

## Research on the Relationship Between Logistics Investment and National Economic Development of China

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**Abstract:** By comparing the impact of the logistics industry investment on the national economy, and the impact of the logistics investment and the transportation investment on the national economy, we find that the transportation system investments as a part of logistics industry investment, its driving effect to the national economy is greater than that of the overall logistics investment. The driving effect of the transportation investment to the national economy was reducing. In the future development of logistics, on the one hand, we must build and improve infrastructure, improve the hardware conditions of logistics; more importantly, we should improve the logistics organization, strive to improve logistics efficiency.

**Key words:** National economy; Logistics investment; Transportation investment; Growth rate

### 1 Introduction

The logistics industry is an emerging composite industry, it includes transportation, warehousing, distribution and processing sectors. Internationally, the logistics industry is considered as the artery and basic industry of the national economic development. <sup>[1]</sup>Logistics industry development and its infrastructure are inseparable, especially with its transportation infrastructure. Many domestic and foreign scholars have studied the promoting role of transportation investment in national economic development, such as Huang<sup>[2]</sup>; Wang<sup>[3]</sup>; Berechman <sup>[4]</sup>; Nakamura <sup>[5]</sup>; Akinyemi <sup>[6]</sup>. But there are few researches on the relationship between logistics industry investment and national economy. And much fewer comparative studies are there on the impact of the national economy between the transportation investment and the logistics investment. This article just starts the research from this point.

Compilation of the Logistics Statistical Yearbook in China began in 1991, so we can collect data on the logistics industry also from 1991. In view of the important position of the transportation in the logistics industry development, in this paper, we use the data of the transportation system investment as that of the logistics industry investment before 1991.

### 2 Transportation Investment and National Economy from 1978 to 1990

From 1978 to 1990, the investment in China's transport system increased to 180.53 billion Yuan from the 24.8 billion Yuan; In the beginning, its proportion in the national economy was small, after 1984, the transport system investment proportion in GDP had increased and it reached the peak in 1986, more than 1%, then it was maintained at about 0.8% later.

**Table 1 1978 -1990 The Transportation System Investment and GDP at 1978 Prices**

Year	GDP	(1)	(2)	Year	GDP	(1)	(2)
1978	3645.20	24.800	0.0068	1985	7036.76	53.064	0.0075
1979	3922.24	25.033	0.0064	1986	7656.00	76.186	0.0100
1980	4228.17	22.266	0.0053	1987	8544.09	81.826	0.0096
1981	4448.03	17.649	0.0040	1988	9509.57	77.808	0.0082
1982	4852.81	22.464	0.0046	1989	9899.47	74.253	0.0075
1983	5381.76	25.654	0.0048	1990	10275.65	83.299	0.0081
1984	6199.79	43.668	0.0070				

Source: Based on China compendium of statistics 1949-1999; 2005 Year book of China transportation and communications. Where (1) is the transportation system investment ;(2)is the proportion in GDP  
Unit: billion Yuan

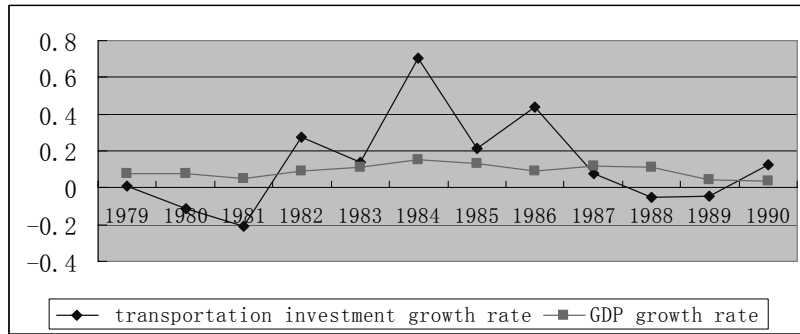


Figure 1 Transportation Investment Growth Rate and GDP Growth Rate in 1979-1990

Figure 1 reflects the relationship between the transportation investment growth rate and GDP growth rate from 1979 to 1990. The transportation investment growth rate and GDP growth rate are positively correlated in this phase, and the correlation coefficient is 0.5980. We can see a great variance between transportation investment growth and GDP growth rate in the figures. The maximum difference between "peak" and "valley" of transportation investment growth rate is higher than 0.9, but the changes in GDP growth rate is relatively stable, the maximum difference between "peaks" and "valley" is only about 0.1, but the direction of change is roughly the same. In 1981 the GDP growth rate was only 5.2%, and the transportation investment had a negative growth; The GDP growth in 1984 was 15.2%, and the transportation investment was 70.22%. From the Asian financial crisis in 1987, the GDP growth rate decreases sharply in the subsequent two years. While China adopted a proactive fiscal policy in response to the financial crisis, to increase infrastructure construction and domestic demand, the transport investment growth rate improved on the contrary.

According to Table 1 data, we establish the linear regression equation of transport investment and GDP :

$$y = 2482.276 + 84.9242x \tag{1}$$

(5.3787) (10.0714)

In the formula,  $Y$  is GDP,  $X$  is the transportation investment. Where  $R^2 = 0.9022$ , after adjusting  $R^2 = 0.8933$ , the goodness of fit is high,  $t$  of  $X$  in the model is 10.0714,  $t$  of constant term is 5.3787, they all are bigger than  $t_{0.05} = 1.7959$  and can pass the test with critical value = 5%. The value of  $F$  is 101.4335, adjoint probability is 0.000001, the overall effect of the linear regression is significant. In this regression equation, the coefficients of  $X$  is 84.9242. It shows that, when the transport investment growth rate increases by one unit (10 thousand Yuan), GDP increases by 84.9242 units (849,242 Yuan)

### 3 Logistics Investment and National Economy from 1991 to 2006

China's logistics industry investment and its proportion in the national economy made a steady growth from 1991 to 2006. The logistics industry investment in 1991 was 35.75 billion Yuan, accounting for 1.65% of GDP. The logistics industry investment in 2006 was 1.21694 trillion Yuan, it was thirty-four times that of 1991, and the proportion in GDP also increased to 5.74%.

Table 2 1991-2006 The Logistics Investment and GDP at 1978 Prices

year	GDP	(1)	(2)	(3)	year	GDP	(1)	(2)	(3)
1991	11221.0	159.6	0.014	133.8	1999	25552.9	816.5	0.032	731.29
1992	12814.4	272.6	0.021	208.3	2000	27699.4	818.1	0.030	735.26
1993	14608.4	393.3	0.027	325.7	2001	29998.4	904.3	0.030	820.39
1994	16522.1	450.1	0.027	378.6	2002	32728.3	1049.2	0.032	957.35
1995	18323.0	433.7	0.024	369.9	2003	36001.1	1273.8	0.035	1106.82
1996	20155.3	469.6	0.023	412.8	2004	39637.2	1659	0.042	1384.89
1997	22029.8	535	0.024	477.6	2005	43759.5	2002.8	0.046	1670.17
1998	23748.1	775	0.033	702.2	2006	48616.8	2583.7	0.053	2075.35

Source: Based on China compendium of statistics 2009; 2005 Year book of China transportation and communications. Where (1) is the logistics investment; (2) is the proportion in GDP; (3) is the transportation investment

Unit: billion Yuan

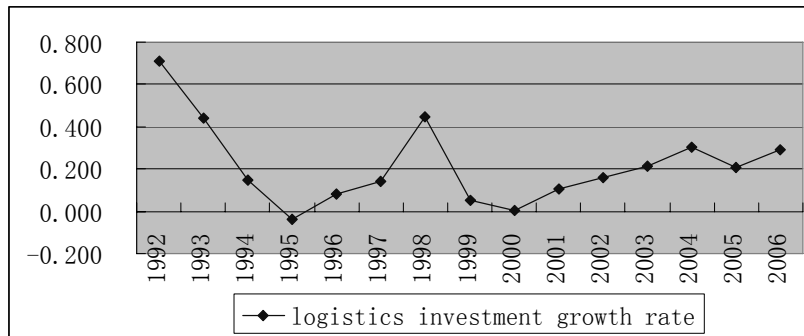


Figure 2 Logistics Investment Growth Rate in 1991-2006

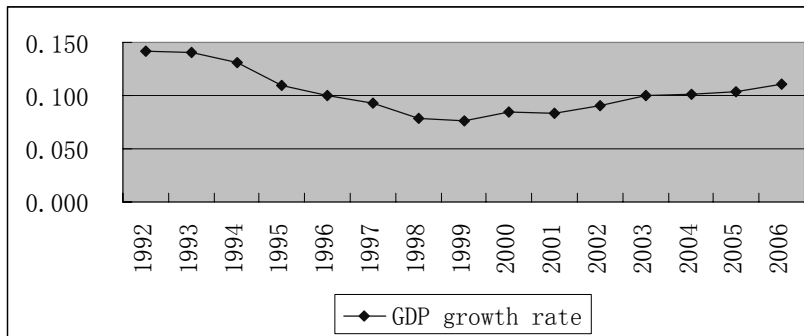


Figure 3 GDP Growth Rate in 1991 -2006

Figures 2 and 3 reflect the relationship between the logistics investment growth rate and GDP growth rate from 1992 to 2006. Same as the previous stage, there is a big difference between the the growth rate changes of logistics industry investment and GDP. The maximum difference between the "peak" and "valley" of logistics investment growth rate is about 0.74, and the variance of GDP growth rate is only about 0.066. Although the fluctuation range of the logistics investment is relatively severe, it dropped in the years after the Asian financial crisis. In 1998, the investment growth in the logistics industry reached a new peak, mainly in transport infrastructure. Transportation facilities investment was 211.3 billion Yuan in 1997, it rose to 308.2 billion Yuan and increased nearly 50% in 1998. The next few years, the railway mileage and highway mileage all increased much more. Except for the prominent growth rate of the logistics industry investment in 1988, the change direction of logistics investment and GDP is roughly the same, they are positively correlated in this phase, and the correlation coefficient is 0.5980.

According to the data in Table 2, we establish the linear regression equation of logistics investment and GDP:

$$y = 11649.15 + 16.2387x \tag{2}$$

(9.2758) (14.4815)

In the formula,  $Y$  is GDP,  $X$  is the logistics investment. Where  $R^2 = 0.9374$ , adjusted  $R^2 = 0.9330$ , the goodness of fit is high,  $t$  of  $X$  in the model is 14.4815,  $t$  of constant term is 9.2758, they are bigger than  $t_{0.05} = 1.7613$  and can pass the test with critical value = 5%, the value of  $F$  is 209.7127, adjoint probability is 0, The overall effect of the linear regression is significant. In this regression equation, the coefficients of  $X$  is 16.2387. It shows that, when the logistics investment growth rate increases by one unit (10 thousand Yuan), GDP increases by 16.2387 units (that is 162387 Yuan).

According to the data in Table, we also establish the linear regression equation of transport investment and GDP :

$$y = 10712.03 + 20.1775x \tag{3}$$

(10.7344) (19.0775)

In the formula,  $Y$  is GDP,  $X$  is the transportation investment. Where  $R^2 = 0.9630$ , adjusted  $R^2 = 0.9603$ , the goodness of fit is high;  $t$  of  $X$  in the model is 19.0775,  $t$  of constant term is 10.7344, they are bigger than  $t_{0.05} = 1.7613$  and can pass the test with critical value = 5%, the value of  $F$  is 363.95, adjoint probability is 0, The overall effect of the linear regression is significant. In this regression equation, the coefficients of  $X$  is 20.1775. It shows that, when the transportation investment growth rate increases by one unit (10 thousand Yuan), GDP increases by 20.1775 units (that is 201775 Yuan)

#### 4 Conclusions

By comparing the impact of the logistics industry investment on the national economy, and the impact of the logistics investment and the transportation investment on the national economy, we find that the transportation system investments as a part of logistics industry investment, its driving effect to the national economy is greater than that of the overall logistics investment.

From 1991 to 2006, when the transportation investment growth rate increased by one unit (10 thousand Yuan), GDP increased by 201775 Yuan; When the logistics investment growth rate increased by one unit (10 thousand Yuan), GDP increased by 162387 Yuan. With the growth of GDP and investments on transportation, the driving effect of the transportation investment to the national economy is reducing. From 1978 to 1990, when transportation investments improved for every 10,000 Yuan, GDP increased by 849,242 Yuan; however, when transportation investments improved for every 10,000 Yuan, GDP increased by 201,775 Yuan from 1991 to 2006. This shows that the driving effect of the transportation investment to the national economy was reducing.

For the future development of logistics, on the one hand, we should build and improve transportation infrastructure, improve the hardware conditions of logistics; But more importantly, we should focus on improving the logistics organization to improve logistics efficiency.

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