

UNIVERSITÀ DEGLI STUDI DI SIENA

QUADERNI DEL DIPARTIMENTO
DI ECONOMIA POLITICA

W. Adrian Riso
Edgar J. Sanchez Carrera

Inequality and Economic Growth in China:
pre and post-reform periods

n. 600 – Settembre 2010



Inequality and Economic Growth in China: pre- and post-reform periods

W. Adrián Risso* Edgar J. Sánchez Carrera†

June 2, 2010

Abstract

This paper studies the long-run relationship between economic growth and income inequality in China during the pre- and post-reform periods: 1952-1978 and 1979-2007, respectively. Income inequality is measured by the Gini coefficient and economic growth by real per capita GDP. The cointegration analysis shows that, for both periods the relationship is positive and the inequality-growth elasticity has grown in the second period. In addition, a more robust test of Granger-causality suggested by Toda and Yamamoto (1995) indicates that whereas in the first period there is unidirectional causality from inequality to growth, there is no directional causality in the second period.

Keywords: Cointegration; Economic Growth; Gini Coefficient.
JEL classification: E62; N10; O11; O15; O40; R12

*Department of Economics, University of Siena. Sede: P.zza S. Francesco 7, I-53100 Siena, Italy. Tel. +39 3208418350 Fax: +39 0577 232661. E-mail address: risso@unisi.it

†Department of Economics, University of Siena. Tel. +39 3342837007 Fax: +39 0577 232661. E-mail address: sanchezcarre@unisi.it

1 Introduction

The relationship between economic growth and income inequality has been widely studied and still is an interesting topic of present and future research. For instance, among others, there are early contributions in the last decade showed that higher inequality at the beginning of a longer-term period was linked to poorer growth performances (Alesina and Rodrik, 1994), Perotti (1994, 1996), Persson and Tabellini, 1994), that is, the relationship between inequality and growth results to be negative. Gradually this consensus weakened, since a negative relationship was found in developing countries, but for richer countries there was no relation at all. Anyway, an opposite consensus with a very different content seems to take shape: inequality stimulates economic growth (Forbes, 2000 and Arjona et al., 2001).

At any case, the debate on the issue of inequality and economic growth continues and the main consensus comes from the idea that the income distribution in a country is traditionally assumed to shift from relative equality to inequality and back to greater equality as the country develops. That is, inequality will rise as some people move away from prevailing traditional activities, which yield a low marginal product, into more productive venture, i.e. the well known Kuznets hypothesis (see Kuznets S., 1955).

In this vein, in a theoretical framework Benhabib (2003) demonstrated that while excessive inequality can disrupt the economy by inviting political interference through rent-seeking behavior and appropriation, policies which support some modest inequality to take advantage of productivity differences will lead to the best growth rates. Benhabib concludes that the relationship between inequality and growth may be as follows: "*growth may rise modestly at first, as we move away from complete equality, and then drop again as inequality increases further.*"

This relationship is particularly relevant in the case of China. Since, the last fifty years have been a period of upheaval, the Chinese economy has changed from the Communist Revolution to the present period of openness and global integration (see Kanbur and Zhang (2005)). The official raison of these reforms was to promote rapid economic growth and a more equal income distribution, to attain national self-sufficiency, and to further socialist or communist ideals. In fact, the reforms made the real per capita GDP (Y) to grow at 7.07% annually since 1979, however the inequality (I) has also grown at 1.41% to a Gini coefficient of 0.42 (it was 0.22 in 1952). Two distinct stages are normally used in describing the development of the national economy: adoption and implementation of a Soviet-type economy from 1952 to 1978 and gradual economic reform toward a market-led economic system since 1979. Chinese economic reforms tried to combine central planning with market-oriented reforms to increase productivity, living standards, and technological quality without exacerbating inflation, unemployment, and budget deficits. China pursued agricultural reforms, dismantling the commune system and introducing the household responsibility system that provided to the peasants greater decision-making in agricultural activities.

Therefore, this paper contributes to the empirical research of growth and inequality in China by analyzing two different periods. The first period from 1952 to 1978 is characterized by a Communist planned economy. The second period from 1979 to 2007 is characterized by the Rural reform where the decentralization and opening up to trade and foreign direct investment was the engine of economic growth.

Hence, the aim of this paper is to offer a proper answer to the issue inequality-growth nexus by using a cointegrated VAR-setting approach, in this way, we can cope and avoid the problems of parameter heterogeneity, omitted variable bias and endogeneity, from which suffers the model of macroeconometric analysis (see Gobbin and Rayp, 2008).

The remainder of the paper is organized as follows. The next section presents a short review of the Chinese economic system in the last fifty years. Section 3 introduces the methodology and dataset. Section 4 presents the empirical results. Finally, section 5 draws some conclusions.

2 Brief review of the Chinese economic system

To describe the economy of China we start with the pre-reform period, before 1979, that was under the plan of the central government. The central government controlled more than 90 percent of trade by monopolizing the imports and exports of over 3000 kinds of commodities.¹ By 1979, China has been engaged in an effort to reform its economy. The Chinese leadership has adopted a pragmatic perspective on many political and socioeconomic problems, and has sharply reduced the role of ideology in economic policy. Consumer welfare, economic productivity, and political stability are considered indivisible. The government has emphasized raising personal income and consumption and introducing new management systems to help increase productivity. The government has also focused on foreign trade as a major vehicle for economic growth. While in pre-reform China, the imports were mainly controlled through high tariffs. Considering Kanbur and Zhang (2005), in the pre-reform period, we get four sub-periods:

1. Revolution and Land reform (1949-1956);
2. The Great Leap Forward and the Great Famine (1957-1961), that is, "between the spring of 1959 and the end of 1961 some 30 million Chinese started to death and about the same number of births were lost or postponed". According to Smil (1999), the origins of the famine can be traced to Mao Zedong's decision, supported by the leadership of China's communist party, to launch the Great Leap Forward. Mao, beholden to Stalinist ideology that stressed the key role of heavy industry, made steel production the centerpiece of this deluded effort. Instead of working in the fields;

¹These commodities can be classified into two categories: plan-commanded goods (both the value and volume of trade were strictly controlled) and plan-guided goods (only the value of trade was controlled).

3. The post Famine recovery (1961-1965);
4. Cultural revolution and transitional reform (1966-1978). Maoism developed a critique of the Soviet model as "revisionist" and articulating a separate model he deemed more suited to China, which depended more on human willpower, called "unbalanced development," and on political mobilization (1966-69). China found itself in international isolation, on terms of enmity with both superpowers, and driven even further into the need for self-reliant economic development. Mao died in 1976, and then Deng Xiaoping acquired the leading role in Chinese politics in 1978. Chinese communism under Deng could no longer be called totalitarian, because it substantially relaxed political mobilization and gave citizens more individual freedom, and to some extent limited the exercise of power and made it more predictable. But still, it was not a democratic regime because of the monopoly of power in the hands of a single political party, indeed, in the hands of a few top leaders.

Since the 1980s, China tried to combine central planning with market-oriented reforms to increase productivity, living standards, and technological quality without exacerbating inflation, unemployment, and budget deficits. China pursued agricultural reforms, dismantling the commune system and introducing the household responsibility system that provided peasants greater decision-making in agricultural activities. The government encouraged non-agricultural activities such as village enterprises in rural areas, and promoted more self-management for state-owned enterprises, increased competition in the marketplace, and facilitated direct contact between Chinese and foreign trading enterprises. China also relied more upon foreign financing and imports.

On the other hand, Benjamin et al., (2005) noted that one important dimension of rising inequality may be widening gap between urban and rural incomes. But, pooling the urban and rural samples leads to an overall level of inequality no higher than the rural sample alone. In this vein, Benjamin et al., conclude that over the course of two and half decades of post-reform, China experienced a significant increase in inequality and this fact must be seen in the context of rapidly rising incomes and improvements in welfare that literally pulled hundreds of millions out of poverty, especially in agriculture. We can define two phases in the post reform:

1. Rural reform (1979-1984). China broke with the Soviet doctrine, introducing a family-based contract system, the so-called household responsibility system. As a result, China's agriculture has been revived. After 30 years of stagnation, growth in agricultural output in the first half of the 1980s accelerated to a rate several times the previous long-term average.²

²Between 1978 and 1984, output of the three main crops, namely grain, cotton and oil-bearing crops, increased at annual rates of 4.8 percent, 7.7 percent and 13.8 percent, respectively, compared with the average rates of increase of 2.4 percent, 1.0 percent and 0.8 percent per year from 1952 to 1978 (China State Statistical Bureau, 1985).

2. Post-rural reform, decentralization and opening up to trade and foreign direct investment (1985 to present). China has pursued policies such as fostering the rapid development of foreign-invested factories, which assemble imported components into consumer goods for export. USA is one of China's primary suppliers of power generating equipment, aircraft and parts, computers and industrial machinery, raw materials, and chemical and agricultural products.³ By the late 1980s, the economy had become overheated with increasing rates of inflation. At the end of 1988, in reaction to a surge of inflation caused by accelerated price reforms, the leadership introduced an austerity program.

If we compare the pre- and post- reform periods the inequality was relatively lower in the first period and it evidently rose during the Great Famine (see below Table I). The transition from the Cultural Revolution to the period of rural reform observed a decline of inequality, but it gathered pace in the early 1980s and reached it's though in 1984. From the post-reform period to present, inequality rises steadily and sharply with a relatively greater economic growth than in the pre-reform period.

Table I: Average levels & Annual growth rates

period	years	Y	g_Y^*	I	g_I^*
Whole period	1952-2007	1,802	4.79%	0.30	1.16%
Pre-Reforms	1952-1978	705	2.33%	0.27	1.04%
Post-Reforms	1979-2007	2,824	7.07%	0.33	1.41%
Land Reforms	1952-1956	568	3.47%	0.23	0.55%
Great Leap and Famine	1957-1961	646	-3.44%	0.28	6.22%
Post Famine recovery	1962-1965	622	8.42%	0.28	-2.15%
Cultural Revolution	1966-1978	806	2.28%	0.28	0.81%
Rural Reform	1979-1984	1,175	6.07%	0.27	-2.19%
Post Rural Reform	1985-2007	3,254	7.21%	0.34	2.27%

Source: Own calculations. *Average annual growth rates.

With the exception of the urban-rural disparity, that could explain certain causality from inequality to growth, in the pre-reform period China was basically an egalitarian society and the low inequality was identified as a strain on economic growth. However, the post-reform period has seen remarkable growth. Although regional inequality and the rural-urban gap declined from the late 1970s to the mid-1980s, both increased rather dramatically since the mid-1980s. China's growth is preceded by a fairly low initial inequality in the pre-reform period (see Wan, Lu and Chen, 2006). From this perspective, the inequality-growth relationship seems to be negative. However, the Chinese ex-

³By 1992 China initiated significant trade reforms: the rates of tariff remained high, averaged at 44.05 percent. Since post-reform period China has cut its tariff rates substantially every year (see Wan, Lu and Chen, 2007). The average tariff rate fell to 17.1 percent in 1998 (see Yin, 1998, p. 126).

perience depicts a positive correlation when pre- and post-reform periods are examined separately as we show in the next sections.

3 Dataset and methodology

To measure economic growth, we consider historical annual data of real per capita GDP (Y) in 1990 International Geary-Khamis dollars. The main source is:

- Historical Statistics for the World Economy on Angus Maddison database: www.ggdc.net/maddison/Historical_Statistics/horizontal-file_03-2007.xls.

To measure China's regional income inequality, we consider annual data of Gini coefficient (I). Our main source is:

- Kanbur and Zhang (2005). While the data of the years 2001 to 2007 was computed through growth rates of Gini coefficient and the source was the National Bureau of Statistics of China:
<http://www.stats.gov.cn/eNgliSH/statisticaldata/yearlydata/>.

Because most macroeconomic variables are trended, time series can potentially create problems of finding spurious regressions when they are non-stationary, (see Phillips (1986) for an analysis of spurious regressions). Classical econometrics is not applied when process is non-stationary and cointegration method should be applied. Therefore as a first step we have to study the integration order of the series in order to applied cointegration method. One method is the two-step procedure proposed by Engle and Granger (1987). However this method assumes the existence of only one cointegration relation. Most general procedure was proposed by Johansen (1988) and Johansen and Juselius (1990), this test has the advantage of testing all the possible cointegration relationship.

Banerjee et al. (1993) highlights the important connection between a cointegration relationship and the corresponding long-run equilibrium equation. Studying a cointegration relation is analyzing a statistical equilibrium between variables tending to grow over time. The discrepancy of this equilibrium can be modeled by a Vector Error Correction (VEC) model which shows how after a shock the variables come back to the equilibrium. Gobbin and Rayp (2008) pointed out that a cointegrated VAR-setting approach is the proper way to cope and avoid the problems of parameter heterogeneity, omitted variable bias and endogeneity of the variables.

Hence, to study short- and long-run relationships between (Y) and (I), we follow the next procedure:

1. A first step in cointegration analysis is to study the stationarity of the series by using unit root tests; two popular techniques have been used: the Augmented Dickey-Fuller (ADF, 1981) and the Kwiatkowski-Phillips-Schmidt-Shin (KPSS, 1992) test. These tests have been performed in

levels (i.e., log of real per capita GDP and log of Gini coefficient) as well as in the first difference (i.e., economic growth and income inequality).

2. An unrestricted Vector Autoregressive (VAR) is estimated, which is known to be “sensitive” to the number of time lags (Banerjee et al., 1993). For determining the appropriate number of time lags of VAR the following criteria were employed: Akaike Information Criterion (AIC) and Schwartz Bayesian Criterion (SBC).
3. The existence of a long-run relationship between Growth and Inequality is examined via a Vector Error Correction (VEC) model after applying the Johansen’s cointegration technique (1988, 1990, and 1995). A test for weak exogeneity is conducted in order to do inference⁴.
4. Finally, the causality between the variables is studied based on the more robust Toda and Yamamoto (1995) Granger no-causality test which allow the Granger test in an integrated system.

To test the causality relationship among variables: income inequality, and economic growth; we specify the following Vector Auto Regressive (VAR) model:

$$(Y(A)_t, I(A)_t)$$

where Y is real per capita GDP and I is a measure of income inequality, all of them in a given country A at time t . If the two times series are integrated of the same order then the estimation of a cointegration regression has been considered. Thus, we search for a long-run relationship among the two variables and then, a Vector Error-Correction (VEC) model is applied to model the short-run dynamics. The model is represented in a first-differenced error correction form:

$$\Delta X_t = \mu + \Pi X_{t-1} + \sum_{i=1}^{i=k-1} \Gamma_i \Delta X_{t-i} + \varepsilon_i \quad (1)$$

where $X = (\text{real per capita GDP}, \text{Income Inequality})$ is a vector containing the variables and μ is a vector of constant terms. The matrix Π conveys information about the long-run relationship between the X variables. The rank of Π is the number of linearly independent and stationary linear combinations of the variables.

Cointegration by itself does not indicate the direction of the causal relationship. Granger (1988) proposed a test to study causality. However, this is not causality in a philosophical sense. It should be understood as a kind of pre-determination among variables. The dynamic Granger causality can be captured

⁴To derive implications from cointegration to policy analysis, it is fruitful to check the exogeneity of the studied variables. For statistical inference at least weak exogeneity should be tested. For example, McCallum (1984) asserts that incorrect signs can be produced if exogeneity is not studied.

from the VAR model. Nevertheless, when the variables are integrated, application of the standard Granger causality test is incorrect, because the variables are unit root; the standard causality tests are invalid. Toda and Yamamoto (1995) suggest an alternative procedure. When the variables are integrated, they propose to estimate a VAR model with $(k + d_{max})$ lags. Where k is the standard optimal number of lags and d_{max} is the maximal order of integration that we suspect might occur in the process⁵. Once the VAR is estimated, we test Granger causality only using the k first lags. For instance, if we consider the following equation from a VAR model:

$$I_t = \gamma_0 + \gamma_1 Y_{t-1} + \gamma_2 Y_{t-2} + \gamma_3 I_{t-1} + \gamma_4 I_{t-2} \quad (2)$$

where $k = 1$ was selected according the minimum AIC and $d_{max} = 1$, the null hypothesis of non-causality from Y to I should be:

$$H_0 : \gamma_1 = 0 \quad (3)$$

It means,

H_0 : real per capita GDP does not Granger-cause income inequality.

The hypothesis is tested using the Wald test. Notice that, Toda and Yamamoto (1995) assert that Wald and LR tests are asymptotically equivalent in the present situation.

4 Empirical results

Recall that, the null hypothesis of the KPSS test is stationarity, complementing the ADF test. Remember that the ADF test has low power against stationary near unit root processes. Table II shows that the variables are integrated of first order.

Table II: ADF and KPSS unit root tests

Variable	<i>GDP</i>		<i>I</i>	
	ADF	KPSS	ADF	KPSS
Unit Root Test				
Trend. & Const.	-0.50	0.26*	-1.52	0.16*
Constant	3.34	0.88*	-0.52	0.78*
Without Trend, Const.	3.21		1.88	
Variable	ΔGDP		ΔI	
	ADF	KPSS	ADF	KPSS
Unit Root Test				
Trend. & Const.	-5.07*	0.09	-6.16*	0.08
Constant	-4.26*	0.72*	-6.13*	0.10
Without Trend, Const.	-2.87*		-5.97*	

Critical values in parenthesis. * Null Hypothesis Rejection at 5%

⁵The coefficient matrices of the last d_{max} lagged vectors in the model are ignored and we can test linear or nonlinear restrictions on the first k coefficient matrices using standard asymptotic theory.

Now, we estimate a VAR with 1 lag (according to the minimum AIC) and then, we proceed with a VEC model testing the cointegration relationship for the pre- and post-reform periods and for the whole period 1952-2007. Table III summarizes the results.

Table III: Summary Results for China (1952-2007)

Period	Elasticity*	t-stat	Granger-Causality
Whole (1952-2007)	0.20	[-3.55]	Gini \longrightarrow GDP
Pre-reforms (1952-1978)	0.29	[-2.10]	Gini \longrightarrow GDP
Post-reforms (1979-2007)	0.36	[-9.13]	None

Source: Own calculations.

*GDP per capita elasticity of Inequality ($\frac{\partial I}{\partial Y} \frac{Y}{I}$).

Note that there is a cointegration relationship for the whole period, it is positive but real per capita GDP is weak exogenous (Chi² statistic is 0.59 producing a p-value of 0.44). Moreover, Table III shows that testing Toda and Yamamoto (1995) Granger-causality for the whole period indicates that causality goes from Inequality to Economic Growth.

The cointegration test for the first period suggests an inequality-growth elasticity of 0.29 where GDP per capita is weak exogenous (Chi² statistic is 1.36 producing a p-value of 0.2434). Once again, Toda and Yamamoto Granger-causality test indicates that causality goes from Inequality to per capita GDP in the pre-reforms period. This unidirectional causality can be explained by the composition of the Chinese economy. The pre-reform period, nearly 80 percent of China's population lived in rural areas and was primarily involved in agriculture but there was not perfect equality in rural China (see Benjamin et al., 2005). There were differences across localities and regions reflecting differences in endowments and natural conditions which can predetermine economic growth.⁶

The cointegration test indicates one relationship for the second period with elasticity of 0.36 and GDP per capita is weakly exogenous (Chi² statistic is 1.147 producing a p-value of 0.284). However, there is not directional causality in this period.

In addition, we present the Impulse Response Functions explaining how a positive shock in the per capita GDP produces an effect on Inequality (Gini coefficient). Figure 1 shows, the pre-reform period, a positive response of inequality by a positive shock of income during the first three terms but then there is a decline on inequality in the subsequent three terms and then, once again a positive response.

⁶These differences were also exacerbated by policies of local grain self-sufficiency, which helped limit redistribution across regions. There was a significant geographic component explaining inequality in the pre-reform period, with the majority of the poor people located in the provinces situated in China's western region, running from Gansu and Ningxia, through Sichuan and to the southwestern provinces of Yunnan and Guizhou (Benjamin et al., 2005).

Response to Cholesky One S.D. Innovations

Response of Inequality to real per capita GDP (1952-1978)

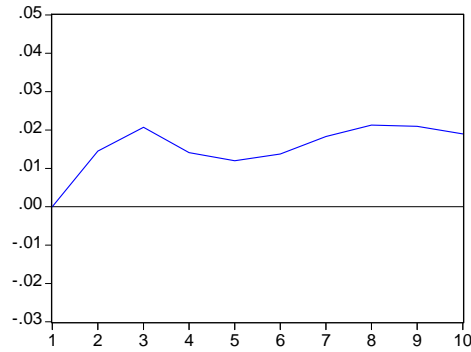


Figure 1. Impulse Response Function: Pre-reform period.

Figure 2 shows that during the post-reform period, a positive shock of income produces a rapidly increment of inequality after the second term.

Response to Cholesky One S.D. Innovations

Response of Inequality to real per capita GDP (1979-2007)

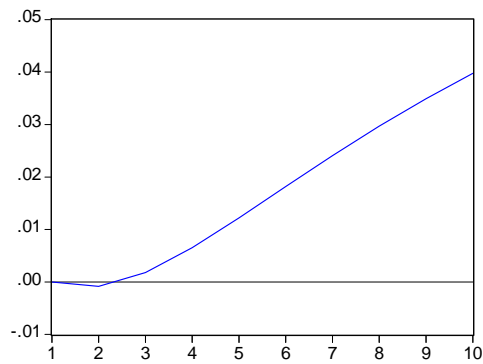


Figure 2. Impulse Response Function: Post-reform period.

Instead, Figure 3. shows for the whole period (1952-2007), the response of inequality by a positive shock of income is adjusted to be constant after the fourth term.

Response to Cholesky One S.D. Innovations

Response of Inequality to real per capita GDP (1952-2007)

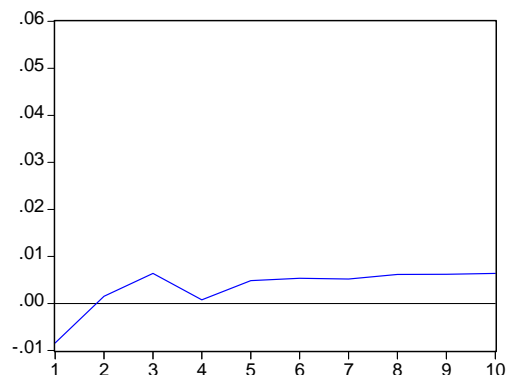


Figure 3. Impulse Response Function:Whole period.

5 Concluding remarks

We consider two periods in the modern economic history of China. The pre-reform period going from 1952 to 1978 is characterized by the adoption and implementation of a Soviet-type economy. The economy showed a modest annual economic growth rate of 2.33% and very low levels of inequality, with an average Gini coefficient of 0.27. The post-reform period tried to combine central planning with market-oriented reforms to increase productivity. In fact, the economy has grown at an annual growth rate of 7.07% since 1979 and also the inequality with an average Gini coefficient of 0.33.

In this context, we study the relationship between Income Inequality and Economic Growth in China during the pre and post reform periods. We found a significant and positive long-run relationship between inequality and economic growth in both periods. The inequality-growth elasticity is greater in the post-reform than the pre-reform period. Using a more robust Granger causality test we find a unidirectional predetermination between the variables for the whole period and for the pre-reform period. However, there is not causality in the post reform period. Except the urban-rural disparity which explains the unidirectional causality from inequality to growth, pre-reform China was basically an egalitarian society. In the pre-reform period, the low inequality was identified as a strain on economic growth. However, the reform period has seen remarkable growth. Although regional inequality and the rural-urban gap declined from the late 1970s to the mid-1980s, both increased rather dramatically since the mid-1980s.

Therefore, we can conclude that the Chinese experience depicts a positive relationship between inequality and growth if the pre- and post-reform periods are analyzed separately.

References

- [1] Alesina A., Rodrik D. (1994), "Distributive Politics and Economic Growth", *Quarterly Journal of Economics* 109, pp.465-490.
- [2] Arjona R., Ladaique M., Pearson M. (2001), "Growth, Inequality and Social Protection", *OECD Labour Market and Social Policy Occasional Papers* no. 51, 80p.
- [3] Banerjee, A., Dolado, J., Galbraith, J. and Hendry, D. (1993), *Co-integration, Error Correction, and the Econometric Analysis of the Non-Stationary Data*, Oxford University Press.
- [4] Benhabib, Jess (2003), "The Tradeoff Between Inequality and Growth", *Annals of Economics and Finance* 4, pp. 329-345.
- [5] Benjamin, D. Brand L., Giles J. and S. Wang (2005), "Income Inequality During China's Economic Transition", Working Papers tecipa-238, University of Toronto, Department of Economics.
- [6] China State Statistical Bureau, Editorial Office. *Zhongguo Tongji Nianjian*, 1985 (China Statistical Yearbook, 1985). Beijing, Zhongguo Tongji Chubanshe, October, 1985.
- [7] Dickey, D. A. and W. A. Fuller. (1981), "Likelihood Ratio Statistics for Autoregressive Time Series with a Unit Root", *Econometrica* 49, pp. 1057-1072.
- [8] Engle, R. and Granger, C. (1987), "Co-integration and error correction: representation, estimation and testing", *Econometrica* 55, pp. 251-276.
- [9] Forbes K.J. (2000), "A Reassessment of the Relationship Between Inequality and Growth", *The American Economic Review* 90(4), pp.869-887.
- [10] Gobbin N. and G. Rayp (2008), "Different ways of looking at old issues: a time-series approach to inequality and growth", *Applied Economics* 40(7), pp. 885 - 895.
- [11] Granger, C. (1988), "Some recent developments in a concept of causality", *Journal of Econometrics* 39, pp. 199-211.
- [12] Johansen, S. (1988), "Statistical Analysis of cointegration vectors", *Journal of Economic Dynamics and Control*. 12, pp. 231-254.

- [13] Johansen, S. and Juselius, K. (1990), "Maximum likelihood estimation and inference on cointegration with applications to the demand for money", *Oxford Bulletin of Economics and Statistics* 52, pp. 169-210.
- [14] Johansen, S. (1995), *Likelihood-based inference in cointegrated vector autorregressive models*, Oxford University Press, Oxford.
- [15] Kanbur, R. and X. Zhang (2005), "Fifty years of regional inequality in China: a journey through central planning, reform, and openness", *Review of Development Economics* 9(1), pp. 87-106.
- [16] Kuznets, S. (1955), "Economic Growth and Income Inequality", *American Economic Review* 45(1), pp. 1-28.
- [17] Kwiatkowski, D., P. Phillips, P. Schmidt and Y. Shin. (1992), "Testing the Null Hypothesis of Stationarity Against the Alternative of a Unit Root", *Journal of Econometrics* 54, pp. 159-178.
- [18] McCallum, B. (1984), "On low-frequency estimates of long-run relationships in macroeconomics", *Journal of Monetary Economics* 14, pp. 3-14.
- [19] Perotti R. (1994), "Income Distribution and Investment, *European Economic Review* 38, pp.827-835.
- [20] Perotti R. (1996), "Growth, Income Distribution and Democracy: What the Data Say", *Journal of Economic Growth* 1(2), pp.149-187
- [21] Persson T., Tabellini G. (1994), "Is Inequality Harmful for Growth", *The American Economic Review*, 84 (3), p.600-621.
- [22] Phillips, P. (1986). "Understanding spurious regressions in econometrics", *Journal of Econometrics* 33, pp. 311-340.
- [23] Smil Vaclav (1999), "China's great famine: 40 years later", *BMJ* **319**, pp. 1619-1621.
- [24] Toda, H., and Yamamoto, T., (1995), "Statistical inference in vector autorregressions with possibly integrated processes", *Journal of Econometrics* 66, pp. 225-250.
- [25] Wan, G. Lu and Chen (2006), "The inequality-growth nexus in the short and long run: empirical evidence from China", *Journal of Comparative Economics* 34, pp. 654-667.
- [26] Wan, G. Lu and Chen (2007), "Globalization and regional income inequality: empirical evidence from within China", *Review of Income and Wealth* 53(1), pp. 35-59.
- [27] Yin, X. (1998), *The Procedure and Effects of China's Reform of International Trade* (in Chinese), Shanxi Economic Publishing House, Shanxi.