

A MACROECONOMETRIC MODEL OF INCOME DISPARITY IN CHINA

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This paper examines what impacts, if any, macroeconomic performances and macroeconomic policy have had on income inequality in China during the period 1955-1998. A vector autoregression model (VAR) is estimated which includes measures of macroeconomic performance, such as inflation and unemployment, and of macroeconomic policy such as money supply and fiscal expenditure. The VAR techniques, “innovation accounting” and “Granger causality,” are utilised to examine the causal linkage, if any, between “macro-factors” and income disparity in China. We find that fiscal spending and unemployment appear to be the most important sources of change in income dispersion as far as the “macro” factors are concerned. [C32, D31, O11 and O53]

1. INTRODUCTION

Rapid economic growth in China since the beginning of the 1980s has attracted worldwide attention, but there has also been increased awareness of the possibility of changes in China’s regional income inequality in the reform era. There is a growing literature on this issue, the bulk of which is concerned with an empirical question, that is, whether there is widening regional income inequality¹ in China since the 1980s and, if so, what are the sources of this increased income dispersion?

This paper seeks to add to this literature by applying a VAR model which uses the VAR techniques of “innovation accounting” and “Granger causality” to examine the causal linkages, if any, between “macro-factors” and income disparity

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¹Income inequality can have many different dimensions such as the disparity between urban and rural areas, between blue-collar and white-collar workers and between the inland and coastal areas. In this paper, income disparity refers to inter-provincial differences in per capita GDP. Further, the term “income inequality” is interchangeably used with “income disparity”.

in China. It is not intended to determine *how* macro-variables affect income inequality, rather, we investigate whether a statistical relationship exists between macro-variables and income inequality in China and the degree of causality. There has been relatively little recent work on the impact of macroeconomic performance and policy on the level of income inequality in China. Further, few have utilised the VAR approach to analyse this issue.

The rest of paper progresses as follows: Section 2 presents a brief review of the literature, followed by an analysis of China's possible regional income dispersion using some standard statistical measures such as coefficient of variation and Gini coefficients. Section 3 presents the econometric model used while Section 4 offers the empirical results. Concluding remarks are contained in Section 5.

2. A REVIEW

This section provides a brief review of the literature on China's income inequality and includes an analysis of income disparity for the period 1955-98 using conventional statistical indicators.

A. A Short Review

The literature on Chinese income disparity is large, so this paper concentrates on the research of the 1990s. Table 1 summarises some previous studies and outlines the data used, the analytical techniques and the main findings. The researchers were mainly concerned with whether there have been changes in income disparity in China. The conclusions are mixed: some present evidence of reduced income disparity from the 1950s to the 1990s, others argue for the contrary.

For instance, Wu (1999) has used the concept of convergence to look for changes in income disparity in China during the 1960s -1990s period. He concluded that income inequality has tended to converge. Using a similar technique, Raiser (1998) reached the same conclusion. Lin, Cai and Li (1998), on the other hand, come to an opposite view. They decomposed the Theil index and Gini index and found that income disparity between regions in China had increased. Tong (1997) used data envelopment and also concluded that China's income inequality has widened.

It is apparent from Table 1 that, first, a commonly used measure of income inequality has been the coefficient of variation (CV), although other measures are also used. It may be more informative to use several measures in measuring income disparity. Second, the debate over income inequality in China is focused on the *changes* over time.

Several studies have looked into the causes of income inequality in China (eg., Hussain, *et.al.*, 1994; Zhao and Li, 1997; Khan and Riskin, 1999; Tsui 1998 and

Tong, 1997). However, previous works have largely concentrated on “micro-factors” of income inequality such as non-farming and rental income, rural industrialisation levels, productivity and efficiency differences and rural/urban gaps in the income level.

Table 1. Summary of Selected Studies on Regional Disparities in China

Authors	Sample	Methods	Main findings
Lyons1991	1952-87/GVO/consumption	CV	disparity↓
Knight and Song 1993	1987/counties	income functions	rural inequality↑ among counties
Hussain et al.1994	1986/household 5000(urban/rural each)	Gini ratio decomposition	low inequality /sources: urban non-wage &rural non-farming
Lee 1994	1984-90/NI	growth equation	disparity in export contribution
Chen 1995	1987-94/household data	Gini ratios	Disparity↑
Hu,Wang and Kang 1995	1987-94/GDP	CV Descriptive analysis	Disparity↓ but large regional disparity by international Standard
Wei,Wei 1995	1952-91/NI	Gini ratios/CV	disparity↓in 1987-91but ↑ in 1952-78
Chen and Fleisher 1996	1978-93	growth equation	regional convergence
Jian,Sachs and Fleisher1996	1952-93/GDP	income dispersion	Disparity ↓ and convergence
Chen and Ravallion1996	1985-90/household data	rural poverty	less increase in poverty
Rozelle 1996	1983-92/household data	Gini ratio and Sources	disparity↑ and convergence Source: rural industrialization
Tsui 1996	post-reform	Gini/CV/GE Sources	disparity↓ in early 1980s disparity↑ in late 1980s
Lyons 1997	1990/Fujian	cross-tabulation	large disparity among countries
Zhao and Li 1997	1988&1995 household data	Gini ratio	disparity↑
Gundlach1997	1979-89/output per worker	1979-89/output per worker	rate of convergence:2.2%
Research Team 1997	1978-96	Gini ratio/descriptive Analysis	disparity↑
Yang and Zhou (1999)	Household survey and aggregate data, 1978-97	production function	but still low in international standard V-shaped process: disparity ↓ in 1978-85 But disparity ↑ after 1985 Source: labour productivity between urban and rural
Tong (1997)	1978-91	data-envelopment analysis	disparity ↑Source: industrial production efficiency across provinces deteriorated

Sources: Wu (1999) and authors' additions

Table 1. Summary of Selected Studies on Regional Disparities in China
(continued)

Authors	Sample	Methods	Main findings
Meng and Wu 1998	1000 rural households	Income equation	Sources of income differential
HU 1997	1980-95/GDP	Regional shares	Less increase in disparity
Li,Zhao and Zhang 1998	1988&1995 household data	Gini ratio ,CV	disparity↑
Lin,Cai and Li 1998	1978-95 GDP and household income	Gini ratio and Theil ratios decomposition	disparity↑ between regions disparity↓ within regions
Raiser 1998	1978-92	α/β convergence	Disparity↓ Convergence after 1985
Tian 1998	Post-1978/GDP	CV	Interprovincial disparity↓ coastal-interior disparity↑
Duncan and Tian 1998	1952-95/NI	CV	Disparity↓
Gustafsson and Li 1998	1998 household survey	Income equation locational aspects	Rural-urban gap accounts for 30% of total disparity
Zhang 1998	1988&1995 household data 1980-95 aggregate	Gini ratios/ decomposition	Rural inequality↑ Source:non-farming income
Khan and Riskin 1998	1988&1995 household data	Gini ratios decomposition	Inequality ↑ and worse in urban China Source: non-farming & rental income
Tsui 1998	Rural household data/late 80s	Theil indexes/ decomposition	Sources of regional disparities: Export and FDI
Wu 1999	1981-95/GDP	Productivity/ efficiency	Convergence, ↓ in disparity

Sources: Wu (1999) and authors' additions

As far as statistical techniques are concerned, to the best of our knowledge, none of the previous research has used the VAR technique to consider the statistical relationship between income disparity and macroeconomic activities.

B. The Increase in Income Disparity in the 1990s

Income inequality is defined here as “inter-provincial differences in per capita GDP”. For our measures of income dispersion, we use the Gini coefficient, the

coefficient of variation, and Theil's Index.² Figure 1 plots these measures over the 1955-98 period. The results clearly show that there was increased income inequality in China over the 1990s.

Furthermore, we also plotted changes in the 20th percentile and 80th percentile values for per capita GDP (see Figure 2). The results confirm the conclusion: there is evidence of increased income disparity in China in the reform period.

It should be pointed out that there is a difference in the results in Figure 1 and Figure 2. Figure 2 shows that income inequality began widening in the 1980s and increased throughout the 1990s. On the other hand, the CV results in Figure 1 show that, if anything, income inequality improved in the 1980s but increased throughout the 1990s.

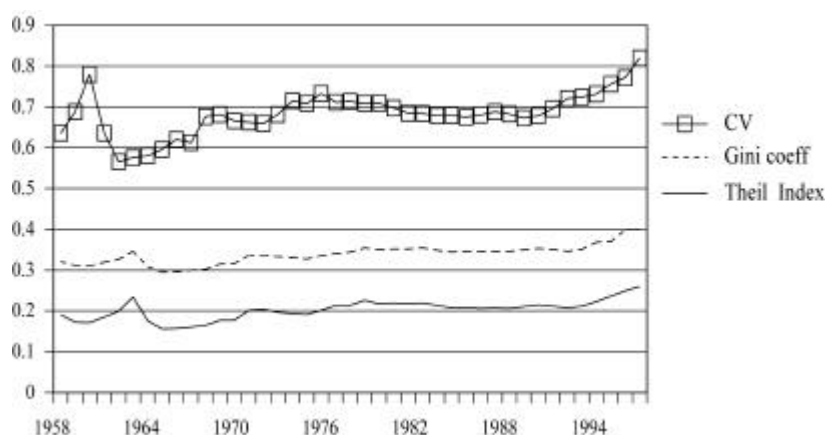


Figure 1. Income Disparity in China: Index Numbers

The 1990s witnessed not only increased Chinese regional income dispersion but also major changes in macroeconomic performance and policies. In this decade, one saw the reform of the Chinese financial system, which brought about a more “market-oriented” monetary policy; As well, China adopted a more expansionary fiscal policy combined with a swifter decentralisation of its fiscal structure. On the macroeconomic activity front, the inflation level was reduced

²The formulae for these indices are: Coefficient variation = $\sqrt{\sum(Y_i - Y)^2/n} / Y$

Theil Index = $\sum Y_i \log(Y_i/Y) / n Y$;

Gini coefficient = $\sum \sum \sqrt{(Y_i - Y_j)^2} / 2n^2 / Y$.

Where: Y_i is per capita income in the i th province, Y is average per capita income and n is the sample size.

in the late 1990s after high price increases in the late 1980s and early 1990s. At the same time, the so-called “reform of state-owned enterprises” started in the late 1990s has increased the unemployment level in China.

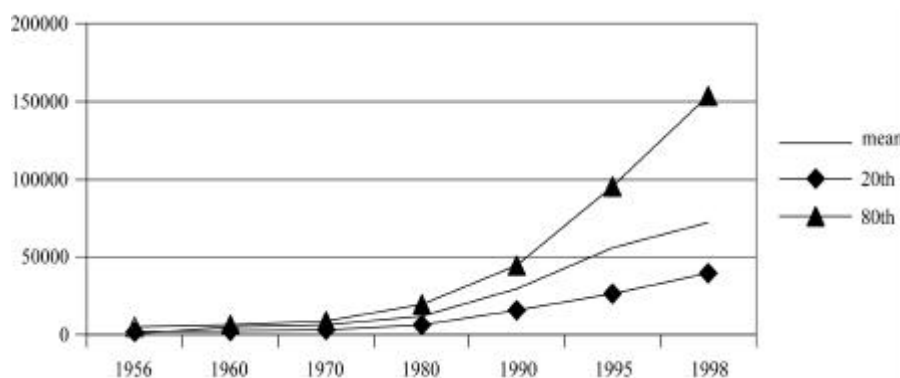


Figure 2. Income Disparity in China: Mean and Percentile Values

To what extent can we explain the increase of regional income disparity in China in terms of these macroeconomic forces?

3. THE MODEL AND DATA

“Macro” variables could have important impacts on income disparity as argued by Balke and Slottje (1994). Moreover, macroeconomic policy (such as fiscal spending, money supply and interest rate) and other macroeconomic variables (such as inflation, exports and inflation level) could have different impacts on income disparity.

According to Balke and Slottje, government’s role as a redistribution mechanism and hence public policy will inevitably influence the level of regional income inequality because of different redistributive impacts. For instance, money supply changes and fiscal spending may impact differently on labour supply and GDP growth in terms of regions. This is particularly relevant in the Chinese case where the impacts of money supply and fiscal policy on output and labour supply have had considerably different results before and after the open-door policy. Similarly, macroeconomic activities such as exports and population/unemployment growth could also differently affect income disparity. In fact, Balke and Slottje (1994) and Blank and Blinder (1986) proposed that income inequality is a function of unemployment,

inflation, fiscal spending and money supply. Others such as Blank (1989) have also discussed the importance of including macroeconomic measures as the sources of income disparity.

Whilst these economists were primarily concerned with the cases of industrialised economies, their analysis does shed some light on the debate over the Chinese case. Fiscal spending has been an important input to Chinese regional development even after the de-centralisation of its fiscal system. Note that we are not looking into specific redistributive programs, or the details of fiscal reform in China. Rather, we are interested in how macroeconomic factors interact to affect income dispersion, and vice versa. It is also well known that FDI and exports have played a strong role in Chinese economic development (see, Shan and Sun 1998; Sun and Chai, 1998), but one can notice that there have been differences in FDI inflows and export performances across different Chinese provinces (see, Sun and Chai, 1998).

It would be informative if the relationship between income disparity and macroeconomic policy and macroeconomic activity is examined in a dynamic way, that is, to look into how this relationship, if any, changed over time and how each macroeconomic activity influenced income disparity.

A. The Model

A VAR specification is attractive for examining the relationship between regional income disparity and macroeconomic activity because the model does not impose any theoretical restrictions on the dynamic behaviour of the variables in the system and will “let the data speak” with regard to the issue we wish to investigate. VAR analysis is commonly used in estimation and inference of macroeconomic relationships despite its drawbacks in certain areas.³ A VAR is perhaps more useful if there is no prior information and economic theory cannot assist model specification. In this case, a consensus does not exist on a well-defined static theory of income distribution let alone on a dynamic theory.

Furthermore, one has to keep in mind that there are possible feedbacks amongst the variables of interest. Thus it is important to take account of the endogenous nature of the relationships or the results may be subject to simultaneity bias. The use of a VAR model has proven to generate more reliable estimates in an endogenous context (Gujarati, 1995).

“The centre piece of VAR is innovation accounting” (Gujarati, 1995, p. 750).⁴ According to Enders (1995), forecast error variance decomposition

³See Gujarati (1995) for a detailed discussion of advantages and disadvantages of using a VAR for macroeconomic analysis.

⁴Readers can refer to Gujarati (1995) and Enders (1995) for more detailed discussions on this technique.

allows inference over the proportion of the movement in a time series due to its own shocks versus shocks to other variables in the system. This method breaks down the variance of the forecast error for each variable into components that can be attributed to each of the endogenous variables included in the VAR. Impulse response function analysis, on the other hand, traces out the time path of various shocks to the variables contained in the VAR system. In other words, this approach determines how each endogenous variable responds *over time* to a shock in that variable and in every other endogenous variable. It thus traces the responses of the endogenous variables to such shocks. These two methods (together called “innovation accounting”) allow a deeper insight into the dynamic relationships among the economic variables of interest in the VAR.

In this paper, therefore, we use the variance decomposition method to break down the variance of the forecast error for income dispersion, measured by the coefficient of variation (CV), into components that can be attributed to each of the other endogenous variables, that is, money supply, FDI, unemployment, inflation level, exports and fiscal spending. If one variable, say, fiscal spending, explains more of the variance of the forecast error for the CV, then we would suggest the hypothesis that “fiscal spending is the major source of income disparity in China”.

At the same time, we can use the impulse response function to trace how the CV variable responds *over time* to a shock in another variable, as compared to its responses to every other endogenous variable in the VAR. If the impulse response function shows a stronger and longer response of CV to a shock in, say FS, then we could suggest the hypothesis that “fiscal spending is the most important source of income inequality in China”.

It has to be acknowledged that the use of VAR is controversial. The concerns mainly focus on the choice of the lag length, the problem of being *a-theoretic* (it uses less a priori information), and the difficulty of ensuring (jointly) stationarity of all variables included in VAR. However, if handled with care, “they can be useful tools to examine the relationships among economic variables in a dynamic context” (Enders, 1995, p.312).

To deal with these concerns, we use AIC and SC⁵ to aid in choosing the lag length, and more importantly, to estimate the VAR with several lag structures to ensure the robustness of our results.⁶

⁵AIC is the Akaike Information Criterion and SC is the Schwartz Criterion. To choose a model which has utilised an appropriate lag length, one has to ensure the model’s AIC and SC values are minimised.

⁶Our VAR estimation under different lag structures indicates no significantly different results and hence we present the results from VAR(3) which is an optimal lag length according to the AIC and SC.

The VAR we used is as follows:

$$V_t = A_0 + \sum_{i=1}^k A_i V_{t-i} + e_t \quad (1)$$

where: $V_t = (CV_t, FP_t, MS_t, EX_t, FDI_t, CPI_t, UN_t)$,

$$e_t = (e_{gdp_t}, e_{fp_t}, e_{ms}, e_{export}, e_{fdi}, e_{cpi_t}, e_{un})$$

$A_1 - A_k$ are seven by seven matrices of coefficients and A_0 is an identity matrix. CV is the coefficient variation of per capita GDP of China, FP is fiscal spending at the central government level, MS is money supply (M1), EX is exports, CPI is the consumer price index (previous year =100), FDI is the total amount of foreign direct investment and foreign loans utilised each year, and UN is unemployment which, is represented by the number of unemployed people in urban areas at the end of each year.⁷

B. The Data

The VAR model was estimated using annual data in real terms (in 1985 prices) over the period 1955-98. In order to ensure stationarity of the data, all variables such as money supply, FDI, unemployment, inflation level, exports and fiscal spending are expressed in first differences of logarithms (ie., growth rates).

The data sources are as follows: *China Statistical Yearbook*, *Market Statistical Yearbook of China*, *Historical Data of GDP Statistics in China*, *Fifty Years of New China*, and *China Trade Union Statistics Yearbook*. The publication details are in the Data Appendix at the end of the paper.

4. EMPIRICAL RESULTS

Our VAR model is estimated in two versions: one uses aggregate data at the national level (eg., total fiscal spending at the central government level), the other

⁷The unemployment data prior to 1982 was estimated using the formula stated in the China Statistical Yearbook, 1999, ie., unemployment rate is urban unemployed persons ÷ non-rural population x 100%. It should be acknowledged that the data on unemployment in China is not reliable.

is based upon the coefficient of variation of inter-provincial data on all variables (eg., CV of inter-provincial fiscal spending). In this way, we could see more clearly the impact of the *differences* in the VAR variables across different provinces on China's income inequality.

We first present the results of the model using the first version (see Table 2).

Table 2. Variance Decomposition for Income Dispersion (%)

Horizon	CV	Forecast error attributed to					
		FDI	Fiscal	Money	Inflation	Unemployment	Exports
1	41.4	7.8	21.4	0.9	1.4	21.5	5.6
2	30.0	7.0	23.6	1.8	1.4	27.5	8.7
3	27.4	7.8	24.6	1.7	1.3	27.2	10.0
4	26.4	8.5	24.8	1.9	1.5	26.3	10.5
5	26.2	9.1	24.5	2.0	2.0	25.9	10.3
6	26.1	9.1	24.4	2.0	2.1	25.8	10.5
7	26.0	9.1	24.4	2.0	2.1	25.8	10.7
8	26.0	9.1	24.3	2.0	2.1	25.8	10.6
9	26.0	9.2	24.3	2.0	2.1	25.8	10.6
10	25.9	9.2	24.3	2.0	2.1	25.7	10.7
15	26.3	9.1	23.9	2.1	2.5	25.3	10.8
20	25.0	8.7	22.9	2.0	4.4	24.6	12.4
30	22.0	8.5	22.1	1.9	6.2	24.3	14.9

The results reported in Table 2 suggest, as one would expect, that the most important explanation of innovations in income dispersion is its own past values (accounting for between 26 and 30 percent) over the different forecast horizons. The next most important explanations are unemployment and fiscal spending (each around 25 percent), exports and FDI (each around 10 percent), and finally, inflation and money supply (each around 2 percent).

Combining these results, we can conclude that first, innovations in unemployment and fiscal spending together account for over 50 percent of the forecast error variance of income disparity at the various forecast horizons. Second, the "external factors" (ie., exports and FDI) together account for around 20 percent, and finally, the "monetary forces" (ie., money supply and the inflation level) together account for less than 5 percent of the forecast error variance. This indicates that fiscal policy plays an important role in the Chinese economy, and unemployment is a major constraint on income growth. Further, until the 1990s, monetary policy was not an important tool in promoting China's income growth.

This was perhaps due to the under-developed state of the financial system. The finding that fiscal spending and unemployment are the most important factors and the monetary factors are not so important, is consistent with the literature on income dispersion in the industrialised economies (see, eg., Balke and Slottje, 1994; and Blank, 1989).

However, exports and FDI are also important elements influencing income disparity in China, but they are less important than fiscal spending and unemployment. This finding is different from Sun and Chai (1998) and others who argue FDI and exports have very strong effects on regional development in China and hence have different impacts on income distribution.

As a final note concerning the variance decomposition results, one should pay attention to the values of the components of the forecast errors over the entire forecast horizon. The results in Table 2 suggest that the proportions of each component (of forecast error variance) remain the same. Furthermore, they are also robust to different lag structures, as mentioned earlier.⁸

A. Empirical Results Based on “Dispersion Variables”

To investigate the sources of income inequality further, we also used the “dispersion variable” for all variables used earlier. That is, we used coefficient of variation values for all variables across the provinces. Hence, we can find out whether, and to what extent, the differences in variables across the different provinces have more significant influences over the differences in CV (ie., the differences in per capita GDP across the provinces).⁹ The results are reported in Table 3.

These results confirm the findings reported in Table 2. That is, the dispersions in fiscal spending and unemployment explain the largest part of the forecast error variance for income dispersion in China. Table 3 shows that, apart from its own innovations, the dispersions in unemployment and fiscal spending together account for over 50 percent of the forecast error variance at the various forecast horizons, followed by the external variables (ie., exports and FDI). Finally, the monetary forces (ie., money supply and inflation level) together were below 6 percent of the forecast error variance.

⁸Results for different lag structures are not reported but are available upon request from the author.

⁹Due to the lack of data over the same range of variables, only 19 provinces were used in this study (Tianjin, Beijing, Shanghai, Shandong, Hebei, Jilin, Jiangxi, Heilongjiang, Guizhou, Henan, Anhui, Guangdong, Shanxi, Liaoning, Jiangsu, Zhejiang, Hubei, Sichuan, and Ningxia). But it is conceivable that this sample will provide a good representation of the population data.

Table 3. Variance Decomposition for Income Dispersion (%)
(all variables are in coefficient variation form)

Horizon	Forecast error attributed to						
	CV	FDI	Fiscal	Money	Inflation	Unemployment	Exports
1	40.3	8.9	21.9	0.7	1.7	22	5.1
2	28.9	8.1	24.1	1.6	1.7	28	8.2
3	26.2	8.9	25.1	1.5	1.6	27.7	9.5
4	25.3	9.6	25.3	1.7	1.8	26.8	10
5	25.1	10.2	25	1.8	2.3	26.4	9.8
6	25	10.2	24.9	1.8	2.4	26.3	10
7	24.9	10.1	24.9	1.4	2.4	26.4	10.2
8	24.9	10.2	24.8	1.8	2.3	26.3	10.1
9	24.9	10.3	24.8	1.7	2.5	26.1	10.2
10	24.8	10.3	24.8	1.8	2.4	26.2	10.2
15	25.2	10.2	24.4	1.9	2.8	25.8	10.3
20	23.9	9.8	23.4	1.8	4.7	25.1	11.9
30	20.9	9.6	22.6	1.7	6.5	24.8	14.4

B. Impulse Response Function

Following the variance decomposition, we proceeded to the impulse response function analysis, and the results are plotted in Figure 3. As suggested earlier, a graphic illustration of an impulse response function can provide an intuitive insight into the dynamic relationships in existence, because it will present the response of a variable to an unexpected shock in another variable over a certain time horizon.

Figure 3 illustrates the responses of income dispersion (CV) to shocks in the six other variables (ie. money supply, FDI, inflation, fiscal spending, exports and unemployment). Some findings are noted. First, the response of income disparity (CV) to fiscal spending and unemployment has been the most significant (3-4 percent changes for a one percent shock in the six other variables). This result confirms the earlier finding that unemployment and fiscal spending are the two most important elements that influence the changes in China's income dispersion.

Second, exports is the third most important variable explaining the variations in income disparity (around 3 percent change for a one percent change in the six other variables). Third, FDI, money supply and the inflation level have much

smaller effects on income dispersion (ie., CV) compared to unemployment and fiscal spending.

Finally, the response of the CV to all other variables tends to revert to their original levels over a 7- year time horizon.

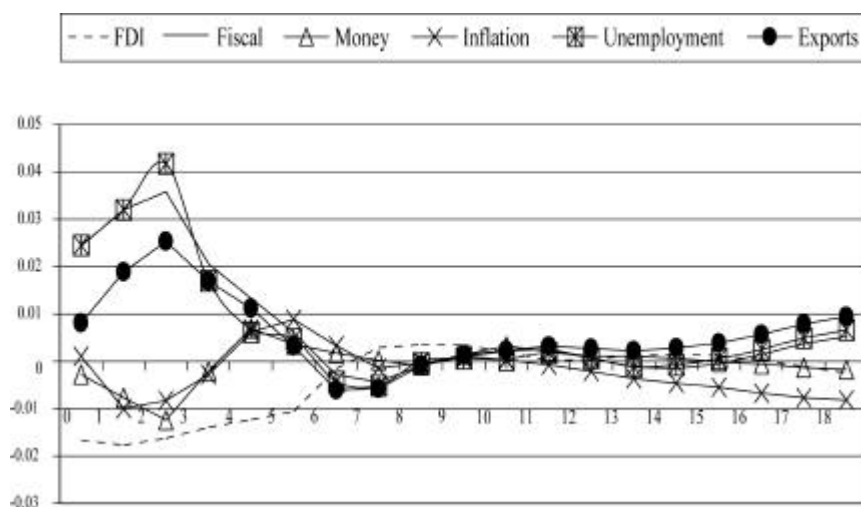


Figure 3. The Responses of CV to Other Variables

C. Granger Causality Test

Another important aspect of VAR analysis is the so-called “Granger causality test”. The test states that “X is said to Granger cause Y if past values of X can predict or precede the changes in Y”. This study uses a Granger no-causality test developed by Toda and Yamamoto (1995) and extended and interpreted by Zapata and Rambaldi (1997).

We wish to test out if there is a Granger type causal relationship between macroeconomic activities and income inequality in China.

The results¹⁰ obtained from Granger causality tests indicate that there is Granger causality from unemployment and fiscal spending to income dispersion (both are significant at the 95 percent level). However, the causal relationships between other variables and income disparity are weak (marginally significant at

¹⁰The Granger causality test results are not reported in this paper due to the scope of the paper but are available upon the request from the author.

the 85 percent level). This finding is consistent with the results from the “innovation accounting” analysis.

Finally, the opposite causality (from income dispersion to “macro-variables”) was not found or is only marginally significant. It suggests that innovations in income disparity do not have significant feedbacks on other “macro-variables” in the VAR system.

5. CONCLUSION

This study has investigated a question that has received worldwide attention since the 1980s. How did macroeconomic activity and macroeconomic policy affect regional income disparity in China? This is an important question given that regional income inequality in China increased in the 1990s along with the vigorous economic growth. Unlike other scholars who looked for “micro-factors”, we have attempted to find an answer to this question by examining “macro-factors”, that is, macroeconomic activity such as inflation and unemployment, and macroeconomic policy such as fiscal spending and money supply.

Using a VAR approach, we put China’s regional income dispersion and other macro-variables in a dynamic context to look at how they interacted over a long time horizon. We found that fiscal spending and its dispersions across different provinces together with unemployment play a prominent role in the widening regional income inequality in China. The monetary factors, on the other hand, had a much less significant role.

This finding provides strong empirical evidence for the view that macroeconomic forces have an important effect on income distribution. This finding is also consistent with the finding based upon the cases of industrialised economies (eg., Balke and Slottje (1994)). Therefore, both economists and policy makers should not lose sight of this fact.

It is worth mentioning that the results reported here is not a substitute but a complement to traditional microeconomic labour economics regarding income distribution. Future research might consider an approach which integrates these two literatures and uses more rigorous econometric methodology and strong economic theory.

DATA APPENDIX¹¹

The VAR model is estimated using annual data in real terms (in 1985 prices) over the period 1955-98. All data are in annual growth rates. The data sources

¹¹The data coverage for each series is cited from “Explanatory Notes of Indicators” contained in the CD-Rom version of China Statistical Yearbook, 1998 (Beijing).

are as follows:

- GDP's CV: *China's GDP Data 1952-95*, Zhongguo Guonei Shengchan Zongzhi Lishi Shuju, China Statistical Bureau, Dongbei University of Economics and Finance Press, Dalian.
- The data for 1997 and 1998 are from *China Statistical Yearbook*, Zhongguo Tongji Nianjian, China Statistical Bureau, Beijing, 1999.
- Fiscal spending: *Market Statistical Yearbook of China*, Zhongguo Shichang Tongji Nianjian, China Statistical Bureau, Beijing 1998, P15; Data for 1998 was taken from *China Statistical Yearbook*, China Statistical Bureau, Beijing, 1999.
- Money supply: *Market Statistical Yearbook of China*, China Statistical Bureau, Beijing 1998, P22. Data for 1998 was taken from *China Statistical Yearbook*, China Statistical Bureau, Beijing, 1999.
- Inflation (CPI): *Market Statistical Yearbook of China*, China Statistical Bureau, Beijing 1998, p.273. Data for 1998 was taken from *China Statistical Yearbook*, China Statistical Bureau, Beijing, 1999.
- Exports: *Market Statistical Yearbook of China*, China Statistical Bureau, Beijing 1998, p.328. Data for 1998 was taken from *China Statistical Yearbook*, China Statistical Bureau, Beijing, 1999.
- Unemployment: *China Statistical Yearbook*, 1990, P130; *China Trade Union Statistics Yearbook*, 1999, p.60.
- FDI: includes all foreign capital, both FDI and foreign loans, actually used.

The data for local provinces are from the 18 provincial statistical yearbooks which included Tianjin, Beijing, Shanghai, Shandong, Hebei, Jilin, Jiangxi, Heilongjiang, Guizhou, Henan, Anhui, Guangdong, Shanxi, Liaoning, Jiangsu, Zhejiang, Hubei, Sichuan, and Ningxia.

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