = 1.9081 [0.3852]
- **Homoscedasticity**: F(13,20) = 0.48945 [0.9056]
- **RESET**: F(1,33) = 0.3151 [0.5783]

#### Stability

- **Sample Period**: 1993(3) to 2003(4)
### 6.6 GDP Deflator

\[ \Delta \ln(P\# GDP\_PRC) = -0.0027 + 0.0023 \times SQ2 + 1.01892 \times \Delta \ln[(VA1\_PRC + VA2\_PRC + VA3\_PRC) / GDPc\_PRC] \\
-1.49945 \times P\# GDPECM\_PRC - 1 \]

- \( P\# GDPECM\_PRC = \ln(P\# GDP\_PRC) - \ln[(VA1c\_PRC + VA2c\_PRC + VA3c\_PRC) / GDPc\_PRC] \)
- \( P\# GDP\_PRC = \) GDP Deflator (1992Q1=1)
- \( VA1\_PRC = \) Value Added from the Primary Sector
- \( VA2\_PRC = \) Value Added from the Secondary Sector
- \( VA3\_PRC = \) Value Added from the Tertiary Sector
- \( GDPc\_PRC = \) Gross Domestic Product in 1992Q1 Price

Residual Diagnostics

\[
\begin{array}{ll}
sigma & 0.0017 \\
R^2 & 0.9992 \\
\text{Joint parameter constancy} & 1.7739^* \\
\text{No autocorrelation} & F(3,33) = 0.5620 [0.6439] \\
\text{No ARCH} & F(3,30) = 0.1049 [0.9565] \\
\text{Homoscedasticity} & F(8,27) = 2.6285 [0.0286] \\
\text{RESET} & F(1,35) = 0.5725 [0.4543]
\end{array}
\]

Sample Period 1994(4) to 2004(3)

### 6.7 Wages: Urban

\[ \Delta \ln(WAGEu\_PRC) = -0.3056 \times \Delta \ln(WAGEu\_PRC\_1) + 0.1130 - 0.5418 \times SQ1 - 0.4748 \times SQ2 - 0.3699 \times SQ3 \\
- 0.2345 \times DST1999Q1 - 0.28266 \times WAGEuECM\_PRC\_1 \]

- \( WAGEuECM\_PRC = \ln(WAGEu\_PRC) - \ln[(VA2\_PRC + VA3\_PRC) / (EMP2\_PRC + EMP3\_PRC)] \)
- \( WAGEu\_PRC = \) Average Earnings of Urban Employed Persons
- \( VA2\_PRC = \) Value Added From the Secondary Sector
- \( VA3\_PRC = \) Value Added From the Tertiary Sector
- \( EMP2\_PRC = \) Number of Employed Persons in the Secondary Sector
- \( EMP3\_PRC = \) Number of Employed Persons in the Tertiary Sector

Residual Diagnostics

\[
\begin{array}{ll}
sigma & 0.0429 \\
R^2 & 0.2816 \\
\text{Joint parameter constancy} & 1.6388 \\
\text{No autocorrelation} & F(4,35) = 0.5219 [0.7202] \\
\text{No ARCH} & F(4,31) = 0.3452 [0.8453] \\
\text{Normality} & Chi^2(2) = 2.6989 [0.2594] \\
\text{Homoscedasticity} & F(8,30) = 0.9935 [0.4609] \\
\text{RESET} & F(1,30) = 0.2220 [0.6402]
\end{array}
\]

Sample Period 1992(2) to 2003(3)
7. Monetary Sector

7.1 M0

\[ \Delta \ln(M0\_PRC) = 0.9593 \times \Delta \ln(M1\_PRC) - 0.0666 \times SQ2 - 0.28425 \times M0ECM\_PRC \_1 \]

\(T71\)

\[ M0ECM\_PRC = \ln(M0\_PRC) - \ln[0.59 - 0.08 \times \ln(TIME)] \times M1\_PRC \_1 \]

M0\_PRC = Cash Issue
M1\_PRC = Narrow Money

7.2 M1

\[ \Delta \ln(M1\_PRC) = \Delta \ln(P\#DGP\_PRC) + 0.20675 - 0.1900 \times SQ1 + 0.2300 \times SQ2 + 0.2689 \times \Delta \ln(GDPc\_PRC \_1) \]

\[ + 0.1100 \times \Delta \left(\frac{MBS\_PRC \_2}{MB\_PRC \_2}\right) - 4.7700 \times \Delta 4 \ln(P\#C\_PRC \_1) - 0.1634 \times M1ECM\_PRC \_1 \]

\(B71\)

\[ M1ECM\_PRC = \ln(M1\_PRC/P\#GDP\_PRC) - \ln(GDPc\_PRC) + 0.3 \times [\text{IRD}\%\_PRC - 100 \times \ln(P\#C\_PRC)] \]

M1\_PRC = Narrow Money
P\#GDP\_PRC = GDP Deflator
GDPc\_PRC = GDP, in 1992Q1 Price
MBS\_PRC = Base Money Supply
MB\_PRC = Base Money
IRDD\%\_PRC = Demand Deposit Interest Rate
P\#C\_PRC = Consumer Price Index (1992Q1=1)

Residual Diagnostics

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>(\sigma)</td>
<td>0.0190</td>
</tr>
<tr>
<td>(R^2)</td>
<td>0.9462</td>
</tr>
<tr>
<td>No autocorrelation</td>
<td>F(3,34) = 0.2834 [0.8370]</td>
</tr>
<tr>
<td>No ARCH</td>
<td>F(3,31) = 0.2945 [0.8290]</td>
</tr>
<tr>
<td>Nonnormality</td>
<td>(Chi^2(2)) = 1.5510 [0.4605]</td>
</tr>
<tr>
<td>Homoscedasticity</td>
<td>F(10,26) = 0.6276 [0.7769]</td>
</tr>
<tr>
<td>RESET</td>
<td>F(1,36) = 1.0501 [0.3123]</td>
</tr>
</tbody>
</table>

Sample Period 1994(1) to 2004(4)

7.3 M2

\[ M2\_PRC = M1\_PRC + 2 \times M2\_PRC \_1 - 2 \times M1\_PRC \_1 - M2\_PRC \_2 + M1\_PRC \_2 - 172577 - 116978 \times SQ1 \]

\[ 24010 + 29520 \times 0.0850 + 0.1138 \]

\[ - 7541.42 \times \Delta^2 (100 \times UEMP\%\_PRC \_1) - 173463 \times \Delta \Delta 4 \ln(P\#C\_PRC \_1) + 29628.2 \times \Delta 4 \text{IRD}\%\_PRC \]

\[ 8229 \times 0.0701 \]

\[ + 0.7933 \times M2ECM\_PRC \_1 \]

\[ 0.0654 \]

\[ 0.0643 \]
A SMALL MACROECONOMETRIC MODEL OF THE PEOPLE’S REPUBLIC OF CHINA  
DUO QIN, MARIE ANNE CAGAS, GEOFFREY DUCANES, NEDELYN MAGTIBAY-RAMOS, XIN-HUA HE, RUI LIU, SHI-GUO LIU

\[ M_{2ECM\_PRC} = \Delta(M_{2\_PRC} - M_{1\_PRC}) - 1.5*PSAV\_PRC - 13300*IRD\%\_PRC \]

\[ M_{2\_PRC} = \text{Broad Money} \]
\[ M_{1\_PRC} = \text{Narrow Money} \]
\[ UEMP\%\_PRC = \text{Unemployment Rate } (\%) \]
\[ PC\_PRC = \text{Consumer Price Index (1992Q1=1)} \]
\[ IRD\%\_PRC = \text{One-Year Interest Rate on Deposits} \]
\[ PSAV\_PRC = \text{Potential Savings Deposit} \]

**Residual Diagnostics**
- \( \text{sigma} \) = 79879.9
- \( \text{variance} \) = 0.7482
- \( \text{R}^2 \) = 0.8503
- \( \text{joint parameter constancy} \) = 1.9646

- **Stability**
  - No autocorrelation
  - No ARCH
  - Normality
  - Homoscedasticity
  - X-Homoscedasticity
  - RESET

**Sample Period** 1993(3) to 2004(1)

### 7.4 Reserve Money

\[
\begin{align*}
\text{RSV\_PRC} &= (M_{2\_PRC} - M_{0\_PRC})^* \left[ 0.01 * \text{RR\%\_PRC} + (RSV\_PRC - 1)/(M_{2\_PRC} - 1 - M_{0\_PRC} - 1) - 0.01 * \text{RR\%\_PRC} \right] \\
&+ 0.172183 - 0.0224647* (SQ1 + SQ2 + SQ3) + 0.06276* \Delta IRCB\%\_PRC - 0.71973* RSVECM\_PRC - 0.03 \\
&0.0211 0.0024 0.0016 0.1001 0.0739
\end{align*}
\]

\[
\begin{align*}
\text{RSVECM\_PRC} &= [RSV\_PRC/(M_{2\_PRC} - M_{0\_PRC}) - 0.01*\text{RR\%\_PRC}] + 0.0055*\text{IRL\%\_PRC} + 0.074*(M_{1\_PRC}/MB\_PRC)
\end{align*}
\]

- **RSV\_PRC** = Foreign Reserves
- **M_{2\_PRC}** = Broad Money
- **M_{0\_PRC}** = Cash Issue
- **RR\%\_PRC** = Required Reserves Ratio
- **M_{1\_PRC}** = Narrow Money
- **MB\_PRC** = Base Money
- **IRL\%\_PRC** = One-Year Interest Rate on Lending
- **IRCB\%\_PRC** = Central Bank Rediscount Rate

**Residual Diagnostics**
- \( \text{sigma} \) = 0.0066
- \( \text{variance} \) = 0.1539
- \( \text{R}^2 \) = 0.8419

- **Stability**
  - No autocorrelation
  - No ARCH
  - Normality
  - Homoscedasticity
  - X-Homoscedasticity
  - RESET

**Sample Period** 1993(3) to 2003(4)
7.5 Net Foreign Assets

\[ \Delta^2 \text{NFA}_\text{PRC} = -1189.50 * 0.1 * \Delta^2 + 0.725529 * 0.001 * \Delta (\text{X}_\text{PRC} - \text{M}_\text{PRC}) + 0.7990 * 0.001 * \Delta \text{FDI}_\text{PRC} \]

\[
\begin{bmatrix}
249.10 \\
0.3590
\end{bmatrix}
\begin{bmatrix}
0.2752 \\
0.1724
\end{bmatrix}
\begin{bmatrix}
0.3921 \\
0.0311
\end{bmatrix}
\]

\[ -0.641666 \cdot \text{NFAECM}_\text{PRC}\cdot 2 \]

\[ \text{NFAECM}_\text{PRC} = r\text{NFA}_\text{PRC} - \frac{\text{X}_\text{PRC}}{1000} + \frac{\text{M}_\text{PRC}}{1000} - \frac{\text{FDI}_\text{PRC}}{1000} - \frac{250}{10} \]

NFA\_PRC = Net Foreign Assets
X\_PRC = Exports
M\_PRC = Imports
FDI\_PRC = Foreign Direct Investments

Residual Diagnostics

<table>
<thead>
<tr>
<th>Test</th>
<th>Value</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sigma</td>
<td>612.84</td>
<td>0.2010</td>
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<tr>
<td>R²</td>
<td>—</td>
<td>0.9056</td>
</tr>
<tr>
<td>No autocorrelation</td>
<td>F(3,32) = 0.7010 [0.5584]</td>
<td></td>
</tr>
<tr>
<td>No ARCH</td>
<td>F(3,32) = 1.0783 [0.3737]</td>
<td></td>
</tr>
<tr>
<td>Normality</td>
<td>Chi²(2) = 0.3361 [0.8462]</td>
<td></td>
</tr>
<tr>
<td>Homoscedasticity</td>
<td>F(7,27) = 1.3551 [0.2641]</td>
<td></td>
</tr>
<tr>
<td>X-Homoscedasticity</td>
<td>F(13,21) = 1.0749 [0.4277]</td>
<td></td>
</tr>
<tr>
<td>RESET</td>
<td>F(1,34) = 0.1154 [0.7362]</td>
<td></td>
</tr>
</tbody>
</table>

7.6 Domestic Credit

\[ \Delta \ln(\text{DC}_\text{PRC}) = -0.029 + 0.6258 * \Delta \ln\left(\frac{\text{M}_\text{PRC}}{1000} + \text{NFA}_\text{PRC} - \text{FD}_\text{PRC}\right) + 0.1462 * \text{DSH2002Q1} \]

\[ (0.1337) \]

\[ - 0.1733 * \text{DCECM}_\text{PRC}\cdot 1 \]

\[ (0.0844) \]

\[ \text{DCECM}_\text{PRC} = \ln(\text{DC}_\text{PRC}) - \ln\left(\frac{\text{M}_\text{PRC}}{1000} + \text{NFA}_\text{PRC} - \text{FD}_\text{PRC}\right) \]

DC\_PRC = Domestic Credit
M\_PRC = Broad Money
NFA\_PRC = Net Foreign Assets
FD\_PRC = Foreign Debt

Residual Diagnostics

<table>
<thead>
<tr>
<th>Test</th>
<th>Value</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sigma</td>
<td>0.0170</td>
<td>—</td>
</tr>
<tr>
<td>R²</td>
<td>0.6260</td>
<td>—</td>
</tr>
<tr>
<td>No autocorrelation</td>
<td>F(3,35) = 1.6227 [0.2017]</td>
<td></td>
</tr>
<tr>
<td>No ARCH</td>
<td>F(3,32) = 0.5728 [0.6370]</td>
<td></td>
</tr>
<tr>
<td>Normality</td>
<td>Chi²(2) = 1.4623 [0.4901]</td>
<td></td>
</tr>
<tr>
<td>Homoscedasticity</td>
<td>F(5,32) = 1.0112 [0.4272]</td>
<td></td>
</tr>
<tr>
<td>X-Homoscedasticity</td>
<td>F(6,31) = 1.0681 [0.4025]</td>
<td></td>
</tr>
<tr>
<td>RESET</td>
<td>F(1,37) = 0.0033 [0.9545]</td>
<td></td>
</tr>
</tbody>
</table>

Sample Period 1993(2) to 2003(3)
7.7 Base Money Supply

\[ MBS_{PRC} = MB_{PRC} \times MSP_{PRC} \times \left[ \frac{0.5573 \times (MBS_{PRC} - MB_{PRC})}{MB_{PRC}} + 1.0965 \right] \]

\[ - 0.2242 \times \Delta \ln(P\#C_{PRC} - 3) \]

\[ \begin{array}{c}
MBS_{PRC} = \text{Base Money Supply} \\
MB_{PRC} = \text{Base Money} \\
MSP_{PRC} = \text{Money Supply Policy} \\
P\#C_{PRC} = \text{Consumer Price Index (1992Q1=1)}
\end{array} \]

**Residual Diagnostics**

<table>
<thead>
<tr>
<th></th>
<th></th>
<th>Stability</th>
</tr>
</thead>
<tbody>
<tr>
<td>sigma</td>
<td>0.0266</td>
<td>variance 0.5770*</td>
</tr>
<tr>
<td>R²</td>
<td>0.7660</td>
<td>joint parameter constancy 0.9007</td>
</tr>
</tbody>
</table>

**Stability**

- No autocorrelation: F(3,32) = 1.2208 [0.3181]
- No ARCH: F(3,29) = 0.1634 [0.9201]
- Normality: \( \text{Chi}^2(2) = 5.7741 [0.0557] \)
- Homoscedasticity: F(5, 29) = 0.7931 [0.5634]

7.8 Interest Rate on Demand Deposits

\[ \Delta \text{IRDD}\%_{ECM_{PRC}} = 0.18515 - 1.1400 \times \Delta \ln((M2_{PRC} - M1_{PRC})/M1_{PRC}) - 0.25826 \times \text{IRDD}\%_{ECM_{PRC}} \]

\[ \Delta \text{IRDD}\%_{PRC} = \Delta \text{IRDD}\%_{PRC} - 0.05 \times \text{IRCB}\%_{PRC} - 9 \times \Delta \ln(P\#C_{PRC}) \]

**Residual Diagnostics**

<table>
<thead>
<tr>
<th></th>
<th></th>
<th>Stability</th>
</tr>
</thead>
<tbody>
<tr>
<td>sigma</td>
<td>0.1022</td>
<td>variance 0.1101</td>
</tr>
<tr>
<td>R²</td>
<td>0.4951</td>
<td>joint parameter constancy 1.1126</td>
</tr>
</tbody>
</table>

**Stability**

- No autocorrelation: F(3,32) = 0.8551 [0.4743]
- No ARCH: F(3,29) = 0.0704 [0.9753]
- Normality: \( \text{Chi}^2(2) = 14.476 [0.0007] ** \)
- Homoscedasticity: F(4,30) = 1.0739 [0.3868]
- X-Homoscedasticity: F(5,29) = 0.9018 [0.4932]
- RESET: F(1,34) = 10.686 [0.0025] **

**Sample Period: 1994(4) to 2004(1)**
7.9 One-year Interest Rate on Deposits

\[
\Delta(IRD\%_{PRC}) = 0.5517 + 2.277 \cdot \Delta(IRD\%_{PRC}) + 1.0550 \cdot \Delta\ln(P\#C_{PRC}) + 0.0970 \cdot \Delta(RR\%_{PRC})_2
\]

\[
- 0.2230 \cdot (IRD\%_{PRC-1}/IRD\%_{PRC-1})
\]

IRD\%_{PRC} = One-Year Interest Rate on Deposits
IRD\%_{PRC} = Interest Rate on Demand Deposits
PRC_{PRC} = Consumer Price Index (1992Q1=1)
M1\%_{PRC} = Narrow Money

Residual Diagnostics

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>(\sigma)</td>
<td>0.2225</td>
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<tr>
<td>(R^2)</td>
<td>0.7284</td>
</tr>
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</table>

Stability

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Variance</td>
<td>0.3366</td>
</tr>
<tr>
<td>Joint parameter constancy</td>
<td>0.9851</td>
</tr>
</tbody>
</table>

No autocorrelation: \(F(3,32) = 2.3658 [0.0894]\)
No ARCH: \(F(3,29) = 0.8847 [0.5686]\)
Normality: \(\text{Chi}^2(2) = 12.602 [0.0018]**\)
Homoscedasticity: \(F(8, 26) = 2.0756 [0.0762]\)
RESET: \(F(1,34) = 4.9420 [0.0330]*\)

Sample Period 1994(1) to 2003(4)

7.10 One-year Interest Rate on Lending

\[
\Delta(IRL\%_{PRC}) = 0.6200 \cdot \Delta(IRD\%_{PRC}) - 0.2510 \cdot IRL\%_{ECM_{PRC}} - 4
\]

IRL\%_{PRC} = IRL\%_{PRC} - 0.75*IRD\%_{PRC} - 4

IRL\%_{PRC} = One-Year Interest Rate on Lending
IRD\%_{PRC} = Interest Rate on Deposits

Residual Diagnostics

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>(\sigma)</td>
<td>0.2258</td>
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<tr>
<td>(R^2)</td>
<td>0.6507</td>
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Stability

<table>
<thead>
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<th>Parameter</th>
<th>Value</th>
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<tbody>
<tr>
<td>Variance</td>
<td>0.3681</td>
</tr>
<tr>
<td>Joint parameter constancy</td>
<td>1.1284</td>
</tr>
</tbody>
</table>

No autocorrelation: \(F(3,29) = 0.5017 [0.6840]\)
No ARCH: \(F(3,26) = 0.1815 [0.9080]\)
Normality: \(\text{Chi}^2(2) = 39.092 [0.0000]**\)
Homoscedasticity: \(F(4,27) = 2.6446 [0.0553]\)
X-Homoscedasticity: \(F(5,26) = 2.0478 [0.1049]\)
RESET: \(F(1,31) = 2.7912 [0.1049]\)

Sample Period 1995(1) to 2003(3)

8. Labour and Employment

8.1 Labour Force/Salary

\[
\Delta_4 \ln(LF\%_{PRC}) = 0.5840 \cdot \Delta_4 \ln(P\#C_{PRC}) + 0.263117 - 0.7800 \cdot LFECM_{PRC-4}
\]

LFECM_{PRC} = \ln(LF\%_{PRC}) - 0.91*\ln(P\#C_{PRC}) + 0.36*(POP\%_{PRC}/POP_{PRC})
8.2 Employment

\[
\Delta \ln(\text{EMP}_\text{PRC}) = 0.6244 \times \Delta \ln(\text{EMP}_\text{PRC} - 1) + 0.13817 - 0.035464 \times \text{EMPECM}_\text{PRC} - 1
\]

Residual Diagnostics

\[
\text{sigma} = 0.0009, \quad R^2 = 0.8889
\]

Stability

\[
\text{variance} = 0.4492, \quad \text{joint parameter constancy} = 1.2275
\]

No autocorrelation \( F(3,29) = 8.3721 \) [0.0004] **
No ARCH \( F(3,26) = 7.3234 \) [0.0010] **
Normality \( \text{Chi}^2(2) = 25.094 \) [0.0000] **
Homoscedasticity \( F(4,27) = 1.6762 \) [0.1757]
X-Homoscedasticity \( F(5,26) = 1.2275 \) [0.6785]
RESET \( F(1,31) = 0.2808 \) [0.5999]

EMP2ECM_PRC = ln(EMP2_PRC) - ln(VA2c_PRC + VA2c_PRC_1 + VA2c_PRC_2 + VA2c_PRC_3)

Residual Diagnostics

<table>
<thead>
<tr>
<th>sigma</th>
<th>R^2</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.0002</td>
<td>0.7643</td>
</tr>
</tbody>
</table>

No autocorrelation \( F(3,29) = 0.3272 \) [0.8057]
No ARCH \( F(3,26) = 0.0000 \) [1.0000]
Normality \( \text{Chi}^2(2) = 9.9952 \) [0.0068] **
Homoscedasticity \( F(6,25) = 2.1131 \) [0.0875]
X-Homoscedasticity \( F(9,22) = 1.9317 \) [0.1002]
RESET \( F(1,31) = 6.4345 \) [0.0164] *

Sample Period 1993(2) to 2003(4)

8.3 Secondary Sector Employment

\[
\Delta \ln(\text{EMP2}_\text{PRC}) = 0.8199 \times \Delta \ln(\text{EMP2}_\text{PRC} - 1) + 0.1595 + 0.0096 \times \text{DSH2003Q1} - 0.01156 \times \Delta^2(\text{UEMP}_\text{PRC})
\]

Residual Diagnostics

<table>
<thead>
<tr>
<th>sigma</th>
<th>R^2</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.0039</td>
<td>0.7031</td>
</tr>
</tbody>
</table>

No autocorrelation \( F(3,29) = 0.00731 \) [0.9996]
No ARCH \( F(3,26) = 0.0020 \) [0.9996]
Normality \( \text{Chi}^2(2) = 0.0034 \) [0.9996]
Homoscedasticity \( F(6,25) = 1.0070 \) [0.2131]
X-Homoscedasticity \( F(9,22) = 0.1002 \) [0.2131]
RESET \( F(1,31) = 0.0164 \) [0.9996]

EMP2ECM_PRC = ln(EMP2_PRC) - ln(VA2c_PRC + VA2c_PRC_1 + VA2c_PRC_2 + VA2c_PRC_3)

Residual Diagnostics

<table>
<thead>
<tr>
<th>sigma</th>
<th>R^2</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.0002</td>
<td>0.7643</td>
</tr>
</tbody>
</table>

No autocorrelation \( F(3,29) = 0.3272 \) [0.8057]
No ARCH \( F(3,26) = 0.0000 \) [1.0000]
Normality \( \text{Chi}^2(2) = 9.9952 \) [0.0068] **
Homoscedasticity \( F(6,25) = 2.1131 \) [0.0875]
X-Homoscedasticity \( F(9,22) = 1.9317 \) [0.1002]
RESET \( F(1,31) = 6.4345 \) [0.0164] *

Sample Period 1993(2) to 2003(4)
Residual Diagnostics

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>(\sigma)</td>
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<tr>
<td>(R^2)</td>
<td>0.9148</td>
<td></td>
</tr>
<tr>
<td>No autocorrelation</td>
<td>(F(3,29) = 0.0165 [0.9970])</td>
<td></td>
</tr>
<tr>
<td>No ARCH</td>
<td>(F(3,26) = 0.4812 [0.6982])</td>
<td></td>
</tr>
<tr>
<td>Normality</td>
<td>(\text{Chi}^2(2) = 16.970 [0.0002]^*)</td>
<td></td>
</tr>
<tr>
<td>Homoscedasticity</td>
<td>(F(9,22) = 1.2199 [0.3327])</td>
<td></td>
</tr>
<tr>
<td>RESET</td>
<td>(F(1,31) = 0.2353 [0.6310])</td>
<td></td>
</tr>
</tbody>
</table>

Sample Period 1994(3) to 2003(4)

8.4 Tertiary Sector Employment

\[
\Delta \ln(\text{EMP3}_\text{PRC}) = 0.092887 + 0.0049^* \text{DSH2002Q1} - 0.552527^* \Delta \ln(\text{EMP1}_\text{PRC}_1 - \text{EMP3}_\text{PRC}_1) \\
+ 0.01778^* \Delta^2 \ln\left(\frac{\text{VA3}_\text{PRC}}{\text{VA3c}_\text{PRC}}/\frac{\text{VA2}_\text{PRC}}{\text{VA2c}_\text{PRC}}\right) + 0.0294^* \text{EMP3ECM}_\text{PRC}_1 \\
B84
\]

\[\text{EMP3ECM}_\text{PRC} = \ln(\text{EMP3}_\text{PRC}) - \ln\left(\frac{\text{VA3}_\text{PRC}}{\text{VA3c}_\text{PRC}}/\frac{\text{VA2}_\text{PRC}}{\text{VA2c}_\text{PRC}}\right) + 0.15^* \ln(\text{VA3c}_\text{PRC}_1 + \text{VA3c}_\text{PRC}_2 + \text{VA3c}_\text{PRC}_3 + \text{VA3c}_\text{PRC}_4)\]

\[\Delta \text{ln}(\text{EMP3}_\text{PRC}) = 0.01346 (0.0012) - 0.0179 (0.0500) \]

\[
\begin{bmatrix}
0.0024 \\
0.2859
\end{bmatrix}
\]

\[\Delta (\text{ln}(\text{EMP3}_\text{PRC}))
\]

Note: All variables are named by their English abbreviation. Special letters and characters used and added to variable names denote the following: \$ - US$; c - at constant price. PC as the first 2 letters of a variable means per capita; u means urban; r means rural. When the variable name is Y, \(\ln(Y)\) means the logarithm of Y, \(Y_1\) means the first lag of Y, \(\Delta Y\) means the first difference of Y, i.e., \(\Delta Y = Y - Y_1\), \(\Delta \ln(Y)\) means first take the logarithm and then take the first difference, i.e., \(\Delta \ln(Y) = \ln(Y) - \ln(Y_1)\); YECM means the long run equilibrium in the behavior equation, where Y is the explained variable. SQ1, SQ2, and SQ3 are seasonal dummies. DSHYYYYQX denotes a one-off (shock) dummy in quarter (Q) X of year YYYY. DSTYYYYQX denotes a one-step dummy from quarter (Q) X of year YYYY onwards. DSYYYYYQX denotes a one-step dummy from quarter (Q) X of year YY to quarter(Q) X of year YY. In the equations, (SE) stands for standard error of the parameter estimate, which is below each parameter estimate. There are three types of equations: behavioral or structural equations, technical or linking equations, and identities. In the equation numbering system, B is used for behavioral equations, T for technical equations, I for identities, and E for exogenous variables.
## APPENDIX 2B
### IDENTITIES

### Investment

<table>
<thead>
<tr>
<th>Identity</th>
<th>Description</th>
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<tbody>
<tr>
<td>( \text{INVc}<em>{PRC} = \frac{\text{INV}</em>{PRC}}{\text{P#INV}_{PRC}} )</td>
<td>( \text{INVc}_{PRC} = ) Gross Fixed Capital Formation, in 1992Q1 price</td>
</tr>
<tr>
<td>( \text{INVc}<em>{PRC} = \frac{\text{INV}</em>{PRC}}{\text{P#INV}_{PRC}(1992Q1=1)} )</td>
<td>( \text{INV}_{PRC} = ) Gross Fixed Capital Formation</td>
</tr>
<tr>
<td>( \text{P#INV}_{PRC} = ) Fixed Investment Price Index (1992Q1=1)</td>
<td></td>
</tr>
</tbody>
</table>

\[
\text{UCC\%}_{PRC} = \left( \frac{\text{P#INV}_{PRC}}{\text{P#GDP}_{PRC}} \right) \left[ \frac{\text{IRL\%}_{PRC}}{4} - 100 \left( \frac{\text{P#INV}_{PRC}}{\text{P#INV}_{PRC}(4-1)} - 1 \right) \right] + \frac{\text{DEPK}_{PRC}}{1 - \text{TAX\%}_{PRC}/100} \tag{1002}
\]

- \( \text{UCC\%}_{PRC} = \) User Cost of Capital
- \( \text{P#INV}_{PRC} = \) Price Index of Investment in Fixed Assets (1992Q1=1)
- \( \text{P#GDP}_{PRC} = \) GDP Deflator
- \( \text{IRL\%}_{PRC} = \) One Year Interest Rate of Lending
- \( \text{DEPK\%}_{PRC} = \) Annual Depreciation Rate of Fixed Assets (%)
- \( \text{TAX\%}_{PRC} = \) Tax Rate

\[
\text{K}_{PRC} = \frac{\text{K}_{PRC}(-1) \cdot (1 - \text{DEPK}_{PRC}/400) + \text{INV}_{PRC}}{1} \tag{1003}
\]

- \( \text{K}_{PRC} = \) Stock of Fixed Investment Assets
- \( \text{DEPK}_{PRC} = \) Annual Depreciation Rate of Fixed Assets (%)
- \( \text{INV}_{PRC} = \) Gross Fixed Capital Formation

\[
\text{BINV}_{PRC} = \text{BINVc}_{PRC} \cdot \text{P#INV}_{PRC} \tag{1004}
\]

- \( \text{BINV}_{PRC} = \) Business Sector Investment
- \( \text{BINVc}_{PRC} = \) Business Sector Investment, 1992Q1 price
- \( \text{P#INV}_{PRC} = \) Price Index of Investment in Fixed Assets (1992Q1=1)

\[
\text{GINV}_{PRC} = \text{GINVc}_{PRC} \cdot \text{P#INV}_{PRC} \tag{1005}
\]

- \( \text{GINV}_{PRC} = \) Government Budgetary Investment
- \( \text{GINVc}_{PRC} = \) Government Investment
- \( \text{P#INV}_{PRC} = \) Price Index of Investment in Fixed Assets (1992Q1=1)

\[
\text{FDI}_{PRC} = \text{FDI}_{PRC} \cdot \text{ER}_{PRC} \tag{1006}
\]

- \( \text{FDI}_{PRC} = \) Foreign Direct Investments
- \( \text{FDI}_{PRC} = \) Foreign Direct Investments (100 million US$)
- \( \text{ER}_{PRC} = \) Exchange Rate

### Government Sector

\[
\text{GDEF}_{PRC} = \text{GREV}_{PRC} - \text{GEXP}_{PRC} \tag{1001}
\]

- \( \text{GDEF}_{PRC} = \) Government Deficit
- \( \text{GREV}_{PRC} = \) Government Revenue
- \( \text{GEXP}_{PRC} = \) Government Expenditure
### Exports and Imports

<table>
<thead>
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<th>Note</th>
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<tr>
<td>( X_{PRC} = X$<em>{PRC} \times ER</em>{PRC} )</td>
<td>(I301)</td>
</tr>
<tr>
<td>( X_{PRC} = ) Export</td>
<td>(B41)</td>
</tr>
<tr>
<td>( X$_{PRC} = ) Export (B41)</td>
<td></td>
</tr>
<tr>
<td>( ER_{PRC} = ) Exchange Rate Exogenous</td>
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<table>
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<td>( M_{PRC} = M$<em>{PRC} \times ER</em>{PRC} )</td>
<td>(I302)</td>
</tr>
<tr>
<td>( M_{PRC} = ) Imports</td>
<td>(B42)</td>
</tr>
<tr>
<td>( M$_{PRC} = ) Imports (B42)</td>
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<td>( ER_{PRC} = ) Exchange Rate Exogenous</td>
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### The GDPS

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<tr>
<td>( GDPc_{PRC} = VA1c_{PRC} + VA2c_{PRC} + VA3c_{PRC} )</td>
<td>(I401)</td>
</tr>
<tr>
<td>( GDPc_{PRC} = ) Gross Domestic Product, in 1992Q1 price</td>
<td></td>
</tr>
<tr>
<td>( VA1c_{PRC} = ) Value Added from the Primary Sector, in 1992Q1 price</td>
<td>(B52)</td>
</tr>
<tr>
<td>( VA2c_{PRC} = ) Value Added from the Secondary Sector, in 1992Q1 price</td>
<td>(B54)</td>
</tr>
<tr>
<td>( VA3c_{PRC} = ) Value Added from the Tertiary Sector, in 1992Q1 price</td>
<td>(B56)</td>
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<th>Equation</th>
<th>Note</th>
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<tr>
<td>( GDP_{PRC} = GDPc_{PRC} \times P#GDP_{PRC} )</td>
<td>(I402)</td>
</tr>
<tr>
<td>( GDP_{PRC} = ) Gross Domestic Product</td>
<td></td>
</tr>
<tr>
<td>( VA1_{PRC} = ) Value Added from the Primary Sector</td>
<td>(B51)</td>
</tr>
<tr>
<td>( VA2_{PRC} = ) Value Added from the Secondary Sector</td>
<td>(B53)</td>
</tr>
<tr>
<td>( VA3_{PRC} = ) Value Added from the Tertiary Sector</td>
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<th>Note</th>
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<tr>
<td>( GDPe_{PRC} = PCON_{PRC} + INV_{PRC} + GCON_{PRC} + X_{PRC} - M_{PRC} )</td>
<td>(I403)</td>
</tr>
<tr>
<td>( GDPe_{PRC} = ) Effective Domestic Demand</td>
<td></td>
</tr>
<tr>
<td>( PCON_{PRC} = ) Private Consumption</td>
<td>(T11)</td>
</tr>
<tr>
<td>( INV_{PRC} = ) Investment in Fixed Assets</td>
<td>(T21)</td>
</tr>
<tr>
<td>( GCON_{PRC} = ) Government Consumption</td>
<td>(B32)</td>
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<tr>
<td>( X_{PRC} = ) Exports</td>
<td>(I301)</td>
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<tr>
<td>( M_{PRC} = ) Imports</td>
<td>(I302)</td>
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<table>
<thead>
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<th>Note</th>
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<tbody>
<tr>
<td>( GDP$<em>{PRC} = GDP</em>{PRC} \times ER_{PRC} )</td>
<td>(I404)</td>
</tr>
<tr>
<td>( GDP$_{PRC} = ) Gross Domestic Product</td>
<td>(I402)</td>
</tr>
<tr>
<td>( ER_{PRC} = ) Exchange Rate Exogenous</td>
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<tr>
<th>Equation</th>
<th>Note</th>
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<tr>
<td>( PC_{PRC} = GDP_{PRC} \times POP_{PRC} )</td>
<td>(I405)</td>
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<tr>
<td>( PC_{PRC} = ) Per Capita Gross Domestic Product</td>
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<tr>
<td>( GDP_{PRC} = ) Gross Domestic Product</td>
<td>(I402)</td>
</tr>
<tr>
<td>( POP_{PRC} = ) Total Population</td>
<td>Exogenous</td>
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<th>Equation</th>
<th>Note</th>
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</thead>
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<td>( PCONc_{PRC} = PCON_{PRC} \times P#C_{PRC} )</td>
<td>(I406)</td>
</tr>
<tr>
<td>( PCONc_{PRC} = ) Private Consumption, in 1992Q1 price</td>
<td></td>
</tr>
<tr>
<td>( GCONc_{PRC} = ) Government Consumption, in 1992Q1 price</td>
<td>(T11)</td>
</tr>
<tr>
<td>( P#C_{PRC} = ) Consumer Price Index (1992Q1=1)</td>
<td>(B61)</td>
</tr>
</tbody>
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A SMALL MACROECONOMETRIC MODEL OF THE PEOPLE'S REPUBLIC OF CHINA
DUO QIN, MARIE ANNE CAGAS, GEOFFREY DUCANES, NEDELYN MAGSTIBAY-RAMOS, XIN-HUA HE, RUI LIU, SHI-GUO LIU

GCONc_PRC = GCON_PRC/P#C_PRC  (I407)
  GCONc_PRC =Government Consumption, in 1992Q1 price
  GCON_PRC =Government Consumption
  P#C_PRC =Consumer Price Index (1992Q1=1)

Xc_PRC = X_PRC/P#C_PRC  (I408)
  Xc_PRC =Exports, in 1992Q1 price
  X_PRC =Exports
  P#C_PRC =Consumer Price Index (1992Q1=1)

Mc_PRC = M_PRC/P#C_PRC  (I409)
  Mc_PRC =Imports, in 1992Q1 price
  M_PRC =Imports
  P#C_PRC =Consumer Price Index (1992Q1=1)

STK_PRC = GDP_PRC–GDPe_PRC  (I410)
  STK_PRC =Inventories
  GDP_PRC =Gross Domestic Product
  GDPe_PRC =Effective Domestic Demand

STKc_PRC = GDPc_PRC – (PCONc_PRC + INVc_PRC + GCONc_PRC + Xc_PRC – Mc_PRC)  (I411)
  STKc_PRC =Inventories, in 1992Q1 price
  GDPc_PRC =Gross Domestic Product, in 1992Q1 Price
  PCONc_PRC =Private Consumption, in 1992Q1 Price
  INVc_PRC =Investment in Fixed Assets, in 1992Q1 Price
  GCONc_PRC =Government Consumption, in 1992Q1 Price
  Xc_PRC =Exports, in 1992Q1 Price
  Mc_PRC =Imports, in 1992Q1 Price

Banking

PSAV_PRC = (PCINCu_PRC – PCCONu_PRC)*POPu_PRC/10000 + (PCINCr_PRC – PCCONr_PRC)*POPr_PRC/10000  (I601)
  PSAV_PRC =Potential Savings Deposit
  PCINCu_PRC =Per Capita Income of Urban Households
  PCCONu_PRC =Per Capita Living Expenditure of Urban Households in Cash
  PCINCr_PRC =Per Capita Income in Cash of Rural Household
  POPr_PRC =Population, Rural

MB_PRC = MO_PRC+RSV_PRC  (I602)
  MB_PRC =Base Money
  MO_PRC =Currency in Issue
  RSV_PRC =Foreign Reserves
<table>
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<tbody>
<tr>
<td><strong>UEMP%<em>{PRC} = 100 \times \left(1 – \frac{EMP</em>{PRC}}{LF_{PRC}}\right)</strong> (I701)</td>
</tr>
<tr>
<td>UEMP%_{PRC} = Unemployment Rate</td>
</tr>
<tr>
<td>EMP_{PRC} = Total Number of Employed Persons</td>
</tr>
<tr>
<td>LF_{PRC} = Labor Force</td>
</tr>
<tr>
<td><strong>EMP1_{PRC} = EMP_{PRC} – \left(EMP2_{PRC} + EMP3_{PRC}\right)</strong> (I702)</td>
</tr>
<tr>
<td>EMP1_{PRC} = Total Number of Employed Persons in the Primary Sector</td>
</tr>
<tr>
<td>EMP_{PRC} = Total Number of Employed Persons</td>
</tr>
<tr>
<td>EMP2_{PRC} = Total Number of Employed Persons in the Secondary Sector</td>
</tr>
<tr>
<td>EMP3_{PRC} = Total Number of Employed Persons in the Tertiary Sector</td>
</tr>
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