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## The stage of economic development and income gap - inspection of Kuznets phenomenon in China

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### ABSTRACT

With the further development of China's economy, the relevance between income gap and the stage of economic development becomes more and more obvious. Using the panel data of 29 provinces in China during 1986-2010, this paper measures the income gap between urban and rural areas with the ratio of urban—rural income and Theil Index respectively. Furthermore, the thesis discusses the relevance between the stage of economic development and the urban-rural income gap. The result shows that China's urban-rural income gap is expanding along with the economic development during these 25 years at the national level. Meanwhile, it is found that there is a marked regional differences in China. The income gap has obviously increased in western China that is in good agreement with it at the nation level. On the contrary, there is a reduced effect of different degree of the income gap in the eastern and central regions. This shows that there is an imbalance of economic development in China once again. There are different stages of economic development within the different region even in one China.

### KEYWORDS

The stage of economic development; Urban-rural income gap; The unbalanced development; Kuznets phenomenon.



The relationship between economic development and income gap became a hot topic among economists since Kuznets put forward Kuznets Phenomenon of income gap. The expanding of income gap between urban and rural areas along with more than 30 years' reform and opening-up is always the focus of China's public. In fact, since the mid 1980s, the income gap between urban and rural areas has a trend of expanding (Li Shi, 2012). However, the income gap becomes smaller and smaller as the increase rate of China's economy slows down. The left part of Kuznets phenomenon seems right up to now. This paper chooses some economic indexes to represent different stages of economic development to show the thesis above in order to make a more rational explanation of this economic phenomenon in China.

## LITERATURE REVIEW

The related researches in this area are still led by researches abroad. In the early stage, the investigation was more focused on the relationship between economic growth and income gap. A large amount of literatures hold the view that there is a negative relationship between economic growth and income gap. In recent years, researches in this area become more and more deep which means that putting income gap and stages of economic development into one analysis frame work. However, since the different institutions and endowments among different countries and areas, the investigation is very complex and difficult to make a uniform conclusion.

The research about income gap also has a rich achievement in China. Cai Fang (2003) showed the relationship between income gap and institution as well as occupation of resources.<sup>[1]</sup> Lu Ming, Chen Zhao<sup>[2]</sup> (2004), Guo Xingfang<sup>[3]</sup> (2005) studied the urban-rural income gap caused by rural-urban dualistic society with the urban-oriented policy. Zhao Wei and Zhao Xiaoxia (2008) thought FDI has a positive contribution to the reducing of income gap.<sup>[4]</sup> According to the dynamic panel data of 30 provinces in China from 1989 to 2006, Zhou Juan and Zhang Guangsheng (2009) had the opinion that FDI not only reduced the income gap directly, but also lessened it through the adjustment of industrial structure and employment structure.<sup>[5]</sup> Liu Yulin (2010) showed that FDI can control the increase trend of income gap and FDI was an endogenous variables of income gap.<sup>[6]</sup> On the contrary, Luo Qian (2008) found that on one hand, FDI increased income gap through the district gathering effect and technology spread effect; on the other hand, FDI created employment opportunities in labor-intensive industries and reduced the income gap through increasing the income of low-income crowd.<sup>[7]</sup> However, the first effect was more obvious. Shen Yingyu and Zhang Erzhen (2011) also showed that FDI would increase the income gap based on the panel data of 29 provinces from 1993 to 2008.<sup>[8]</sup> Second, finance development and the income gap. Finance development means that the high-income customers of financial services will get better services, which leads to the income increase of these people and increases the income gap. According to the panel data of 29 provinces from 1978 to 2006, Ye Zhiqiang, Chen Xiding and Zhang Shunming (2011) found that finance development enlarged the income gap obviously.<sup>[9]</sup> What's more, finance development had a negative relationship with the income of rural residents while little relationship with urban residents.

According the literatures above, one on hand, variables which influent income gap were complex. From the aspect of empirical research, there are Multicollinearity among many variables and this would have a influence on the reliability of conclusion. On the other hand, all the researches in this area were in terms of short-run in China. They all focused on the most serious period of income gap. In other words, they all investigated a hot topic. Income gap is a historical process and has a close relationship with the stages of economic development. As a result, we make finance development level, FDI, trade open level, employment structure, economic development level, urban-rural capital investment ratio and education level as explaining variable to stand for the stages of economic development. Then we try to have an investigation on the relationship between stages of economic development and income gap. This paper uses the panel data of 29 provinces (except Tibet and Chongqing) from 1986 to 2010.

## ECONOMETRIC MODEL SPECIFICATION AND VARIABLES DESCRIPTION

This paper chooses the income gap as explained variable and finance development level, FDI, trade open level, employment structure, economic development level, urban-rural capital investment ratio and education level as explaining variable. The econometric model is shown below:

$$\ln EQ_{it} = C + \alpha_1 FDe_{it} + \alpha_2 FDI_{it} + \alpha_3 Trade_{it} + \alpha_4 Employ_{it} + \alpha_5 Lnagd_{it} + \alpha_6 Capital_{it} + \alpha_7 Edu_{it} + \varepsilon_{it}$$

In the above function,  $i$  and  $t$  stand for province and time respectively,  $\alpha_1$ - $\alpha_6$  are the ratios of explaining variable,  $C$  and  $\varepsilon$  are constant and error term respectively.  $\ln EQ_{it}$  represents the income gap. This paper uses urban-rural income ratio and Theil Index to measure it respectively to get a more reliable regression result. Urban-rural income ratio equals to disposable income per capita of urban resident divided by income per capita of rural residents. Data is collected from "China Statistical Yearbook". Theil Index is mainly calculated by Shorrocks function:

$$Theil_{i,t} = \frac{P_{i,t}^u}{P_{i,t}} \ln \left( \frac{P_{i,t}^u / Z_{i,t}^u}{P_{i,t} / Z_{i,t}} \right) + \frac{P_{i,t}^c}{P_{i,t}} \ln \left( \frac{P_{i,t}^c / Z_{i,t}^c}{P_{i,t} / Z_{i,t}} \right)$$

$u$  and  $c$  stand for urban and rural area respectively.  $P_i^u$  and  $P_i^c$  represent the aggregate income level of urban and rural area in district  $i$ .  $P_i$  shows the aggregate income in district  $i$ .  $Z_i^u$  and  $Z_i^c$  represent the population of urban and rural area in district  $i$ ,  $Z_i$  shows the total population in district  $i$ . Data is collected from Ceinet database and the Statistical Yearbook of every provincial.

*FDe* is finance development level and equals to the ratio of loan balance in year-end and GDP. *FDI* equals to FDI-GDP ratio. *Trade* is trade open ratio and equals to the trade amount divided by GDP. *Employ* is employment structure. It equals to agriculture labor amount divided by total labor. *Lnagdp* is economic development level and it equals to ln(GDP/Capita). *Capital* is urban-rural capital investment ratio. *Edu* is the education level. It is calculated by the average education year among people who are older than 6. Data is collected from *China Statistical Yearbook*, *China Compendium of Statistics 1949–2008*, CEInet Statistics Database and educational Statistical data of the Ministry of Education. The specific variables statistical description are shown in TABLE 1:

**TABLE 1 : The statistical description of the main variables**

Variables	Samples	Mean	Standard Deviation	Minimum	Maximum
INC	725	2.6685	0.6738	1.1440	4.7586
Theil	725	0.1058	0.0590	0.0019	0.2936
FDI	725	0.0280	0.0336	0.00002	0.2425
FDe	725	0.9584	0.2947	5.89E-05	2.2522
Trade	725	0.2670	0.3613	0.0213	2.2030
Employ	725	0.4917	0.1724	0.0393	0.8183
Lnagdp	725	8.6294	1.1456	6.1463	11.2771
Capital	725	6.4804	4.9207	0.6762	43.0848
Edu	725	7.1797	1.2570	4.2485	11.1726

**Data sources:** Computation obtained according to *China statistical yearbook*, *China Compendium of Statistics 1949–2008* and the provincial statistical yearbook in year past.

The statistics results show that the income gap that is measured by *INC* and *Theil Index* increased from 1986 to 2010. *INC* increased from 2.0786 to 3.0223 while *Theil Index* increased from 0.0565 to 0.131.

**EMPIRICAL RESEARCH RESULT AND EXPLANATION**

**National regression result**

Based on the econometric model and variables, this paper uses the panel data of 29 provinces from 1986 to 2006 to investigate the economic development index’s influence on income gap. We can choose Fixed Effects Model and Random Effects Model to analyses the data. However, Hausman test and the result of empirical analysis show that Fixed Effects Model is better than Random Effects Model (TABLE 2). As a result, this paper will mainly use Fixed Effects Model to do regression.

**TABLE 2 : Regression result of the overall panel data using Urban—rural income ratio and Theil Index as dependent variable (national level): 1986 – 2010**

	Urban—rural income ratio				Theil Index			
	Fixed effects	Random effects	Fixed effects	Random effects	Fixed effects	Random effects	Fixed effects	Random effects
C	6.595*** (9.64)	-2.630** (-8.95)	5.828** (-8.69)	-2.504** (-8.46)	0.498** (7.92)	-0.308** (-11.65)	0.457** (7.25)	-0.302** (-11.33)
FDe	0.368** (6.75)	0.588** (11.48)	0.333** (6.27)	0.522** (10.41)	0.026** (5.24)	0.046** (9.68)	0.024** (4.88)	0.041** (8.80)
FDI			-3.577*** (-6.95)	-4.679*** (-9.51)			-0.189*** (-3.91)	-0.302*** (-6.54)
Trade	0.333*** (6.26)	-0.009 (-0.19)	0.481*** (8.64)	0.231*** (4.44)	0.007 (1.51)	-0.022*** (-5.07)	0.015*** (2.91)	-0.007 (-1.35)
Employ	1.225*** (5.67)	3.631*** (25.29)	1.374*** (6.54)	3.538*** (25.15)	0.056*** (2.80)	0.268*** (20.43)	0.064*** (3.21)	0.262*** (20.09)
Lnagdp	-0.436*** (-6.42)	0.459*** (14.59)	-0.334*** (-4.96)	0.482*** (15.23)	-0.034*** (-5.42)	0.044*** (15.37)	-0.028*** (-4.49)	0.045*** (15.79)
Capital	0.013** (4.37)	0.006** (1.97)	0.018** (6.08)	0.013** (4.47)	0.001** (4.59)	0.001** (2.25)	0.002** (5.45)	0.001** (3.91)
Edu	-0.180*** (-7.28)	-0.145*** (-5.99)	-0.197*** (-8.21)	-0.174*** (-7.34)	-0.023*** (-9.98)	-0.019*** (-8.51)	-0.024*** (-10.43)	-0.021*** (-9.36)
R <sup>2</sup>	0.78	0.59	0.79	0.63	0.75	0.57	0.76	0.59
A- R <sup>2</sup>	0.76	0.59	0.78	0.62	0.74	0.57	0.75	0.59
Hausman	251.21***		218.98***		232.49***		206.52***	

Notes: Bracket corresponding *t* value, \*,\*\*and\*\*\*represent obvious level of 10%,5% and 1%, Hausman test,ditto.

According to the empirical results in TABLE 2,  $R^2$  is bigger than 0.74. What's more, finance development level is positively related to income gap in 1% confidence level and FDI is negatively related to income gap. INC and Theil Index give us the same results. This shows finance development has a good influence in the growth of high-income crowd's income and enlarges the income gap, which is the same as the conclusion of Ye Zhiqiang. Taken finance development level into consideration, the increase of FDI reduces income gap. It shows the fact that foreign investment changes the capital structure of China and increases the residents' income through technical spill effect and employment effect. On one hand, FDI augment the labor accumulation in rural area and benefit the low-income crowd more than high-income crowd; on the other hand, FDI enlarges the demand for low-technology labor and improves the trend of increasing income gap. The further research shows finance development level has a smaller rate when FDI taken into consideration. The rate of finance development level decrease from 0.368 to 0.026 and from 0.333 to 0.024 respectively. The development of FDI can slow down the increase of income gap caused by finance development.

For other explaining variable, trade open ratio is positive related to income gap which means that trade with foreign countries increases the income gap. Certainly, this phenomenon is mainly caused by different stages of opening-up. Region with a better open level would benefit from opening-up earlier. At the same time, the benefits of opening-up are also allocated un-fairly. Low-income crowd in rural area always doesn't benefit from the trade revenue<sup>[10]</sup>. Meanwhile, economic development level and education level are both negative related to income gap. The development of economy as well as education can reduce income gap. Urban-rural capital investment ratio is obviously positive related to income gap. This rate says that the bigger the difference between urban and rural area in fixed assets investment is, the larger the urban-rural income gap is. Employment structure is also positive related to income gap. If more labor is put into agriculture production, the income gap will become larger. Both the traditional comparative advantage theory and labor endowments in current China show that migration of labor from rural areas to urban areas guarantees China's attraction to investment. On the contrary, the high ratio of agricultural labor force would have a bad influence on labor-intensive industries as well as the income gap.

Although Theil Index gives us the same result, we still need use regional regression to make some further researches and give us more evidence.

### REGIONAL RANGE REGRESSION RESULT

TABLE 3 represents the regional regression result. The result tells us all the economic indexes have a significant influence on income gap in different districts. However, the influence of a same factor is different in different areas.

**TABLE 3 : Regression result of the overall panel data using Urban—rural income ratio and Theil Index as dependent variable (regional level): 1986 – 2010**

	Urban-Rural Income Ratio			Theil Index		
	eastern regions	Midlands	western regions	eastern regions	Midlands	western regions
C	3.843*** (4.82)	2.636** (2.58)	-0.547 (-0.46)	0.423** (5.39)	0.190** (2.00)	-0.192* (-1.73)
FDe	-0.030 (-0.56)	-0.276** (-2.40)	0.375*** (2.90)	-0.017*** (-3.25)	-0.029*** (-2.70)	0.066*** (5.48)
FDI	-0.301 (-0.68)	-6.618*** (-3.34)	-4.894** (-2.28)	0.095** (2.18)	-0.810*** (-4.41)	-0.726*** (-3.60)
Trade	0.335*** (8.95)	-0.539 (-0.76)	-1.868*** (-2.95)	0.012*** (3.19)	-0.147** (-2.23)	-0.064 (-1.09)
Employ	0.906** (4.00)	0.630* (1.88)	4.097*** (10.37)	-0.004 (-0.16)	-0.028 (-0.91)	0.302*** (8.16)
Lnagdp	-0.189** (-2.38)	0.049 (0.35)	0.185 (1.49)	-0.029*** (-3.66)	0.002 (0.19)	0.021* (1.81)
Capital	0.015*** (4.17)	-0.019* (-1.68)	-0.006 (-1.11)	0.002*** (4.41)	-0.002* (-1.87)	0.0002 (-0.44)
Edu	-0.056* (-1.91)	-0.049 (-0.66)	-0.053 (-1.25)	-0.013*** (-4.33)	-0.005 (-0.75)	-0.010** (-2.40)
$R^2$	0.83	0.67	0.77	0.77	0.68	0.75
A- $R^2$	0.82	0.65	0.76	0.75	0.66	0.73
Hausman	59.07***	87.01***	65.23***	79.97***	98.47***	38.56***

Notes: Bracket corresponding  $t$  value, \*, \*\*and\*\*\*represent obvious level of 10%,5% and 1%, Hausman test, ditto.

The difference between eastern region and national range regression is that finance development level is negative related to income gap in eastern region. On one hand, the gathering of financial institutions promotes the development of financial service in eastern region. Financial institutions in eastern region enjoy a better measurement of loan price, which releases the finance development's positive effect on income increase. According to *2011 China's regional financial operation report* published by People's Bank of China, up to the end of 2011, eastern region has 39% financial institutions in China. What's more, banks with foreign capital put 94.2% of their assets in eastern region. Meanwhile, rural area cooperation financial institutions put 48.4% of their assets in this region. All these make a more convenient and cheap finance service and increase the income in eastern region. On the other hand, the high urbanization level and developed private economy reduce the income gap caused by finance gap between urban and rural areas. Since the reform of state owned banks in 1990s, finance development policy paid much more attention to urban areas. The finance gap between urban and rural areas became more and more obvious and enlarged the income gap<sup>[11]</sup> (Ran Guanghe and Lu Zhaoyang, 2011). However, the better finance system in eastern area promotes regional economic development, especially labor-intensive industries, which reduce the income gap. At the same time, Theil Index is positive related to income gap. This is mainly because of the income allocation effect of FDI. FDI increases the high-skill labor's income through industrial structure promotion and technology spill effect. Most of high-skill labor is urban residents.

FDI and finance development's influence on income gap is different in central and western region. In central region, both FDI and finance development are negative related to income gap. The effect in western region is more complex. Finance development is positive related to income gap while FDI is negative related to income gap. The explanation is finance development level in west region is lower than central region. Up to the end of 2011, 12 provinces in western region have 348 listed companies in total compared with 353 listed companies in 6 central provinces. Bad investment environment, the low ability of repay loans and limited finance channel in western region makes high-income crowd easier to get finance. In central region, finance development has overcome the sole effect on income gap. All kinds of finance channels provide a good foundation for enterprise growth. FDI is negative related to income gap in both central and western region. But rate of FDI in central region are -6.618 and -0.810 respectively. Both rates' absolute values are bigger than western region. FDI has a better effect on reducing income gap in central region. With the process of reform and opening-up, foreign investment has moved from eastern region to inland areas. The positive effect of FDI on income allocation hasn't been totally delivered in central and western region. Speeding up the movement of FDI from eastern region to central and western region is the key choice of the development of the west regions and the rise of central China.

Taken other variables into consideration, the factors affecting eastern region income gap are trade open level, employment structure, economic development level, urban-rural capital investment ratio and education level. The factors affecting central region income gap are trade open level, employment structure and urban-rural capital investment ratio. The factors in western region are trade open level, employment structure, economic development level and education level. The result shows that trade open level and employment structure are significant factors. It shows that there is no substantive changes of the polarization trend of the regional economic and society development and urban-rural dualistic economic structure has not been turnaround.

## CONCLUSION AND POLICY SUGGESTION

This paper uses the panel data of 29 provinces from 1986 to 2010 to find some indexes' influence on income gap in terms of national and regional range. Using INC and Theil Index as indicators of income gap, we can draw three conclusions. First, in the view of national range, both INC and Theil Index show finance development level will enlarge the income gap while FDI would reduce the gap. The increase of FDI will also reduce the gap increased by finance development. Second, in the view of regional range, different regions have different regression results. In eastern district, finance development reduces the income gap in fact while FDI enlarges the income gap. This result is totally different with the national range's regression result. In central district, both finance development and FDI reduce income gap and western district has the same regression result with national range. Last, in conclusion, the finance development in western region falls behind a lot, which prevent financial service from reducing income gap. At the same time, FDI in eastern district enlarges the income gap. This phenomenon indicates that FDI in eastern district has changed its target from scale to structure. As a result, it is very important to put more FDI in high-end manufacturing industry and transmit low-end industry to central and western district.

Based on analysis above, I think we can take the following actions to reduce income gap in short run. First, put more FDI in western and central district as well as rural area. Second, taking the finance development level into consideration, we can use different reserve rate for different regions and loose the market entrance limitation of financial institution in western and central district. It is extremely significant that we should enlarge the loan scale towards agriculture, rural areas and farmers and encourage the capital in urban areas to move to rural areas. Last, we should develop FDI as well as financial service simultaneously. Additionally, we should make the finance channel and FDI transmit channel broader and broader.

It should be pointed out that China is society whose economic development is un-balanced. The indexes used by this paper would have different results in different regions as well as stages. For example, FDI would reduce income gap in developed regions while enlarge income gap in developing regions. In conclusion, this paper shows that income gap has a really closed relationship with development stage. The big income gap would cause a series of social problems. However, these problems are beyond the scope of this paper.

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