

Relationship between government behaviours and economy growth

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Abstract

In macroscopic economic environment the government behaviors play a pivotal role. This article selects 51 major countries in the world and uses “Least Squares Method” to research the relationship between government behaviors and economy growth. Moreover, it will compare the results of the analysis for the government of China to develop policies and systems to provide theoretical basis. The significance degree of influencing between government behaviors and economy growth of nations which are in different development stages are different.

Introduction

Nowadays, the international competition turns more serious increasingly. More and more nations adopt market economy system. These countries fully aware of the government's role in economic growth.

It explored the effect that the different acts of government take on economic growth and sought the law of the acts of government and the economic growth through constructing and analysing a modified Cobb-Douglas function. And then It will also provide a theoretical basis and practical basis for the Chinese government formulating system and decision.

First step: Model and Variable Selection

Most economists who are researching macroeconomic take the Cobb-Douglas function as the model to study. Its basic form is:

$$Y = AK^\alpha L^\beta e^u$$

K is the capital stock, L is the number of labor. A represents the impact that technology and other factors have on economic growth. The function used in this paper is a modification in the form of Cobb-Douglas function:

$$\log(Y) = c + k \log(KL) + \beta_1 \log(X_1) + \beta_2 \log(X_2) + \beta_3 \log(X_3) + \beta_4 \log(X_4) + \beta_5 \log(X_5) + \mu$$

The meaning of KL in this function is different from that in the Cobb-Douglas function. In order to research the impact that the government's action on GDP per capita, this paper turn the capital and labor to working capital stock conversion

Second step: Analysis

This section will be separated into three parts to analyse the economic growth which was influenced by government behaviour by doing regression analysis with the determined model. The first part, selecting GDP per capita

and the government's Indicators of the 51 major countries in the world , do a regression analysis using weighted least squares. In the same way, Part II and III ,selecting GDP per capita and some government's Indicators from 20 countries with lower GDP per capita and 21 countries with higher GDP per capita separately. We do the same regression analysis using weighted least squares and then conduct a comparative analysis of the developed and developing countries to seek the economic growth which was influenced by the different government behavior.

1 Data

Y : GDP per capita as an dependent variable. (Unit : USD)

KL :The Average working capital stock.Take the Average working capital stock as a reference variable to explain the GDP per capita . (Unit : USD)

X1: Extent of distortion government subsidies:Government subsidies to business in your country (1=keep uncompetitive industries alive artificially,7=improve productivity of industries)

X2: Government intervention in investment: The effect of government intervention on corporate investment is (1=distorting,7=free from government intervention)

X3: Government success in ICT promotion:Government programs promoting the use of information and communication technologies (ICT) are (1=not very successful,7=highly successful)

X4: Business costs of corruption: Offer other firm ' s illegal payments to influence government policies , law ,or regulations impose costs or otherwise negatively affect your firm?(1=impose large costs,7=impose no costs/not relevant)

X5: Government expenditure (government expenditure as a percentage of GDP) (unit :%)

This paper took the 51 major countries in the world as studying targets .

Table 1: the major national indicators data (Here gives Minimum value, 1st Quartile, Median 3rd Quartile and maximum value (over the 51 countries) for the variable Y. The data of 51 countries are shown in the Appendix.

Countries and regions	Y	KL	X1	X2	X3	X4	X5
India	2571	374	3.0	4.5	4.6	3.7	17.60
Mexico	8707	3250	3.3	4.5	3.7	3.8	15.62
Greece	18184	12163	3.4	4.0	3.5	3.5	49.50
Hong Kong of China	26235	11520	4.3	5.9	4.1	5.5	18.87
Luxembourg	56546	22333	5.1	5.2	4.3	5.2	32.56

Data sources :

“World Economic Forum Global Competitiveness Report 2002-2003” [1],

“The Global Competitiveness Report 2003-2004” [2]

2 Analysis

2.1 A regression analysis of 51 major countries

2.1 .1 the correlation coefficient matrix

We got the correlation coefficient between the variables through dealing with the data of the 51 countries. As shown in table 2:

Table 2: The correlation coefficients of the variables

	LOG(Y)	LOG(KL)	LOG(X1)	LOG(X2)	LOG(X3)	LOG(X4)	LOG(X5)
LOG(Y)	1.0000	0.9655	0.3187	0.5177	0.2862	0.7039	0.5085
LOG(KL)	0.9655	1.0000	0.2822	0.4923	0.2673	0.6980	0.5921
LOG(X1)	0.3187	0.2822	1.0000	0.6691	0.5762	0.6010	0.0173
LOG(X2)	0.5177	0.4923	0.6691	1.0000	0.6880	0.7962	0.1943
LOG(X3)	0.2862	0.2673	0.5762	0.6880	1.0000	0.6091	0.0173
LOG(X4)	0.7039	0.6980	0.6010	0.7962	0.6091	1.0000	0.3923
LOG(X5)	0.5085	0.5921	0.0173	0.1943	0.0173	0.3923	1.0000

2.1.2 Data process

Regressing the Data the three-part:

Model1

$$\log(Y)_t = 4.399 + 0.645 \log(KL) + 0.132 \log(X_1) + 0.009 \log(X_2) - 0.071 \log(X_3) + 0.055 \log(X_4) - 0.16 \log(X_5)$$

= 49.058
83.922
3.020
0.120
-1.649
0.973
-8.210

Model2

$$\log(Y)_t = 8.980 + 0.605 \log(KL) + 0.558 \log(X_1) + 0.636 \log(X_2) - 0.368 \log(X_3) - 0.850 \log(X_4) - 0.143 \log(X_5)$$

= 22.229
18.204
2.522
1.951
-1.495
-2.736
-1.209

Model3

$$\log(Y)_t = 9.672 + 0.314 \log(KL) + 0.172 \log(X_1) - 0.507 \log(X_2) + 0.257 \log(X_3) + 0.282 \log(X_4) - 0.151 \log(X_5)$$

= 47.025
6.142
1.592
-2.242
3.471
1.733
-3.086

Annotation 1 : model 1 is a regression analysis for 51 countries;

Annotation 2 : model 2 is a regression analysis for 20 developing countries

with lower GDP per capita;

Annotation 3 : model 3 is a regression analysis for 21 developed countries

with higher GDP per capita;

Annotation4: the numbers in parenthesis are t-values

Annotation5: when $\alpha = 0.05$, the t values are

$$t_{0.025}(51-1) = 2.009 \quad t_{0.025}(20-1) = 2.093 \quad t_{0.025}(21-1) = 2.086$$

The result is shown on table 3:

Table 3 : the result of regression analysis

Variable Y : GDP per capita			
Independent variable	Model 1	Model 2	Model 3
C	4.399 (49.058)	8.980 (22.229)	9.672 (47.025)
log(KL)	0.645 (83.922)	0.605 (18.204)	0.314 (6.142)
log(X1)	0.132 (3.020)	0.558 (2.522)	0.172 (1.592)
log(X2)	0.009 (0.120)	0.636 (1.951)	-0.507 (-2.242)
log(X3)	-0.071 (-1.649)	-0.368 (-1.495)	0.257 (3.471)
log(X4)	0.055 (0.973)	-0.850 (-2.736)	0.282 (1.733)

log(X5)	-0.160 (-8.210)	-0.143 (-1.209)	-0.151 (-3.086)
R ²	0.999	0.999	0.999
F	4200.687	308974.5	61.659
D.W	2.277	2.235	1.802
Sample	51	20	21

2.2 An Empirical Analysis

2.2.1 Analysis of economic significance

1) We can see from the regression results of the 51 countries: On world economic growth, when other factors remaining unchanged, the capital of labor stock per capita increasing 1% causes GDP per capita of the world increasing 0.645%. Other factors remaining unchanged, the Extent of distortion government subsidies increasing 1% causes GDP per capita of the world increasing 0.132%. Government expenditure increasing 1% causes GDP per capita of the world reduce 0.160%. Capital investment causes larger changes in GDP per capita. The world economy is the main factor for Capital stimulating economic growth. Government acts played a smaller role in influencing the course of economic growth and a supporting role in economic growth.

2) We can see from the results of the regression of 20 developing countries with lower GDP per capita: In the circumstances where the governments interact. The independent variables which impact on the economic growth of developing countries significantly: the capital of labor stock per capita increasing 1% causes GDP per capita in developing countries increasing

0.605%; The Extent of distortion government subsidies, the indicator of Extent of distortion government subsidies increasing 1% causes GDP per capita of developing countries increasing 0.558%; Business costs of corruption, the indicator of Business costs of government corruption increasing 1% causes GDP per capita in developing countries reducing 0.850%. Capital caused GDP per capita grew by almost two-thirds. Developing countries are mainly type of capital stimulating economic growth.

3) We also can see from the results of the regression of 20 developing countries with lower GDP per capita: In the circumstances where the governments interact, the independent variables which impact on the economic growth of developing countries significantly: The capital of labor stock per capita increasing 1% causes GDP per capita in developed countries increasing 0.314%. This number is far less than the indicator of developing countries. The indicator of the government intervention in economic increasing 1% causes GDP per capita in developed countries reducing 0.507%. The indicator of the Government success in ICT promotion increasing 1% causes GDP per capita in developed countries increasing 0.257%. The indicator of the Government expenditure increasing 1% causes GDP per capita in developed countries reducing 0.151%.

2.2.2 Comparative analysis

From the Table of regression analysis, we can see that the significant degree of the countries at different stages of development affected by different government behaviors is different.

1) Government subsidies in industrial areas take different effects on economic growth of countries at different stages of development. In

developing countries, the effect that the government subsidies in industrial took on economic growth is significant. In developing countries , giving subsidy to the enterprises which can improve the competitiveness of industrial can improve its industrial competitiveness and promote industrial development and economic growth; The industrial technologies which are at a mature stage are more advanced in developed countries and have stronger competitive power in international market. The government reducing its support will promote the industry growth healthily.

2) Government intervention in economic takes different effect on economic growth of countries which are at different stages of development. The economics in developing countries is relatively backward. Market economy is not sound. Government intervention to the enterprises is strong in the investment field .But the significant degree is weak to economic growth. Government intervention in business investment in developed countries can prevent monopoly enterprises and enhance the competitiveness of the market .It play a role in promoting economic growth.[3]

3) Government success in ICT promotion takes different effects on economic growth of countries at different stages of development.

In developing countries, the development in the field of information and communication technology developments is late. It is also in a state of backwardness and the technology is ackwarder than developed countries. These countries tend to adopt Renovation of imports with very few innovations.The development of information and communication infrastructure is relatively sound in developed countries. And they have a strong technical support. So it has formed a relatively complete information and communication market. This market impacts on economic growth significantly and largely. [4]

4) Corruption of the government takes different effects on economic growth of countries which are at different stages of development.

Market economy is still not perfect in developing countries, or a sound legal system of supervision. Corruption happens frequently and its impact on economic growth is also relatively significant. In developing countries, government corruption causes the cost of some enterprises rising and some have also received additional revenue. So it causes the phenomenon that government corruption promotes economic growth in the short term. The market economy in developed countries is relatively sound. Economy and legal system is relatively sound. Government corruption will cause miscarriages and the negative impact on the economy.[5]

5) The number of government expenditure takes different effects on economic growth of countries at different stages of development. The impact on economic growth by government expenditure in developing countries is not significant. In infrastructure, education and national defense the government expenditure promotes the economic growth. In developing countries it is not a major contributing factor. Analyzing the data of developed countries, there is a significant negative correlation between the government expenditures and economic growth. Market economy in developed countries is relatively healthy. But Excessive government expenditures, providing extensive public goods, causes the market fail to play a destabilizing role in the market economy and hinder economic growth.

3. The inspiration of Chinese government in promoting economic growth

Chinese economy is in transition. The economic structure has

undergone a fundamental change. The government functions have a significant transformation. It will be inconceivable without the government's own reform.

To enable the government to perform new functions better, we should raise the government's rationality. Government's rationality refers to the government which is based on accurately judge the conditions can weigh the advantages or disadvantages and determine the priorities of development of social economic, formulate scientific and rational policy measures and to ensure its implementation.

Concerning to the government, this paper makes the following suggestion.

1) Change government subsidies to improve industrial competitiveness. China has been a member of WTO, the pace of industrialization has embarked on a normal track. Chinese industry must to improve competitiveness to participate in international competition. The government should reduce the support for not competitive enterprises and transfer funds to be able to truly improve the competitive edge of China's industrial enterprises, such as information and telecommunication companies and research companies.

2) Reduce government intervention to enterprises in the economic sphere. Excessive government intervention in the economic field will distribute the market to get effectiveness of the allocation of resources and lead the market uncontrolled. However, the government also has to control the area of lifeline of the national economy, such as energy, information and communication, transportation, national defense, and so on. These factors are having a crucial impact on economic growth of China.

3) Government should increase the promotion of information and

communication .Then use information technology to promote industrialization and promote the optimization and upgrading of the internal of industries. Information and communication revolution has brought an upsurge of economic growth to Latin American countries. China is also in a critical stage from industrialization to information technology. "Information technology brings along industrialization, industrialization promotes information technology" a new road to industrialization. It is the main form of the next stage of economic development in China.

4) Strengthen the governance of government corruption .Strengthen and improve the supervision of the government. The biggest feature of the governments is its compelling force. If they lose the restrictions and oversight, the result is bound to be corrupt and inefficient. If we want to Strengthen the supervision of the government, we need to strengthen the government's openness and transparency and enhance the degree of openness of administration according to law so that the government's direct supervisor and various social organizations and individuals can obtain adequate information to improve the effectiveness of supervision.

Conducting an effective constraint on the government is according to the executive actually.

5) Select appropriate government expenditures. Rapid economic growth of China in recent years is, to some extent ,attributed to the Chinese government's large-scale expenditures. In the short run, the Chinese government expenditures played a significant role in promoting economic growth. However, in the long run, increasing the scale of government expenditures will, lower capital and the output efficiency. Therefore, it would be appropriate to reduce the size of government expenditures and increase the support for technology research and development efforts.

Government expenditure should be mainly used to improve the efficiency of capital and labor.

During the process of impacting on the economic growth, the role of government is not omnipotent, nor is the market. In a developing country such as China, facing to the complex, economic development can not be “across the board” or for radical economic reform. [6]Economic reform and development should be gradual. Practice has proved that Chinese government intervention before reform is effective. The achievements of founding market economy which was raised during reform and opening up is outstanding. The government and the market should play a role together in Chinese economic development process. They can complement each other and support each other. Each of them can play a role in different areas. Thus, the whole country can achieve efficient and orderly of economic development.

References

- [1]Peter K.Cornelius [German] Michael E. Porter[America] Klaus Schwab[Switzerland] , translated by Liying Fang & Zhixian Luo, 2003, World Economic Forum Global Competitiveness Report 2002-2003, Machinery Industry Press
- [2]Michael E. Porter , Klaus Schwab , Xavier Sala-i-Martin , 2004 , The Global Competitiveness Report 2003-2004 , The World Economic Forum , Oxford University Press
- [3]Xiao Huang, Xiongyi Bin , 2006, The role of government and its relationship with the market research , Public technology, Science Press
- [4]Jianchu Shang, Fangzhi Fan, Gengqing Zhang , 2005, Technical innovation, economic growth and government intervention, <http://www.wanfangdata.com.cn/qikan/periodical.articles/tjyj/tjyj2005/0502/050213.htm>

[5]Tianyun Zhou, 2001,Corruption of public investment and economic growth ,Economic reform ,

<http://www.nova.cn/Browse/ShowDoc.aspx?Code=3-1&Id=2005062709342978855>

[6]Shixian Huang , 2005,On the negative external effects of government intervention in economic analysis , Look & Search , People of China press

Appendix: Target data of the 51 main countries we study:

Countries and regions	Y	KL	X1	X2	X3	X4	X5
India	2571	374	3.0	4.5	4.6	3.7	17.60
Indonesia	3138	595	3.8	3.5	3.5	3.8	20.60
Philippines	4021	506	2.8	3.7	3.6	2.9	19.39
Jordan	4106	2000	3.9	4.8	4.9	4.8	32.60
China	4475	823	3.8	4.5	4.3	3.9	19.30
Venezuela	5226	1883	2.5	1.9	2.2	2.4	24.70
Colombia	6068	921	3.4	3.7	3.7	3.0	20.30
Turkey	6176	2112	2.7	3.5	2.9	3.5	44.31
Romania	6326	1734	2.0	3.1	3.8	2.5	15.94
Thailand	6788	1208	4.4	5.2	4.6	4.0	17.82
Brazil	7516	1585	4.0	4.4	4.0	4.0	35.40
Soviet	7926	1579	2.9	3.6	2.9	3.5	14.66
Mexico	8707	3250	3.3	4.5	3.7	3.8	15.62

Malaysia	8922	2487	4.0	4.1	5.3	4.6	30.70
Chile	9561	3434	4.3	4.7	3.9	4.1	22.40
South Africa	10132	2930	4.1	4.5	4.0	4.7	26.35
Poland	10187	2828	2.7	4.0	3.1	3.6	33.50
Argentina	10594	212	2.9	2.8	2.4	3.0	22.21
Estonia	11712	5167	4.3	5.0	4.8	5.0	36.21
Slovakia	12426	4700	3.3	4.2	3.2	3.4	40.60
Hungary	13129	5949	4.2	4.3	3.6	3.9	40.68
Czech	15148	6327	2.8	4.6	3.3	3.6	43.99
Korea	16465	8892	4.0	4.3	5.3	4.3	23.80
Slovenia	17748	9222	3.8	4.6	3.7	4.2	44.70
Portugal	17808	6634	3.3	4.2	3.8	4.8	41.00
Greece	18184	12163	3.4	4.0	3.5	3.5	49.50
Israel	19382	8292	4.3	4.2	4.4	4.9	46.70
New Zealand	20455	9950	3.7	5.1	3.6	6.6	35.80
Spain	20697	15368	3.6	4.8	3.8	4.4	38.50
Singapore	23393	9420	5.5	5.3	5.9	6.1	18.15
Taiwan of China	23420	6272	4.0	4.7	5.2	4.4	25.00
Sweden	25315	11319	4.0	5.3	4.4	6.4	53.42
Italy	25570	14580	3.7	4.4	3.7	3.9	45.30
Japan	25650	17613	2.6	4.5	4.1	4.4	46.9
Britain	25672	10364	4.1	5.2	3.8	5.6	38.7
Finland	25859	14641	5.0	6.3	5.2	6.6	45.17
France	26151	16011	3.1	4.5	4.3	4.9	50.60
Hong Kong of	26235	11520	4.3	5.9	4.1	5.5	18.87

China							
Germany	26324	12232	2.3	3.7	4.0	5.3	46.30
Belgium	26695	15755	3.4	4.7	3.6	5.4	46.56
Netherlands	27275	14817	4.4	5.4	3.7	5.8	27.03
Australia	27756	15413	4.3	5.4	3.9	5.8	25.20
Switzerland	28359	17995	2.9	5.2	4.2	5.6	38.70
Austria	28611	18410	3.7	4.5	3.9	5.4	47.20
Canada	28699	12389	3.4	4.5	4.6	5.1	37.70
Iceland	29614	16875	4.1	5.6	4.8	6.6	31.60
Denmark	29975	18162	4.4	5.7	4.8	6.7	51.30
Ireland	32960	24783	3.8	4.0	4.4	5.1	30.30
United States	35158	16220	3.8	5.4	4.6	5.1	18.37
Norway	36047	20044	3.3	4.4	3.9	5.5	41.30
Luxembourg	56546	22333	5.1	5.2	4.3	5.2	32.56