

## A Study on Driving Effect on Economic Development of Fixed Assets Investment in Inner Mongolia

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**Abstract:** This paper took 2000-2014 years in Inner Mongolia as the research object, using the Solow residual method to measure capital, labor, scientific and technological progress contribution to economic growth rate. And analysed the relationship between fixed assets investment and economic growth of Inner Mongolia with the amount of investment in fixed assets accounted for the proportion of the nominal GDP index. The study showed that the investment in fixed assets in Inner Mongolia has a huge role in promoting the economic growth of the region, and it had the characteristics of high investment rate and high investment growth rate.

**Keywords:** Solow residual method; Investment in fixed assets; Economic growth

### 1. INTRODUCTION

Since the beginning of twenty-first Century, Inner Mongolia economic growth has achieved remarkable results. Between 2000 and 2014, Inner Mongolia's GDP rose from 153.9 billion yuan to 1.7769 trillion yuan, an increase of 11.5 times; the modern economy as one of the important driving force of investment in fixed assets, also increased from 43 billion yuan to 1.7941 trillion yuan, an increase of 41 times. The growth rate of fixed asset investment is far more than the growth rate of GDP. In this context, we would explore the role of investment in fixed assets in Inner Mongolia's economic growth in the capital, labor, science and technology progress in the status of the three factors, as well as the scale of investment in fixed assets. On the basis of analysis above the relationship between fixed assets investment and economic growth is revealed, and the positive cycle of investment and economy in the autonomous region is sought.

### 2. THE DATE SOURCE AND VARIABLE SELECTION

The index of nominal GDP, GDP price index , Price index of investment in fixed assets, Fixed assets investment, The social workers are all derived from the Statistical Yearbook of Inner Mongolia or WIND Database. By analyzing nominal GDP and GDP growth index of can get real GDP; The real fixed assets investment acquires from the dates of Investment in fixed assets and Fixed assets investment price index; The independent variable labor force input selects the number of employee of the Inner Mongolia.

**Table1.** The indicators data in Inner Mongolia autonomous region

Year	Fixed asset investment (one hundred million yuan)	Fixed asset prices index (last year = 100)	In 2000 of constant investment in fixed assets (one hundred million yuan)	Fixed assets inventory from 2000 years (one hundred million yuan)	Nominal GDP (one hundred million yuan)	The comparable price of GDP growth index (last year = 100)	In 2000 constant real GDP (one hundred million yuan)	Social workers (ten thousand)
2000	430.42	100.00	430.42	430.42	1539.12	100.00	1539.12	1061.60
2001	496.43	100.80	492.49	922.91	1713.81	109.60	1686.88	1067.00
2002	715.09	101.00	702.39	1625.30	1940.94	112.10	1890.99	1086.10
2003	1209.44	102.60	1157.86	2783.16	2388.38	116.30	2199.22	1005.20
2004	1808.91	105.00	1649.30	4432.45	3041.07	119.40	2625.87	1026.10

2005	2687.84	103.70	2363.23	6795.68	3905.03	121.60	3193.05	1041.10
2006	3406.35	103.30	2899.29	9694.97	4944.25	118.00	3767.80	1051.20
2007	4404.75	103.80	3611.82	13306.80	6423.18	119.00	4483.69	1081.50
2008	5604.67	108.10	4251.37	17558.17	8496.20	117.20	5254.88	1103.30
2009	7535.15	98.50	5802.76	23360.93	9740.25	116.90	6142.96	1142.50
2010	8971.63	105.40	6555.02	29915.95	11672.00	114.90	7058.26	1184.70
2011	10899.79	106.30	7491.82	37407.77	14359.88	114.30	8067.59	1249.30
2012	13112.01	101.60	8870.43	46278.20	15880.58	111.70	9011.49	1304.90
2013	15520.72	99.60	10542.12	56989.00	16832.38	109.00	9822.53	1408.20
2014	17941.95	99.80	12211.11	65037.91	17769.50	107.80	10588.69	1487.60

**3. THE SELECTION OF THE MODEL**

This paper uses Solow residual method to measure the Inner Mongolia autonomous region capital, labor, and the contribution rate of scientific and technological progress. And uses square method to conclude the output elasticity of capital and labor, and then with technology progress contribution rate formula calculates the final result. But considering that the investment of capital, Labour lag cannot be used directly into the development of economy. So on the basis of Solow residual value, we get a simple improvement that Distributed lag model, which considers the lag in simple regression. With the above method to measure the contribution rate of science and technology of the Inner Mongolia autonomous region.

After getting a simple mathematical change, Solow model varies as (1):

$$\frac{\Delta Y}{Y} = \frac{\Delta A}{A} + \alpha \frac{\Delta K}{K} + \beta \frac{\Delta L}{L} \tag{1}$$

According to the type, model is as follows:

$$y = a + \alpha k + \beta l \tag{2}$$

Among them,  $\alpha$ ,  $\beta$  are capital output elastic coefficient and labor output elastic respectively; Y for economic growth; K for the capital increase rate; L for labor increase rate.

With the data obtained, we use Distributed lag model, Combined with AIC criterion, to find capital k lags 4 stages and labor l lags 3 stages by the continuous trial. Using Eviews software and according to the least squares regression analysis to determine the coefficient of function.

**4. THE CALCULATION RESULTS AND ANNALYSIS**

Science and technology progress contribution rate formula:

$$E_A = 1 - \frac{\alpha K}{Y} \cdot 100\% - \frac{\beta L}{Y} \cdot 100\% \tag{3}$$

Above of them:  $E_A$  for the contribution rate of science and technology. K, L, Y are growth rate of

output, growth rate and growth rate of capital respectively .And  $\frac{\alpha K}{Y}$  for labor force,  $\frac{\beta L}{Y}$  for capital contribution.

**4.1. Metrics Analysis**

According to the regression results by the above formula, we can get the annual dates including capital contribution rate, labor contribution rate and the contribution rate of science and technology during 2000 to 2014, which are summarized as follows in Table 2

**Table2.** *The Inner Mongolia science and technology progress contribution rate*

Year	Capital contribution	Labor contribution	Scientific and technological progress contribution rate
2001	32.43%	2.23%	65.34%
2002	76.05%	6.21%	17.74%
2003	85.89%	-19.19%	33.30%
2004	47.24%	4.50%	48.26%
2005	43.27%	2.84%	53.89%
2006	27.21%	2.26%	70.53%
2007	27.93%	6.37%	65.70%
2008	22.23%	4.92%	72.85%
2009	46.62%	8.83%	44.55%
2010	18.78%	10.41%	70.80%
2011	21.58%	16.02%	62.41%
2012	33.96%	15.98%	50.07%
2013	45.21%	36.94%	17.85%
2014	43.82%	30.36%	25.82%
Mean	40.87%	9.19%	49.94%

From the average level, we can know that during the period (2001-2014)in Inner Mongolia, the average contribution rate of capital and labor are 40.87% and 9.19% respectively, and the average contribution rate of science and technology was 49.94%.As the same time, Chinese corresponding values were 37.05%, 3.77% and 59.18% respectively. Among them, the average contribution rate of science and technology during the “10th Five-Year Plan” is 43.71%, and that rate is 64.89% during the period of “11th Five-Year Plan”, was 39.04% in the first four years of “12th Five-Year Plan”. At the same period, Chinese average contribution rate of science and technology were 57.21%, 63.15%, 56.68%.Only during the period of "11th Five-Year Plan" ,science and technology contribution rate was slightly higher than the national average, and in the first four years of "12th Five-Year Plan" science and technology contribution rate significantly belowed the national average level. The contribution rate of Chinese scientific and technological progress was 22% higher than the rate of capital contribution, while Inner Mongolia was only 9% higher. The above data shows that Inner Mongolia on the scientific and technological progress to promote economic development lags behind the Chinese average level, particularly in the "12th Five-Year Plan" period.

#### 4.2. The Analysis of Investment in Fixed Assets

Experience shows that a large number of investment to support growth will cause the lack of demand, overcapacity and cutting the prices of related products, then make the enterprise management fall into dilemma. Investment scale beyonding the states and enterprises need may cause overheating, inflation, then leads to a rise in prices and a decrease in the level of people's life. Improper or excessive investment also can make economic structure unbalanced, industrial structure development deformed. Inner Mongolia, China and the United States in the fixed asset investment accounted for the proportion of nominal GDP and fixed asset investment growth rate data as follows Table 3.

**Table3.** *2001-2014 The United States, China, Inner Mongolia fixed asset investment accounted for the proportion of nominal GDP and fixed asset investment growth rate*

year	fixed asset investment accounted for the proportion of nominal GDP			fixed asset investment growth rate		
	The United States	China	Inner Mongolia	The United States	China	Inner Mongolia
2001	18.62%	34.44%	28.97%	0.38%	13.05%	15.34%
2002	18.07%	36.53%	36.84%	-1.25%	16.89%	44.05%
2003	18.47%	41.17%	50.64%	5.11%	27.74%	69.13%
2004	19.48%	44.20%	59.48%	9.48%	26.83%	49.57%
2005	20.83%	48.35%	68.83%	10.49%	25.96%	48.59%
2006	21.57%	50.95%	68.90%	6.31%	23.91%	26.73%
2007	21.46%	51.54%	68.58%	1.27%	24.84%	29.31%

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2008	20.80%	54.69%	65.97%	-3.37%	25.85%	27.24%
2009	18.41%	66.00%	77.36%	-13.92%	29.95%	34.44%
2010	18.15%	62.96%	76.86%	1.05%	12.06%	19.06%
2011	18.84%	66.48%	75.90%	5.45%	23.76%	21.49%
2012	19.87%	72.30%	82.57%	7.84%	20.29%	20.30%
2013	20.35%	78.83%	92.21%	3.93%	19.11%	18.37%
2014	21.06%	80.49%	100.97%	6.03%	14.73%	15.60%
Mean	19.71%	56.35%	68.15%	2.77%	21.78%	31.37%

As table 3 illustrates, developed countries such as the United States, the proportion of fixed assets investment in the name of GDP is very low, generally maintained at around 20%. Inner Mongolia and China have shown the same growth trend, and the proportion of Inner Mongolia is higher than Chinese level. The characteristics of Inner Mongolia of fixed assets are as follows: First, Inner Mongolia has high investment. In other word, fixed capital investment account for a high ratio of nominal GDP. During 2000 to 2014, the average value is 68.15%, and the same period in the United States, Chinese values are 56.35%, 19.71%; Second, the investment growth rate is high, and the actual growth rate of fixed asset investment is much higher than GDP growth rate. Inner Mongolia, China and The United States fixed assets growth rate with an average of 31.37%, 21.78%, 2.77%, and GDP growth rate of the average value is 19.42%, 14.38%, 1.74% between 2000 and 2014. The high investment rate guarantee the years of rapid economic growth. But facing the situation that the construction of infrastructure layout has been basically completed, the whole society has excess production capacity, export is facing shrinking foreign demand, investment will drive more and more difficult. Finally, it is difficult to pose a stimulating effect on economic growth significantly.

## 5. CONCLUSION

Inner Mongolia's fixed assets investment in promoting the economic growth and the role of great progress of science and technology for the autonomous region the contribution rate cannot be underestimated. In the sample period, the investment in fixed assets accounted for the proportion of GDP increased, and the proportion is higher than China's level, so Inner Mongolia economic growth is more dependent on fixed asset investment. In addition, we can draw from the above two indicators that in the process of economic development Inner Mongolia should continue to take the investment strategy, because investment in fixed assets is the most direct and effective means to promote economic growth. But high investment rate and high investment growth rate of the fixed assets investment also revealed the potential of the investment in fixed assets for the future economic growth is inadequate. Inner Mongolia should adhere to the investment pull strategy, at the same time, pay attention to play a dual role of investment and consumption, expanding consumer demand, and enhance the role of consumption in stimulating the economy. If Inner Mongolia would like to realize the economic benign, sustainable development, we must change the economic growth mode, and further strengthen the path that the scientific and technological progress to the development of innovation driven development.

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