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# The Analysis of the China National Logistics Costs Structure

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### KEYWORDS

Logistics costs,  
Transportation costs,  
Storage costs,  
PPI,  
Vertical integration

### ABSTRACT

This paper analyses the national total logistics costs growth and structure, from the statistics points of view. The findings prove that the method of reducing transportation costs in order to decrease the logistics costs and also logistics costs as percentage of GDP is not conclusive. The analysis of changes in inventory costs and administrative costs indicate that institutional factors should be paid more attention. Specific methods should be taken to reduce the logistics costs.

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## 1 Introduction

Logistics has been recognized as one of the major production services in China, because of its great impacts on the Chinese modern economic system. The costs occurred from production activities can be seen as the essential characteristics of logistics, and they have been drawing researchers' attention. Chang Dongliang (2008), in his book "Empirical study of accounting of logistics costs", integrates the principals of accounting practice and the performance measurement, and introduced the two dimensions of logistics cost calculations, i.e. microeconomic method and macroeconomic method. Comparing to the microeconomic method, the macroeconomic method is more accurate in terms of data quality, data availability and mathematical precision. Generally speaking, the macroeconomic logistics cost estimation method includes three main cost indicators: transportation costs, storage costs and administrative costs. The sum of those three costs contributes to the total logistics costs which are widely applied for logistics measurements.

The analysis of logistics costs and elements play significant roles in understanding the overall national logistics industry, identifying its current stages, finding main problems, and suggesting valid solutions. Commonly, total national logistics costs have accounted for about 18% of the GDP values of China, since years ago. This number is 6.8% higher than the average number in the world. This logistics costs to GDP ratio is higher not only than developed countries', such as USA (8.5%), Japan (8.7%), and Germany (8.3%), but also BRICS, such as India (13%) and Brazil (11%). The recent main stream proposals to cut the logistics costs are mainly focused on cutting corporate taxes, reducing toll road charges, and decreasing relevant business expenses. Yet, according to the findings from research, the above proposals are not convincing. A more rigorous analysis regarding the recent movements and vertical analysis in transportation costs, inventory costs, and administrative costs should be taken when examining and suggesting the policies to cut total cost of logistics.

For example, it is not difficult to find that China's economic growth depended more on manufacturing and exporting than India and Brazil did, hence, the logistics costs in China were reasonable higher than India and Brazil were. Moreover, considering the

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investments in Chinese logistics infrastructure were less than developed countries, it is more likely that China have higher logistics costs. In order to suggest proper policies, this research uses the methodology that focusing on the structure and movement of the expenses on transport, inventory, and administration, and to deduct the main reasons and bottleneck issues create rapid increased national logistics costs. Consequently, the police makers are able to break the bottleneck problems and improve efficiency. This following paper will illustrate from the perspectives of “structure” and “amount”.

## 2 Total Logistics Costs Analysis

According to the *National Development and Reform Commission Website Bulletin in 2012*, the national total logistics costs was 18% of GDP in 2012, which had a year-on-year increase of 0.2%. As commented by the ‘Logistics and Purchasing Association’s Report’, ‘the operational logistics costs remain high (Chinese in original)’. As shown in the Figure 1, the national logistics costs as percentage of GDP stood at around 18% which was 9% higher than to the United States.

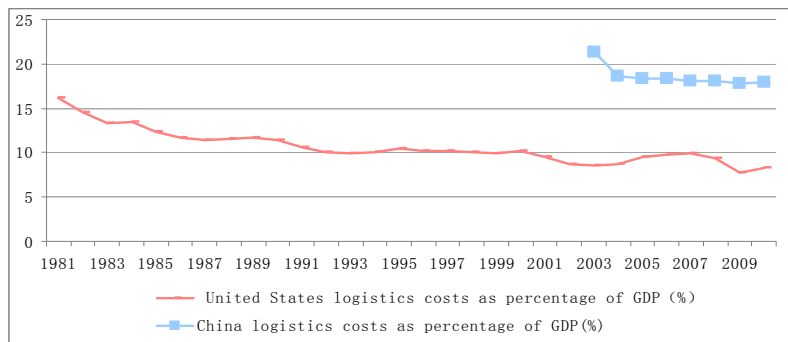


Figure 1 Logistics costs as percentage of GDP in China and the US

The majority believes that low logistics operational efficiency and overall high taxation levels in China are the main reasons caused the differences in logistics costs between China and developed countries. Therefore, some recommended that reducing taxes and improving technologies, and investing infrasutcture are able to fill these gaps. The above agruments are reasonable because the high taxation and other barriers result in numberious vehicals overload and overspeed, and also drivers work overtime. Yet, the facts shows that the level of logistics costs of GDP alone may be just a periodic indicator. Even in the developed countries, such as the US, the same ratios were higher than 16% in 1980s. Thus, comparing with the US in 1970-1980s, which in the same industrialization level as current China, it seems to be accpetable that China had a 18% ratio.

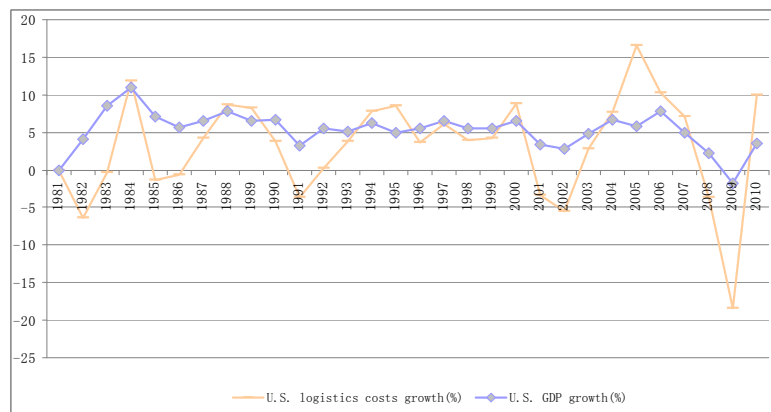
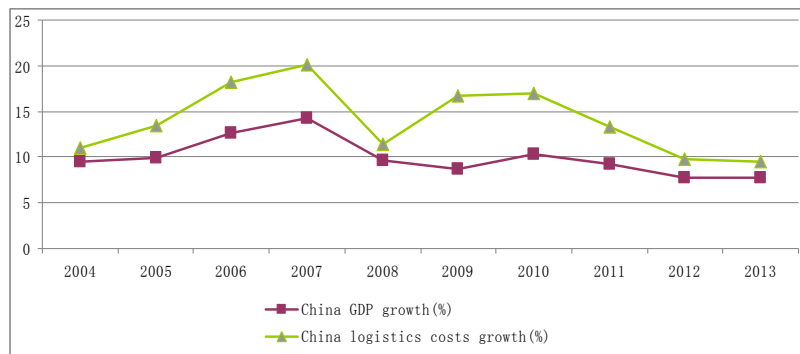


Figure 2 The U.S. logistics costs growth and GDP growth form 1981 to 2011

In order to analyze the logistics costs of GDP between China and the US, comparing the total logistics costs growth with GDP growth in both country can help in understanding. Firstly, in 1980-1980 of nearly 30 years, American logistics costs growthes were lower than GDP growthes. Even in economic boom periods, logistics costs growth shared the same level with GDP growth. Furthermore, when the US economic shows a decrease in GDP growth, such as in 1986, 1991, and 2002, the total logistics presented a even high growthes. As a result, the logistics costs as a proportion of GDP has declined without doubts.

Considering the fact that the U.S. has basically entered the post-industrial era, since the 1980 s, the amount of industrial production has been limited, and the economic growth was mainly depended on the consumption and financial services. The logistics demand from manufacturing declined. The effect was that the business opportunities in logistics industry largely come from external

environment. For instance, the Internet bubble burst in 2001 and the subprime crisis in 2008 led to logistics costs growth's declines being greater than the GDP growth's fallbacks. On the other hand, for example, during 2003 to 2006, the logistics costs grew faster than GDP because of the emergence of electronic commerce associated with the business expansions in express industry. From long-term observations, growth factors, including logistics and other supply industries, generally stay slightly higher than the growth of GDP, while logistics costs grows slowly than GDP growth. This clearly observed in the processes of developments of logistics industry in the US. For this reason, it can be predicted that in the future, with the deepening of Chinese industrialization and urbanization, the empirical facts can also be revealed in China. When the economy development reaches a certain point, which at the point transformation from industrial and to post-industrial, the economic growth will certainly fall, and the logistics costs growth will fall as well. Technology innovation or transformation of business will become the dominant determinants in driving industry's expansion and contraction.



**Figure 3 China logistics costs growth and GDP growth from 2004 to 2012**

The differences are obvious when contrasting the logistics costs growth against the GDP growth in China and in the US. Firstly, China's logistics cost is higher than GDP growth, suggesting China's logistics industry is in its technology and business expansion stage. Otherwise, it is difficult to guarantee the logistics costs growth is significantly higher than GDP growth. However, this option is not to deny the possibilities of heavy taxes causing high logistics costs. However, tax factors have limited influences, because the taxes basically have the identical effects on the costs growth year to year. Moreover, in facts, taxes affect not only logistics industry, but also on the other industries growth against GDP growth.

To sum up, the differences between Chinese and American logistics costs growths and GDP growths can be explored from the perspective of "amount". The US as a developed country has a stable economic system, showing a stable input and output in its production chain without large scale capital investment. On the other hand in China, production depends largely on the capital investment at early stage, such as infrastructure construction, technology upgrading, and equipment and facilities improvement. Logistics industry services not only logistics function, but also the infrastructure construction. In other words, Chinese logistics provide services not only for the products "made in China", but also facilities the enterprise to provide services "made in China".

Therefore, the current Chinese logistics stage exists in the US logistics development process. In China, the rise of e-commerce provides business opportunities for logistics; meanwhile, the big data analytics will greatly improve logistics operation efficiency. For example, e-commerce drives the construction of logistics infrastructure, such as Ma Yun's 'rookie' project. These construction projects directly or indirectly lead to a higher logistics costs. China will be at industrialization stage for years, thus this will impact positively on the growth in logistics costs continuously. In the long term, the ratio will decrease after completed infrastructure construction and achieved a stable economic system.

### 3 Logistics Costs Structural Analysis

The analysis of national logistics costs components have significant importance in governance policies making. China's logistics costs components are relatively stable. The research analyses the proportion of transportation costs, inventory costs, and administration costs of the total logistics costs, from 2005 to 2012. The statistical finding, as shown in the Figure 4, illustrates that the three costs proportions are very consistent in these 8 years, accordingly in 54.1%, 33.2%, and 12.7%. This finding indicates that there is unlikely to find a valid overall strategy to reduce the total costs, unless the proportions of each components shift dramatically.

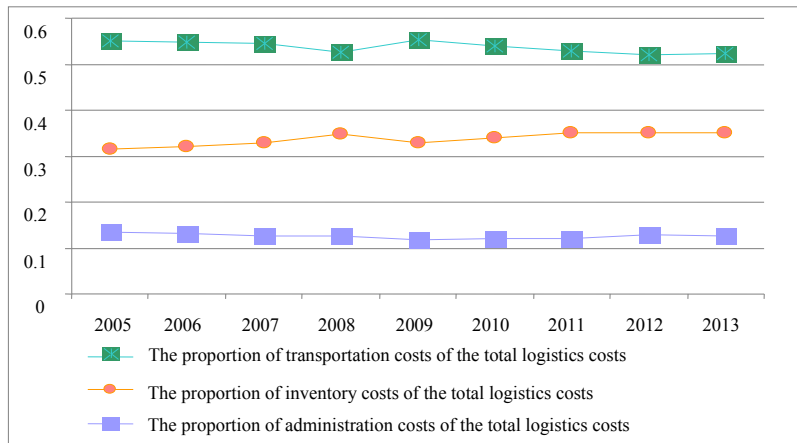


Figure 4 Three costs as percentage of total logistics costs

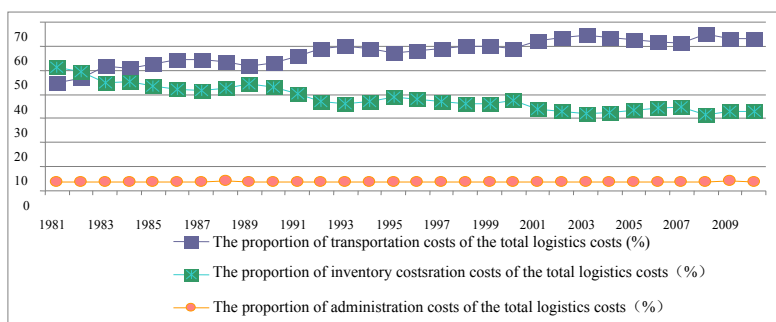


Figure 5 Proportion chart of U.S. logistics costs (1981-2010)

### 3.1 Transportation costs

Some argues that high transportation costs are due to high toll roads charges. Yet, there are doubts about this argument. Transportation costs accounted for 50% to 60% in the US logistics costs, from 1980 to 2010, consistenting with the current situation in China. Whereas, although US trasport costs increased, the total logistics costs to GDP ratio remianed decreased. Nevertheless, the inventory cost accounted about 30% to 40% in the given period, which is similar with China current situation. Though, the Chinese porpotion of administrative costs are almost two times of the USA's, both countries' porpotions are steady. To sum up, if we need to discuss the structure of each component, it is more suitable to examine the relations between transportation costs and administrative costs, rather than focus too much on the changes on administrative solely.

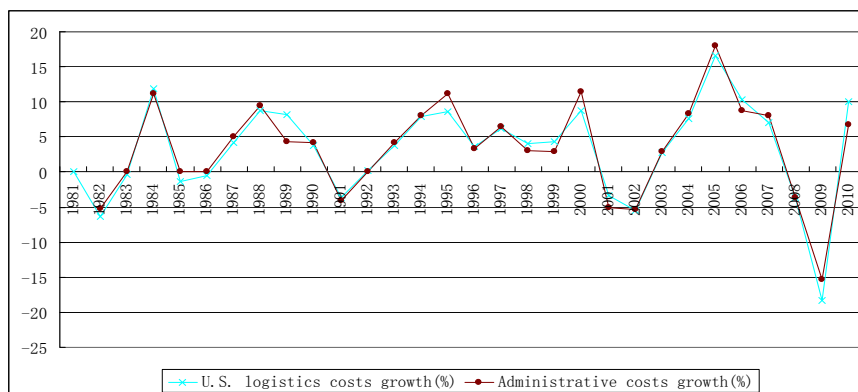


Figure 6 Administrative costs growth and logistics cost growth in U.S., from 1981 to 2010

### 3.2 Administrative costs

Initially, the contribution of administrative costs to total logistics costs growth should be analysed. Obviously, administrative costs have positive but weak effects on total logistics costs. This has been recognised as a typical mature economy indicator. It is inconclusive to cities that China has an over high administrative costs. The first reason is that Chinese overall economic level

determined that the governing system in logistics industry needs to be improved. Secondly, growth rates of administrative costs are even lower than the growth rate of total logistics, proving that administrative costs have been drawing policy makers' attentions. Affected by the economic incentive policy in 2009, administrative costs have the tendency of extension. It shows that the economic incentives slows economic structure transformation and reduces the enterprise's desire to promote operation efficiency.

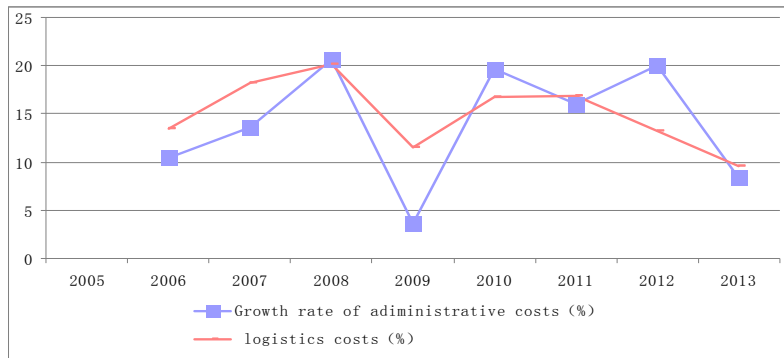


Figure 7 Growth rate of administrative costs and logistics costs in China, from 2005 to 2012

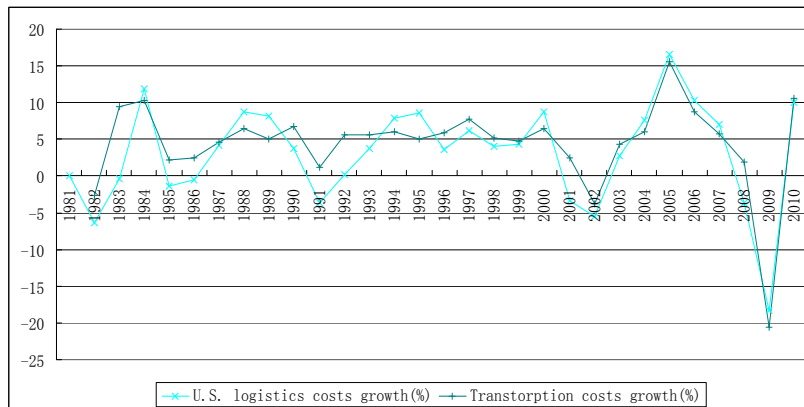


Figure 8 The U.S. transportation cost growth rate and total logistics cost growth rate, from 1981 to 2010

From the growth rates of transportation costs and inventory costs against total logistics costs, the transportation costs growth rates were slightly higher than total logistics costs growth rates before 2000 in the US. The proportion of the transportation costs was even higher than current Chinese transportation costs proportion, but these facts does not increase the overall US logistics costs. Comparitively speaking, from 2005 to 2012, the trends of growths of transportation costs were consistent with the growths of total logistics costs, but 1% -2 % lower. The dramatic changes in 2009 was mainly due to the short-term impacts caused by a few external policies. At that time, the state department started the fuel tax reform, and canceled the roads fees for the secondary road. However, after the 2009 short-term policy impacts, transportation costs still weight heavily in total logistics. The evidences suggeste the share of the costs relations is quite stable. Moreover, it shows that logistics industry marketization degree was high, and it can effectively resolve the impacts of short-term external policies. The tendency of the administrative costs have the similar experiences.

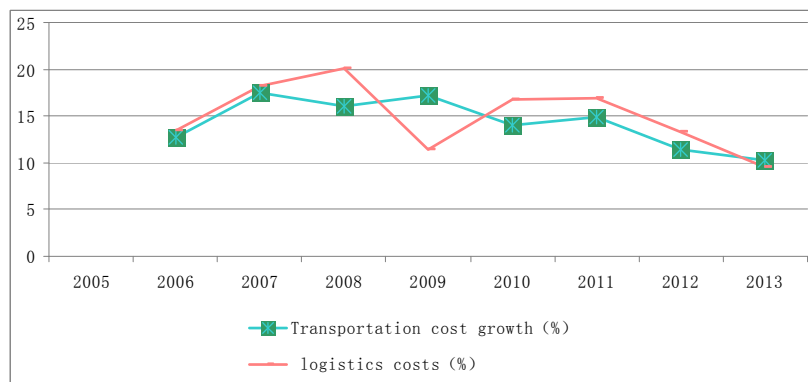


Figure 9 Transportation cost growth and logistics cost growth in 2005-2013

### 3.3 Inventory costs

For both China and the US logistics costs growth, inventory costs contribute the most. Thus, cuts of the fuel prices and toll roads charges have limited effects on the reduction of logistics costs growth. As shown in the Figure 10, the inventory costs growth rates were normally higher than the growth rates of total logistics costs, except the case that policies intervened in 2009. Nevertheless, though transportation costs are accounted more than inventory costs, the growth rates of transportation costs were lower than growth rates of inventory costs, and even lower than the growth rates of total logistics costs. In conclusion, the continually increased administrative costs are the direct factor that increases the proportions of logistics costs of GDP. The savings from transportation have been covered by the growths in administrative costs.

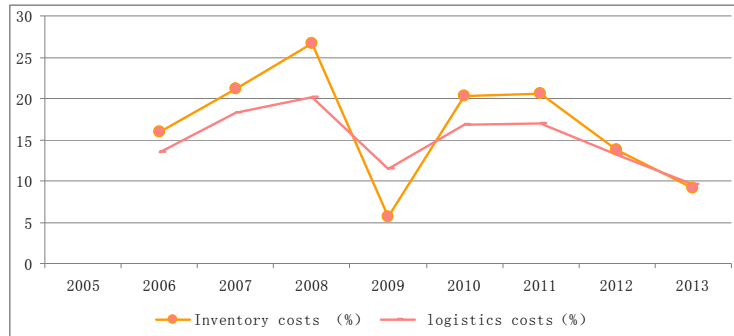


Figure 10 Inventory costs impact on logistics costs' growth, 2006-2012

The inventory costs growth were higher than the other two, there was a jump after 2008, then slowed down after the governance intervene in 2009, but the costs have gone back to a high levels since 2010, and reached a peak point in 2012. The reason for the big jump in 2008 was the fiscal and tax policies and external taxes. This was started at the end 2007, when the policy called 'The ministry of finance, state administration of taxation on tax, town land royalties of relevant policies notice' released. This policy increased the taxes on logistics using land, thus affected the proportion administrative costs took in logistics costs. An illustration of this policy is that warehousing related revenues must pay 5% business tax. The warehouse rental incomes are required to pay a 12% income tax and a 5% business tax. Nevertheless, the charges for logistics purpose land share the same charges standards as commercial used land, which is about 10 times higher than normal industrial using land. Therefore, also considering the inflation in rental costs, the above facts led to the increments in inventory costs.

In fact, the series of charges and taxes discussed above are caused by the increasing inventory costs, recognised as paradox interaction. Although Chinese government had released the "business tax to value added tax revolution", it is more likely that administrative costs will continually increase. With regard to the warehousing land demands are huge, taxation is too high to be covered by profits in the short term, and thus, the fact is enterprises are struggling to bear the stresses. In other words, the increasing costs in fuel and toll roads are only the tip of iceberg, and the undeveloped governing system and institutional faults in Chinese current logistics industry are the iceberg itself.

The analysis of the relationship between Producer Price Index (PPI) and logistics costs can help to understand the logistics industry from the manufactures perspective. PPI is a family of indexes that measures the average change in selling prices received by domestic producers of goods and services over time. PPIs measure price change from the perspective of the seller. Generally, producing a product need to go through three stages, i.e. raw materials, work-in-process products, and finished goods. PPIs are used to predict the costs for a product in each three stages. The final prices are usually the mark-up on producers' costs. Hence, retailers are more likely to charge the added costs to customers.

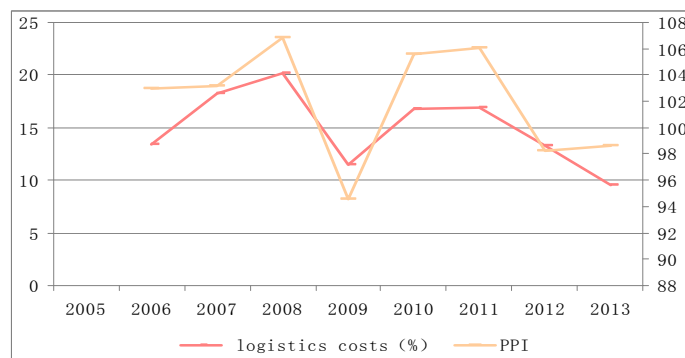
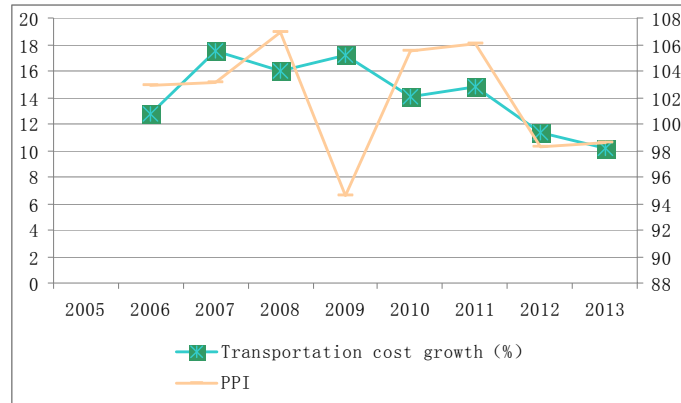


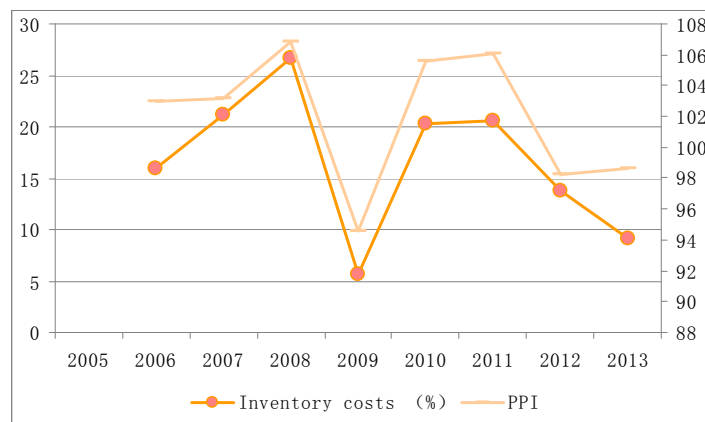
Figure 11 Logistics costs growth and PPI, 2005-2012

First of all, as shown in the Figure 12, transportation costs do not have a liner relationship with PPI. For example, from 2006 to 2008, PPI showed a healthy performance in production activities, the transportation costs were lower as the bargaining power of manufacturers to distributors were higher when the inventory level kept low, which will be proved in the following discussion. PPIs were consistent with GDP declines in the economic crisis between 2008 and 2009, but the policy incitation promoted the transportation costs. Since 2009, PPI has recovered to the previous level, but transportation costs began to decrease due to withdrawal of the policy incitation.



**Figure 12 Transportation cost growth and PPI 2005-2012**

Obviously, the growth speed of inventory costs appear consistency changes with the growth tendency of PPI. This consistency proves the previous theory that during the booming economy, the inventory level will be kept in a low status, but the level of material liquidity will stay high instead. In a result, the PPI and the contribution rates of inventory costs will both stay in a high level. In the opposite end, this correlation will change under a depression or fluctuant economy background. The inventory level will increase and boost the pressure of de-stocking. Both the PPI and the contribution rate of inventory costs will decrease.



**Figure 13 Inventory costs and PPI 2006-2012**

The growth rates of administrative expenses have consistent changes with the PPI until 2010, these two data moved to adverse direction. These phenomena presented the restructuring of China's economy. The traditional elements input into the economic structure met the growth ceiling. The sign of the reconstruction among logistics industries is the ascend of contribution rate and the descend of PPI, started from the beginning of 2010. This sign informed that the inside modulation has archived certain level. This tendency would possibly last three to five years.

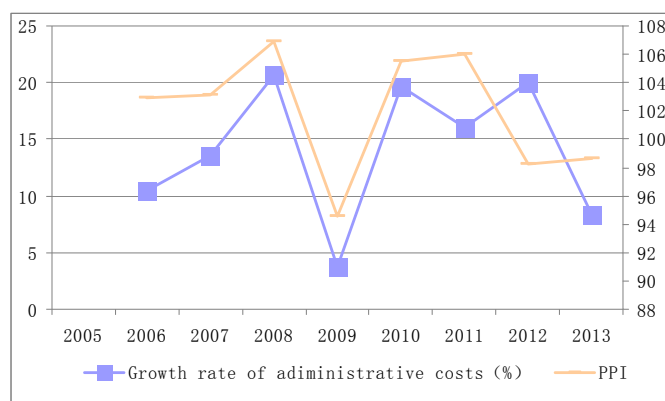


Figure 14 Administrative cost and PPI 2005-2012

## 4 Conclusion

In the recent years, most of researchers and Medias have all agreed on the high transportation expense, especially the highway tolls and the raise of fuel prices, kept the logistic expense a high percentage in the GDP. Also, the logistic expenses have owned a large percentage in the final pricing section of products, under the high CPI status background. Result in the focusing on ‘logistic persistent ailment’ from the whole society and Medias. The common suggests about decreasing the transportation expense became the consistent voice.

Luo Jianren, Guo Xiaopei and their research teams have pointed two factors about establish the integration service and bring out the potential of the basic foundation of market—Firstly, to bring out the full potential of the basic function in distributing the transportation resources. Secondly, is to establish and enhance the integration service. The land resource has been the restriction to the logistics industries under the certain policies, but the improvement of logistics technology development and supply service standard are more dominant in the process. To look further in logistics market, to accomplish the goal that improve the whole logistic market efficiency, to perfect the vertical integration process, and to add the intermediate link into the both initial and final pricing session are the most important goals.

Wang Qinyun examined the Chinese logistic industries policy process, in his opinion, the development of logistics industries are based on the material circulation under the planned economy to the newborn logistic market in the market economy. So the newborn logistics market still has plenty of planning economy characteristics. To analyze the costs of the logistic industry, and to improve the efficiency and beneficial result, the innovation in the policy and system lays is desired. It also needs to accord with the objective law of the logistic development and the Chinese economy actuality. Essentially, the costs of inventory in the logistic industries connect with the local government competitive mode. It also correlated with the fiscal and taxation pattern in the both local government and Central Committee of the Communist Party. As a result, the change in the policy will also solve the problems, such as gradually completing the tax and fiscal policy relate to the logistics. This will solve the flaws in a long perspective.

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