

An Examination of China's Development Factors and Governance Indicators over the 1985-2012 Period

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Abstract

In this study, we examine China's development over the 1985-2011 period and attempt to find the factors that affect its development. We also look at its governance indicators over time including its Government Effectiveness, Control of Corruption, Political Stability and Absence of Violence/Terrorism, Regulatory Quality, Rule of Law, and Voice and Accountability scores as measured by World Bank's Worldwide Governance Indicators dataset. We find that China has been extremely successful in improving the areas that have a big impact on its growth including scientific achievements, energy production, savings, consumption, capital formation, exports, domestic credit to private sector, and age dependency ratio. On the other hand, this period of rapid advancement coincides with generally worsening corruption, political stability, and voice and accountability measures. Although these factors have not deterred China's advancement yet, they may hinder it in the near future.

Keywords: China's Development · China's GDP · China's Governance Indicators

JEL Classification: O10 · O11 · O40 · O43 · O53

1. Introduction

In this study, we examine China's development over the 1985-2011 period and attempt to find the factors that affect its development. We look at factors including patent applications, scientific and technical journal articles, consumption, savings, capital formation, official exchange rate and exports, foreign direct investments, credit to private sector, and percentage of working-age population.

Many economists have researched China's remarkable economic growth over the past thirty years although some recent papers pointed out to China's recent problems in growth. Several of these papers have examined China's demographic dividend. The demographic dividend is the growth of the working age population which increases the supply of labor. Fang and Zhao (2012) argue that a low dependence ratio would provide China with accelerated economic growth. Fang and Yang (2013) argue that China's one child policy has caused its growth bubble to start deflating. The country now has an ageing population which leads a decline in the growth rate of working age population. Since the dependence ratio has started to change, Fang and Yang (2013) argue that eventually the demographic dividend will no longer exist. Fang and Yang (2013) contend that China's growth slowed in recent years due to the labor shortages, the diminishing returns on capital, and a decline in the savings rate. Even with the one child policy now being relaxed, the decline in the working age population will not be reversed (Fang and Yang, 2013). Fang and Yang (2013) discuss the implications of the recent decline in the working age population of China on its growth.

Eichengreen (2011) contend that China's growth will eventually slow down as the economy reaches a turning point and that it needs to transform its economic growth pattern and incorporate improvements and new developments in order to continue its robust growth. Whalley and Zhao (2010) conclude that human capital plays a significant role in China's growth with a contribution of twenty to forty percent. Without any improvements to labor quality and human capital accumulation China's economic growth rate will decline.

Jefferson, Hu, and Su (2006) contend that the income per capita in China is only a quarter of the corresponding figure in United States. According to the authors, this difference may cause some major problems for China. Not only it causes instability for the rural areas but it also puts a heavier burden on the urban coastal cities to produce a greater amount of productivity to make up for the lagging rural areas. This pressure on the urban cities causes the productivity to slow tremendously, ultimately slowing China's economic development. For China to increase GDP, they could take some of the burden on their urban cities and reallocate it to the rural areas. To enable this reallocation and scale of economies to underdeveloped parts of the county, China should make institutional reforms. China would need to enforce policies, such as land ownership reform, reductions in impediments to labor mobility and interregional trade, banking and corporate governance reform, and laws governing antitrust, bankruptcy, and mergers and acquisitions (Jefferson, Hu, and Su, 2006).

The decline in the savings rate in China is continuing to be a problem and it largely contributes to the decline in economic growth. Tyers, Zhang, and Cheong (2013) suggest that because of the sheer size of the population, the country has started to consume more and export less. Corporate and government savings has been affected as well. Yang, Zhang & Zhou (2011) contend that corporate savings have been affected by firm profitability, labor compensation and dividends, along with government policies. Ma & Yi (2010) suggest that if the government slows things down and has an inward focus on growth, it could start to combat its excess savings. On the other hand, the rise in taxes, social security fees collection, and income taxes have increased disposable income for the government. The government's savings rate has gone from a little below 38 percent in 2000 to an alarming rate of 53 percent in 2007 (Yang, Zhang, & Zhou 2011). Yang, Zhang & Zhou (2011) argue that while this rate has been one of the highest in the world, international trade and capital flows are still forcing the rate to go higher. If the government can resolve this issue, not only could it reduce the excess savings, but it could also produce new industries and create job growth.

Currency manipulation has been stated as one of the main reasons China has had such significant economic growth. Staiger & Sykes (2008) state that Central bank intervention in foreign exchange markets may stimulate exports and retard exports. Historically, China has regularly intervened to prevent the RMB from appreciating in order to advance its economy. Numerous public officials and commentators have argued that China has engaged in "currency manipulation". There have been multiple proposals for strict action against China and its impermissible behavior. Therefore, China may face larger and larger pressure from other countries and this may force it to reduce or completely eliminate its current manipulative behavior. This, in turn, may affect its trade surplus negatively. In a recent paper, Marquez and Schindler (2007) have concluded that the exchange rate policy is not the only factor that will be needed to reduce the Chinese trade surplus. They also note that growth in the rest of the world could have an enormous impact on Chinese exports. Amiti & Freund (2010) argue that a significant increase in global exports would create a downward pressure on prices of goods which could decline China's profit margin and also impact its exchange rate. This would be disastrous for the Chinese economy.

2. China's Progress

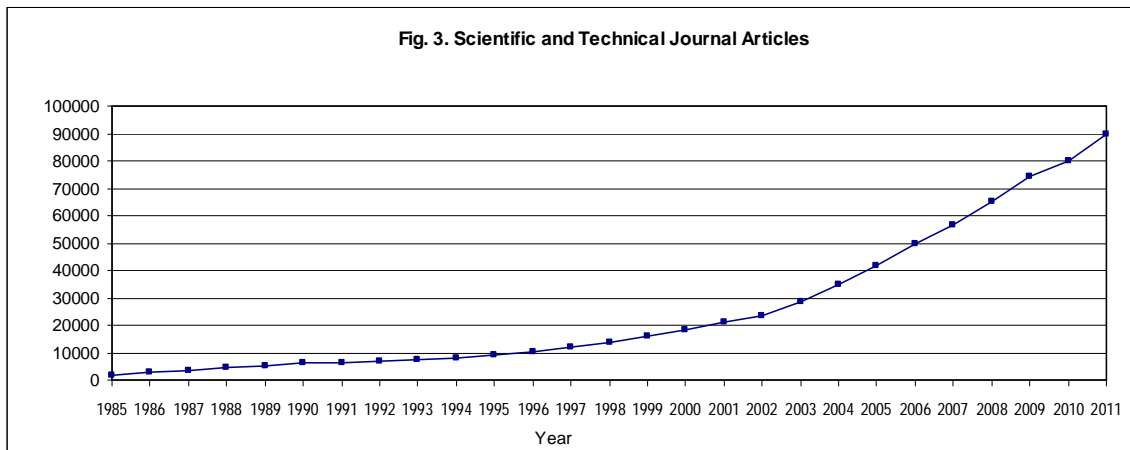
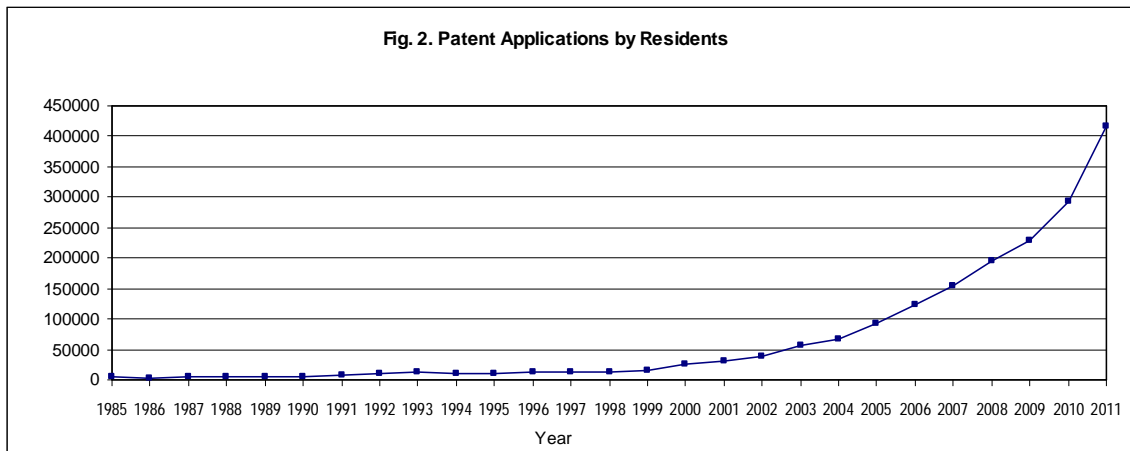
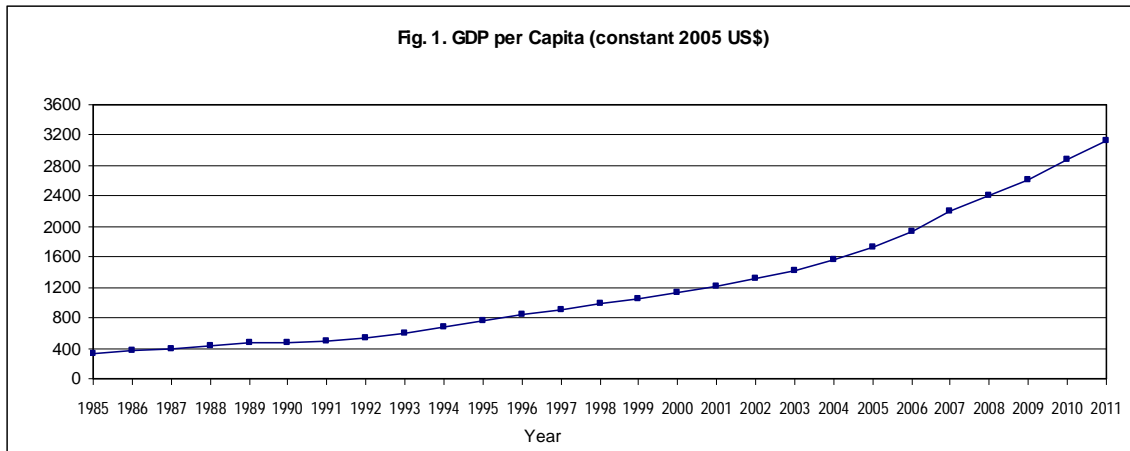
First, we want to look at China's progress over the 1985-2011 period. More specifically, we look at the following variables:

- Patent applications, residents
- Scientific and technical journal articles
- Final consumption expenditure (% of GDP)
- General government final consumption expenditure (% of GDP)
- Gross capital formation (% of GDP)
- Gross domestic savings (% of GDP)
- Household final consumption expenditure (% of GDP)
- Exports of goods and services (% of GDP)
- Age dependency ratio (% of working-age population)
- Official exchange rate (LCU per US\$, period average)
- Foreign direct investment, net inflows (% of GDP)
- Domestic credit to private sector by banks (% of GDP)
- Energy production (kt of oil equivalent)

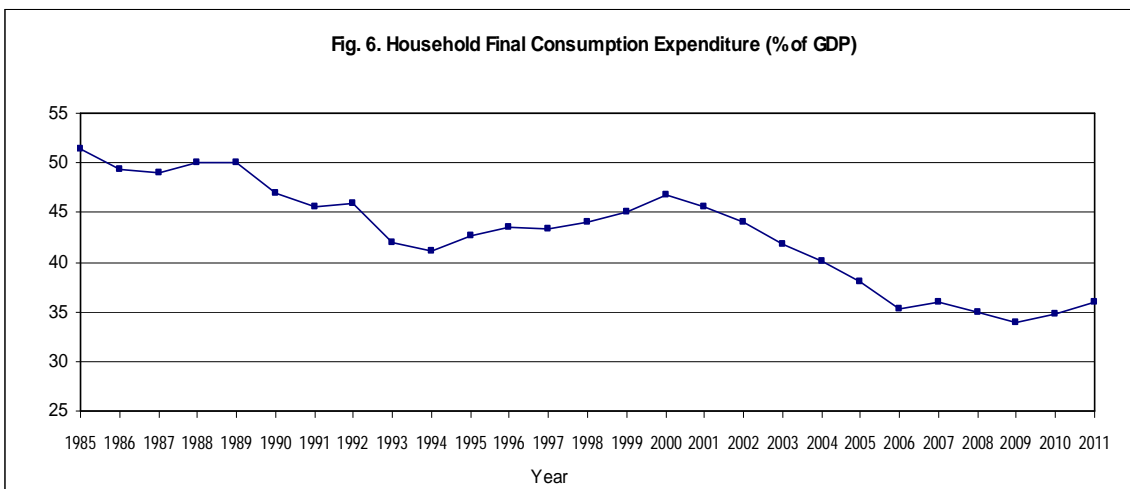
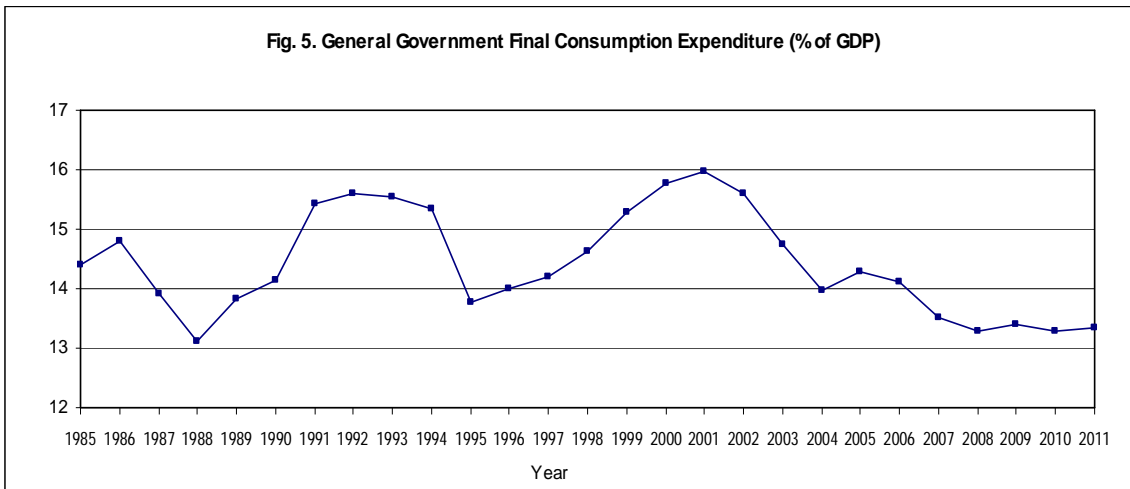
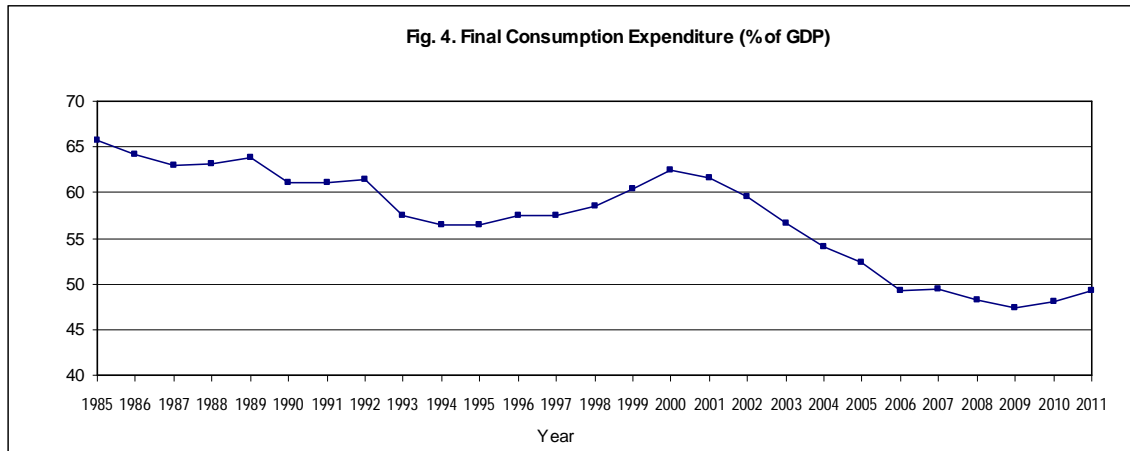
These variables are accessed through World Bank’s Worldwide Development Indicators dataset. Figures 1-14 show each of these fourteen variables over time.

Figure 1 shows China’s GDP per capita over the whole period. It was \$327 in 1985. It gradually increased each year and by 2011 it climbed to \$3,122. This is an impressive increase (i.e. almost ten-folds).

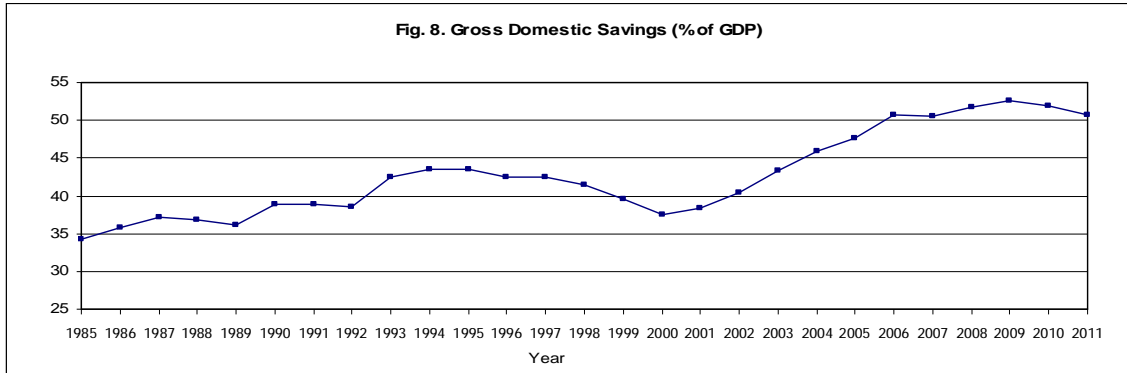
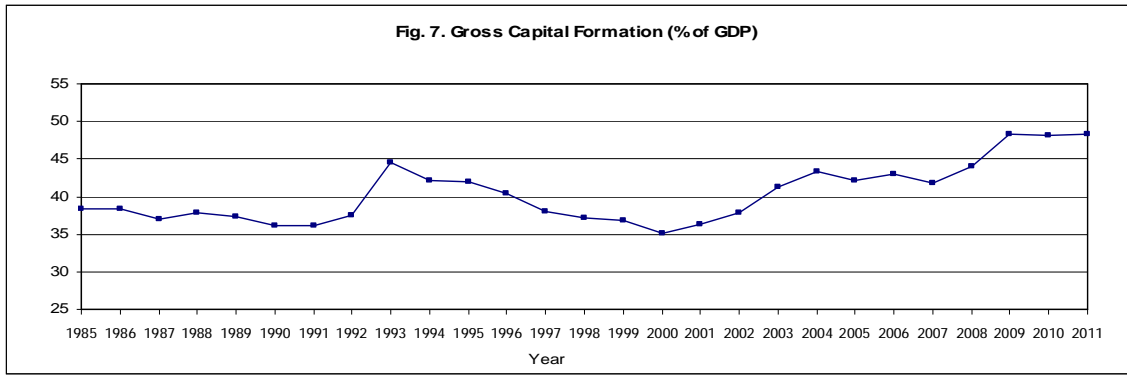
Figures 2 and 3 show China’s progress in science. The number of patent applications and the number of scientific and technical journal articles both continuously climb throughout the period. The number of patent applications by residents went up from 4,065 in 1985 to 415,829 in 2011 (i.e. approximately a hundred times). The number of scientific and technical journal articles went up from 1,943 in 1985 to 89,894 in 2011 (i.e. approximately fifty times). The country’s progress in science was impressive.



Figures 4, 5 and 6 show China's Final consumption expenditure, General government final consumption expenditure over time. We are seeing that both Final consumption expenditure (i.e. total expenditure) and Household final consumption expenditure went down throughout the whole period, while General government final consumption expenditure was almost flat (with ups and downs). Overall, the country has reduced its consumption.



Figures 7 and 8 show China's Gross capital formation and Gross domestic savings measures over time. We are seeing that both measures went up for the whole period, although there were ups and downs. Gross capital formation went up from 38% of GDP in 1985 to 48% of GDP in 2011. Gross domestic savings went up from 34% of GDP in 1985 to 51% of GDP in 2011.



Figures 9 and 10 show China’s Exports and its Official Exchange rate over time. The country’s exports went up until 2007 and then it went down. The Chinese currency was relatively more valuable in the initial years. It lost value until 1994. Then the Chinese government held it almost fixed, as we know, up until 2005-2006. After that, because of the pressures by the U.S., they allowed their currency to go up again. The decline in the exports after 2007 can be explained by the increase in the value of Chinese currency after 2005-2006.

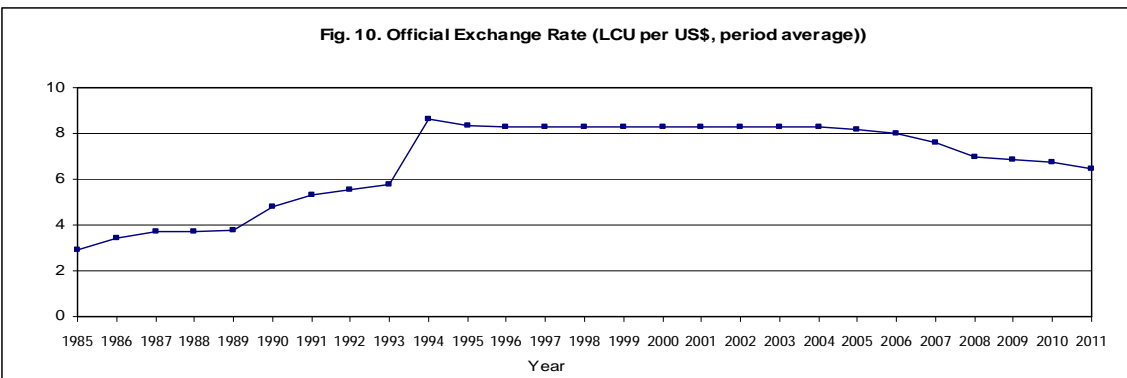
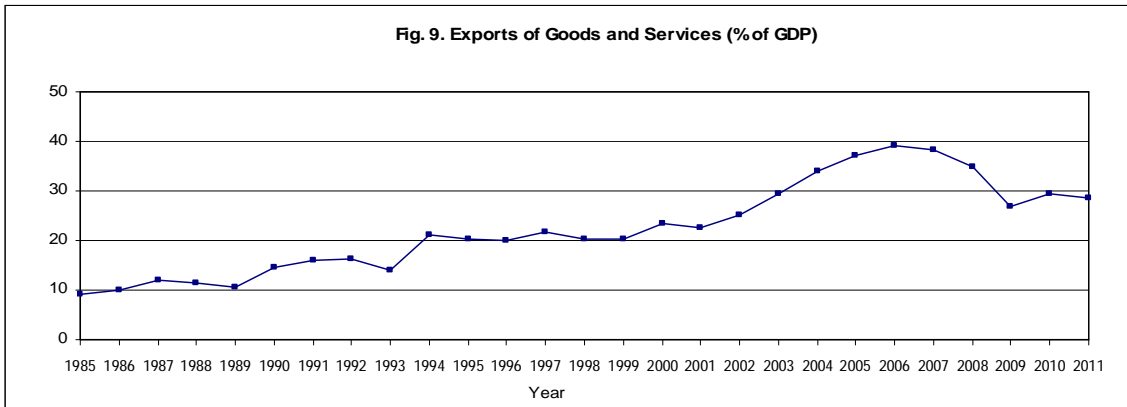


Figure 11 shows China's Age dependency ratio. The country was successful in reducing the age dependency throughout the whole period. It was 58% in 1985. By 2011, it dropped to 36%.

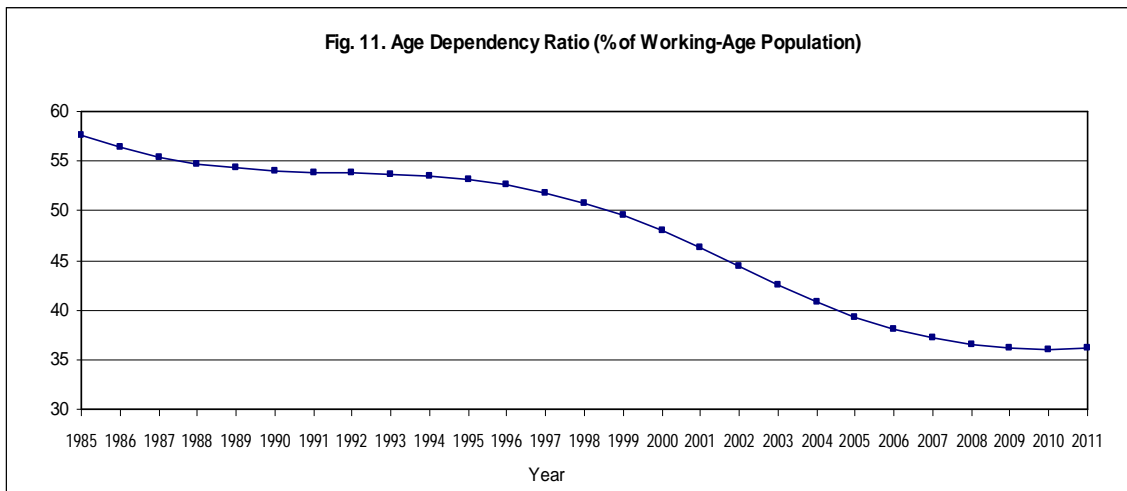


Figure 12 shows China's Foreign direct investment inflows over time. The country was successful in increasing the inflows up until 1993. After that, there was some drop. But, for the whole period, there was an increase. Net inflows were just 0.54% of GDP in 1985. It climbed to 4.53% of GDP by 2011 (dropped from 6.25% in 1993).

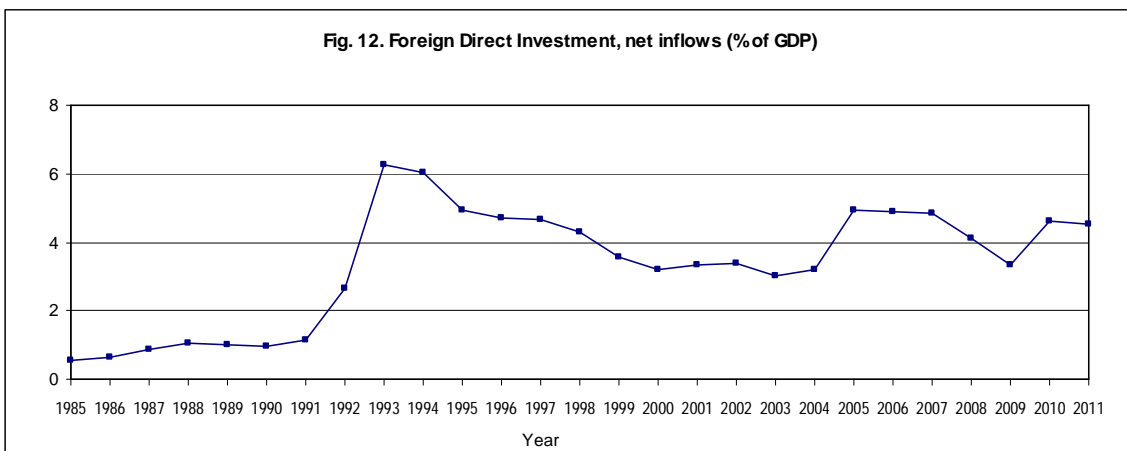
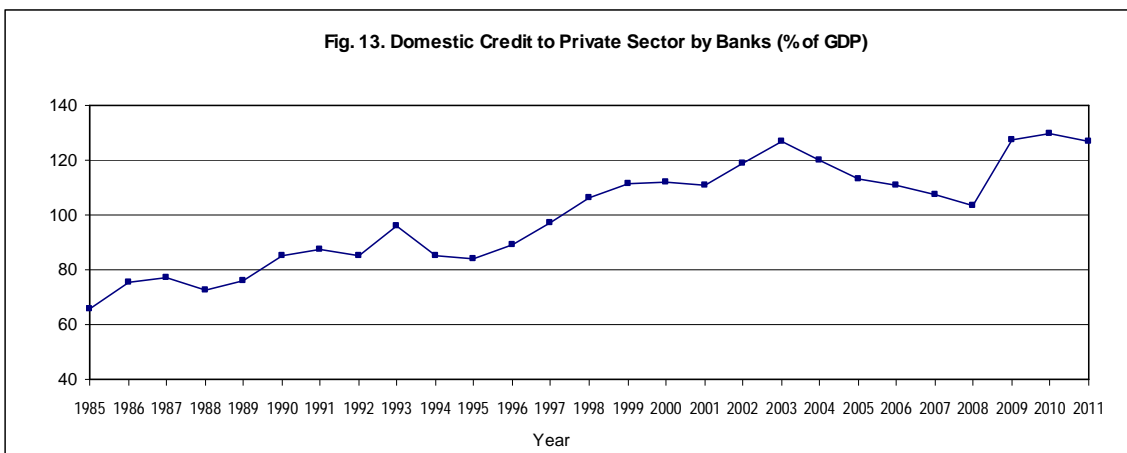
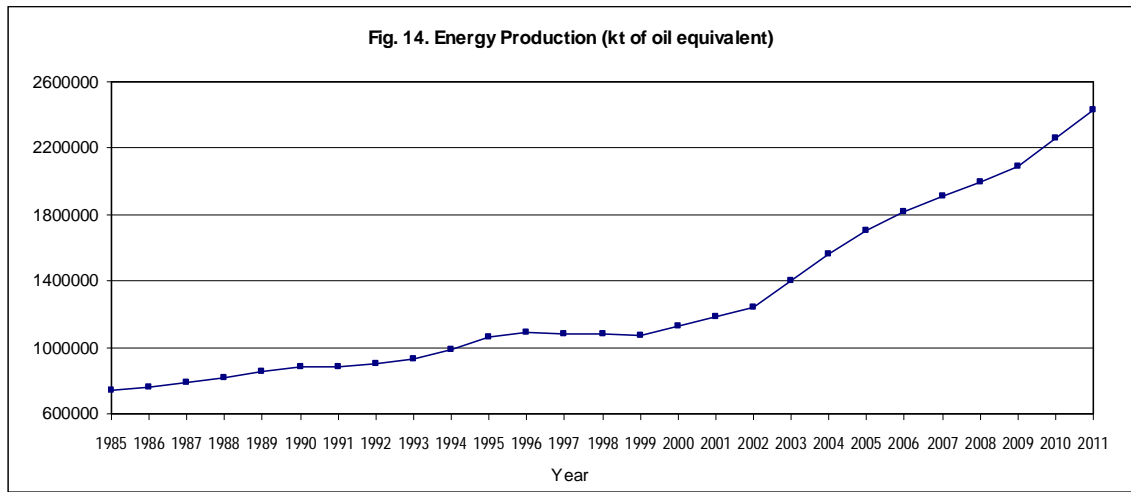


Figure 13 shows Domestic credit to private sector by banks over time. The country was successful in increasing this measure for the whole period. It was 66% of GDP in 1985. It climbed to 127% of GDP by 2011.



Finally, Figure 14 shows China's Energy production over time. The country was successful in increasing its production for the whole period. It was 743,484 kts in 1985. It climbed to 2,432,505 kts by 2011.



3. The Factors that May Influence China’s Progress

Table 1 shows the Pearson correlation coefficients between the variables as well as the statistical significance values. For each variable, the correlation coefficient is shown at the top and the p-value is shown under it.

The first column shows the correlation coefficients between GDP per capita and each of the other variables. We will focus on this column because we are mainly interested in the correlation between each of these factors (i.e. patent applications, scientific and technical journal articles, etc.) and the country’s GDP per capita. The other columns show the correlation coefficients between the other variables (i.e. not GDP per capita). Due to space limitations, we modified the name of each factor in the table as shown below:

- Patent applications, residents: “Patent”
- Scientific and technical journal articles: “Scien.”
- Final consumption expenditure (% of GDP): “Fcons”
- General government final consumption expenditure (% of GDP): “Ggov”
- Gross capital formation (% of GDP): “Gcap”
- Gross domestic savings (% of GDP): “Gdom”
- Household final consumption expenditure (% of GDP): “House”
- Exports of goods and services (% of GDP): “Exp.”
- Age dependency ratio (% of working-age population): “Agedep”
- Official exchange rate (LCU per US\$, period average): “Offexc”
- Foreign direct investment, net inflows (% of GDP): “Fdir”
- Domestic credit to private sector by banks (% of GDP): “Dcred”
- Energy production (kt of oil equivalent): “Enprod”

Table 1. Pearson Correlation Coefficients

	GDP	Patent	Scien.	Fcons	Ggov	Gcap	Gdom	House	Exp.	Age	Offexc	Fordir	Dcred	Enprod
GDP	1													
Patent	0.93 <0.01	1												
Scien.	0.99 <0.01	0.96 <0.01	1											
Fcons	-0.90 <0.01	-0.81 <0.01	-0.89 <0.01	1										
Ggov	-0.46 0.02	-0.53 <0.01	-0.51 0.01	0.51 0.01	1									
Gcap	0.78 <0.01	0.81 <0.01	0.80 <0.01	-0.86 <0.01	-0.53 <0.01	1								
Gdom	0.90 <0.01	0.81 <0.01	0.89 <0.01	-1.00 <0.01	-0.51 0.01	0.86 <0.01	1							
House	-0.89 <0.01	-0.78 <0.01	-0.88 <0.01	0.99 <0.01	0.38 0.05	-0.83 <0.01	-0.99 <0.01	1						
Exp.	0.81 <0.01	0.59 <0.01	0.76 <0.01	-0.84 <0.01	-0.25 0.20	0.55 <0.01	0.84 <0.01	-0.86 <0.01	1					
Agedep	-0.96 <0.01	-0.82 <0.01	-0.94 <0.01	0.88 <0.01	0.38 0.05	-0.69 <0.01	-0.88 <0.01	0.89 <0.01	-0.91 <0.01	1				
Offexc	0.42 0.03	0.15 0.46	0.31 0.12	-0.49 0.01	0.20 0.32	0.21 0.29	0.49 0.01	-0.56 <0.01	0.69 <0.01	-0.49 0.01	1			
Fordir	0.48 0.01	0.34 0.09	0.41 0.03	-0.66 <0.01	0.02 0.93	0.55 <0.01	0.66 <0.01	-0.71 <0.01	0.60 <0.01	-0.46 0.01	0.77 <0.01	1		
Dcred	0.82 <0.01	0.65 <0.01	0.76 <0.01	-0.69 <0.01	-0.04 0.85	0.53 <0.01	0.69 <0.01	-0.74 <0.01	0.77 <0.01	-0.86 <0.01	0.67 <0.01	0.51 0.01	1	
Enprod	0.99 <0.01	0.93 <0.01	0.99 <0.01	-0.93 <0.01	-0.50 0.01	0.81 <0.01	0.93 <0.01	-0.91 <0.01	0.83 <0.01	-0.96 <0.01	0.40 0.04	0.49 0.01	0.79 <0.01	1

First we can look at Patent applications and Scientific and technical journal articles. Both of these variables are positively correlated to GDP per capita. The correlation coefficients are 0.93 (p-value<0.01) and 0.99 (p-value<0.01). Therefore, both are significantly correlated to GDP per capita at 1% level. There is a positive and significant correlation between scientific activities and GDP per capita. As we know from the previous graphs, China's GDP per capita as well as the two scientific achievement variables (i.e. Patent applications and Scientific and technical journal articles) have all continuously gone up during the 1985-2012 period. China did a good job in terms of increasing its number of scientific achievements which in turn is positively correlated to GDP per capita.

When we look at the consumption variables, Final consumption expenditure, General government final consumption expenditure, and Household final consumption expenditure, we are seeing that all three are significantly and negatively correlated to GDP per capita. The coefficients are -0.90 (p-value<0.01), -0.46 (p-value=0.02), and -0.89 (p-value<0.01), respectively. Therefore, for China, more consumption means lower GDP per capita. As we know from the previous graphs, China has lowered its Final consumption expenditure (i.e. total consumption) as well as its household consumption during the 1985-2012 period. We can say that China did well in reducing its consumption which has a negative correlation with GDP per capita.

The correlation coefficients for both Gross capital formation and Gross domestic savings are positive and significant. The coefficients are 0.78 (p-value<0.01), and 0.90 (p-value<0.01), respectively. Therefore, both capital formation and domestic savings are significantly and positively correlated to GDP per capita (as expected). From the previous graphs, we know that China has increased both capital formation and domestic savings throughout the 1985-2012 period. This was beneficial to China's GDP per capita.

The correlation coefficient for Exports is positive and significant. It is 0.81 (p-value<0.01). The coefficient for Official exchange rate is also positive and significant (coefficient=0.42, p-value=0.03). The exchange rate may affect exports and other items. From the previous graphs, we know that China's exports went up until 2006. Then, it started to go down. This may be due to the exchange rate between US\$ and Chinese currency. We know from the exchange rate graph that Chinese currency was more valuable in the initial years; then it started to lose value (i.e. the exchange rate went up) until 1994. Then, China kept it almost fixed, as we know, up until 2005- 2006. After that, due to the pressures by U.S., it started increasing the value of its currency (i.e. the rate went down).

Possibly because of this increase in the relative value of Chinese currency, Chinese exports started to decline after 2007. But, for most of the 1985-2012 period (except for the 2007-2012 period), China did very well in exports. Here, we are seeing that there is a positive and significant correlation between Exports and GDP per capita for China, therefore its efforts from 1985-2007 has been supporting the increase in its GDP per capita.

The coefficient for Age dependency ratio is negative and significant (coefficient=-0.96, p-value<0.01). China was successful in reducing the Age dependency ratio for the whole period which is negatively correlated to its GDP per capita.

The coefficient for Foreign direct investment is positive and significant (coefficient=0.48, p-value=0.01). China was successful in increasing its inflows for the whole period although there was some decline after 1993.

The coefficient for Domestic credit to private sector by banks is positive and significant (coefficient=0.82, p-value<0.01). As we know from a previous graph, China was successful in increasing this measure which is positively correlated to its GDP per capita.

The coefficient for Energy production is positive and significant (coefficient=0.99, p-value<0.01). As we know from figure 14 that China was successful in increasing its production which is positively correlated to its GDP per capita.

Overall, China has improved all of these measures over the 1985-2012 period. These measures are all significantly correlated to its GDP per capita.

4. China's Governance Indicators

We examine all six governance measures that are included in World Bank's Worldwide Governance Indicators dataset. These measures are Government Effectiveness, Control of Corruption, Political Stability and Absence of Violence/Terrorism, Regulatory Quality, Rule of Law, and Voice and Accountability. The dataset only covers the period after 1996, so our graphs start in year 1996. There was no measurement in 1997, 1999, and 2001; therefore we decided to extrapolate for those missing data. The definitions of each measure as defined by the dataset are below:

Government Effectiveness:

Reflects perceptions of the quality of public services, the quality of the civil service and the degree of its independence from political pressures, the quality of policy formulation and implementation, and the credibility of the government's commitment to such policies.

Control of Corruption:

Reflects perceptions of the extent to which public power is exercised for private gain, including both petty and grand forms of corruption, as well as "capture" of the state by elites and private interests.

Political Stability and Absence of Violence/Terrorism:

Reflects perceptions of the likelihood that the government will be destabilized or overthrown by unconstitutional or violent means, including politically-motivated violence and terrorism.

Regulatory Quality:

Reflects perceptions of the ability of the government to formulate and implement sound policies and regulations that permit and promote private sector development.

Rule of Law:

Reflects perceptions of the extent to which agents have confidence in and abide by the rules of society, and in particular the quality of contract enforcement, property rights, the police, and the courts, as well as the likelihood of crime and violence.

Voice and Accountability:

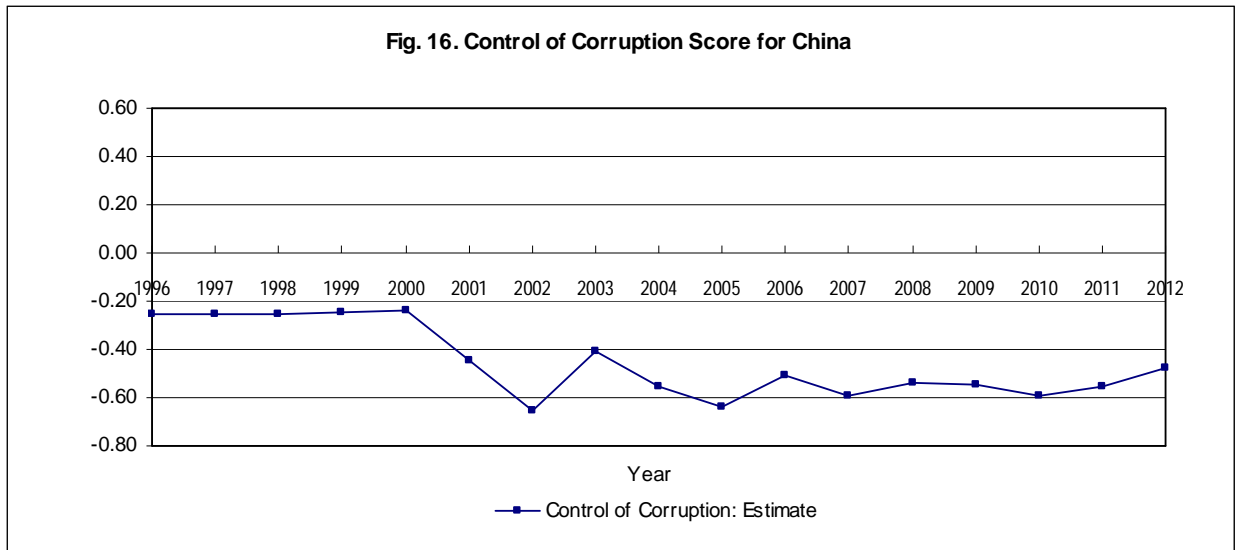
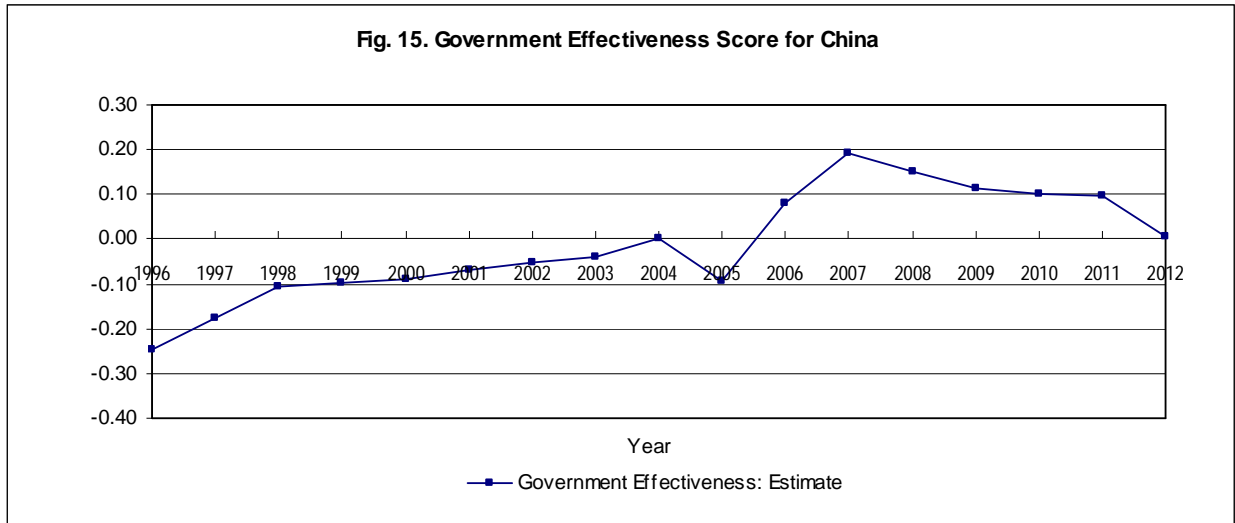
Reflects perceptions of the extent to which a country's citizens are able to participate in selecting their government, as well as freedom of expression, freedom of association, and a free media.

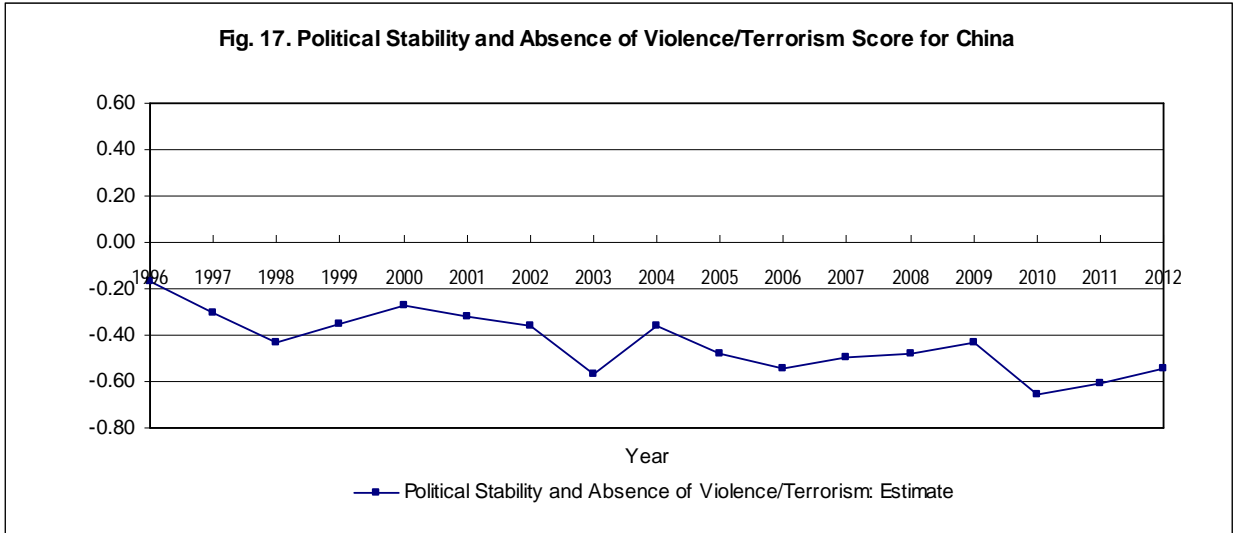
Figures 15-20 show China's score from each governance measure for the period 1985-2012.

Figure 15 shows that China has improved in Government Effectiveness measure during this period. In fact, as we will look at the other measures, we will see that this is the only governance measure that China has improved upon. China's Government Effectiveness score improved from a score of -0.25 in 1996 to 0.19 by 2007. After 2007, it dropped back to 0.01 by 2012. So, although it improved a lot in this measure, after 2007, this score dropped continuously.

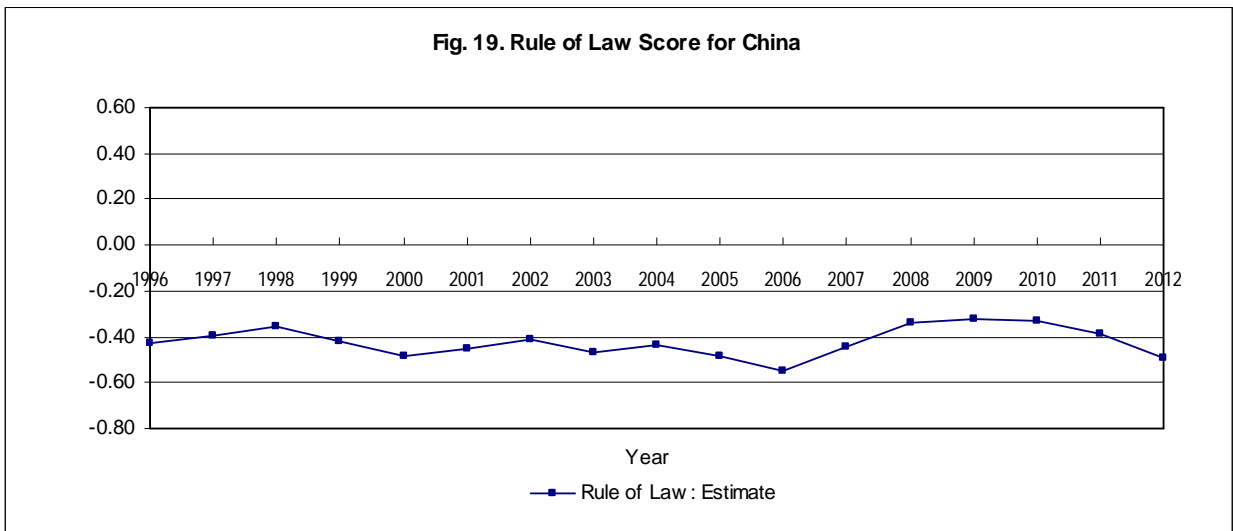
Figure 16 shows that China's Control of Corruption gradually decreased for the period. The score was -0.25 in 1996. It dropped to -0.48 by 2012. So, in terms of corruption, China started losing ground after 2000 (it was flat before that year).

Figure 17 shows that China's Political Stability and Absence of Violence/Terrorism score has also gradually worsened. The country's score in this measure was -0.17 in 1996. It dropped to -0.54 by 2012.





Figures 18 and 19 show China’s Regulatory Quality, and Rule of Law scores, respectively. Both scores went down initially, but came back up by 2012. So, with regard to these measures, China’s performance was flat.



Finally, figure 20 shows China’s Voice and Accountability score. Similar to Control of Corruption and Political Stability and Absence of Violence/Terrorism scores, this score has also gradually declined. It was -1.29 in 1996. It gradually dropped to -1.58 by 2012.

To summarize, we can conclude that except for the Government Effectiveness measure, China either declined or stayed flat in all governance measures.



5. Conclusion

In this study, we examine China’s development over the 1985-2012 period and attempt to find the factors that affect its development. We also look at its governance indicators over time including its Government Effectiveness, Control of Corruption, Political Stability and Absence of Violence/Terrorism, Regulatory Quality, Rule of Law, and Voice and Accountability scores as measured by World Bank’s Worldwide Governance Indicators dataset.

We find that the number of patent applications, the number of scientific and technical journal articles, the gross capital formation, the gross domestic savings, the exports of goods and services, the official exchange rate for its currency, the foreign direct investments made in the country, the domestic credit to private sector by banks, and the energy production each have a positive and statistically significant correlation with China’s GDP per capita.

On the other hand, the final consumption expenditure, the general government final consumption expenditure, the household final consumption expenditure, and the age dependency ratio each have a negative and statistically significant correlation with China’s GDP per capita.

Except for the recent decline in exports and the failure to attract foreign direct investments, China seems to do exceptionally well in all fronts. Interestingly, this period of rapid advancement coincides with generally worsening corruption, political stability, and voice and accountability measures. Although these factors have not deterred China’s advancement yet, they may hinder it in the near future.

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