

Study of Fixed Assets Investment's Effect on the Employment of Three Industries

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Abstract As the industry types, fixed asset investment pulling effect on employment will be different. While investment has lagged effect on employment, there should be long-term effects and short-term effects. By distributed lag model, this paper analyses the impact of investment in fixed assets on the employment of different industries, and by balanced multiplier specifically studies employment effects of different industries. The results of this study provide evidence for policy implementation.

Key words Investment in fixed assets; Lag effect; Balanced multiplier; Distribution lag model

1 Introduction

There are many related bibliographies about the research of investment and employment ,while agreement has not been reached about whether investment has an pulling effect or the degree of pulling .Chen Qiaoyu ,Yang Yanling and Shi shubing think that fixed asset investment is the essential way of enlarging reproduction ,employment expansion needs capital injection ,and investment can create employment opportunity .(Fan fan and Lijing2009) verify that , for the present china's reality ,domestic demand must be expanded with consumption and investment at the core ,thereby the industry adjustment from the micro and macro aspect which coordinates the relationship between investment and the second industry is the right choice of handling the financial crisis and expanding employment .However, Gaolei and (Cao Chunying 2009) think that ,the investment of the second industry ,economy increase and employment influence one another directly and indirectly and long-term balanced relationship exist among them . Investment multiplier effect is in favor of increasing the rate of employment, meanwhile in the process of investment it will promote the improvement of the structure of corporation technology , capital and property right .From the perspective of investment in human capital. (Cai Xinhui 2009) was explaining investment expenditure in education ,social security and training ,etc has a positive function against enhancing labor quality and the rate of employment exemplified investment in human capital has a positive lead on employment .while some other scholars hold an opposite opinion ,According to the investment `s elastic analysis for interest ,He Feng found that under the condition of investment increase has been fixed ,investment for interests elastic is the crucial factor confined the increase of employment ,when investment against interest's elastic is less than 1 ,domestic investment's increase not only can't upheaval the rate of employment ,also influence to decrease the rate of employment .Economist (LI Yining2008) from the china present reality also think investment in infrastructure construction may not enhance employment .

In order to add and mend the above-mentioned ,at the basis of this paper's needs and data accessibility .According to *China statistical yearbook* and the website of China statistical beau ,only got the relative data from 1985-2008.In the first , from the correlation that fixed asset investment is with three industries` employment, the author analyses the pulling situation that fixed asset investment against all kinds of industries` employment , Secondly, the study of the correlation among the three industries and found the intrinsic link between them and according to the change affect of the three industries` employment, put forward the corresponding policy Suggestions.

2 The Trend of Three Industries Employment and Fixed Asset Investment and Its Correlation Test

2.1 The trend of investment in fixed assets and three industries` employment.

Figure 1 shows the 1985-2008 total employment (TE) and fixed asset investment (IFA) change trend, figure 2 for the three industries of employment .During this period, the investment in fixed assets increase, especially in 2001 and after, more with acceleration. Meanwhile, the total employment is on rise in the situation, but relatively steadily, not a drastic change. According to the chart 2, the first industry employment (FD), the rate of decline in 1985 is 63% to39.6% in2008 During that period there are two drop out , 1993-1996 and 2002-2006,and their decline is for 18.8% and 20.9%, Second, the

second industry employment (SD) rate overall is rising, but the rise in the range is relatively minor. By 20.8% in 1985 to 27.2% in 1994, but 2002- 2008 is slightly downward trend. At the same time, the third industry employment (TD) rate has been rising. From 16.8% in 1985 to 33.2% in 2008. Third, before 1994, the rate of second industrial employment is higher than the third industry employment, but after 1994, so the speed of the rate of the third industry employment is rapider after 1994 than the second industry employment. Also can be seen by figure 2, the first industrial employment population is still high.

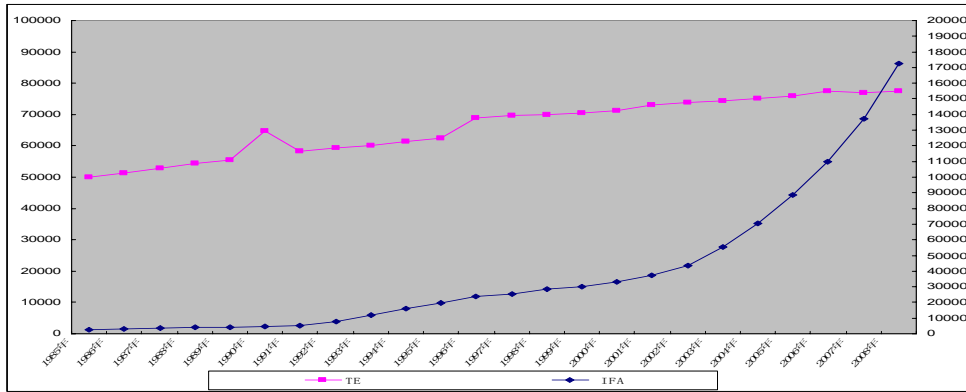


Figure 1 Total Employment and Fixed Asset Investment Change Trend

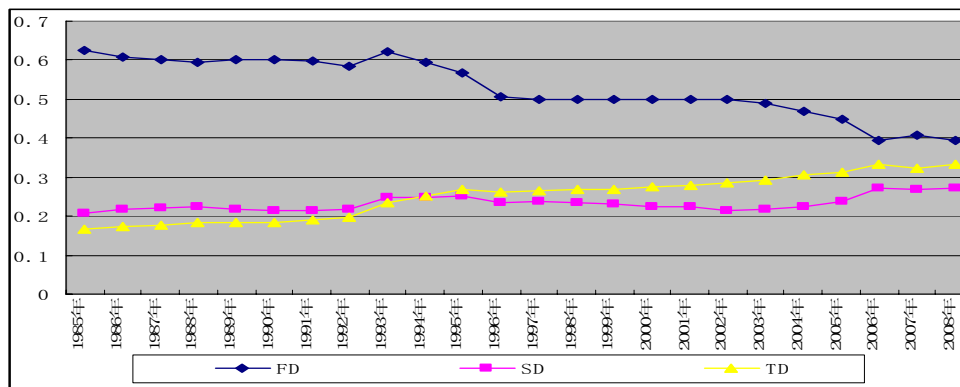


Figure 2 Three Industries of Employment Change Trend

2.2 The correlation between the fixed assets investment and three industries employment,

By using Eviews software, we are to get the correlation between three industries employment and investment in fixed assets and to find the inner relation between them. Table 1: specific as follows.

Table 1 The Correlation Between the Fixed Assets Investment and Three Industries Employment

Variable	FD	SD	TD	IFA
FD	1	-0.07206	0.018363	-0.37746
SD	+	1	0.954928	0.883072
TD	+	+	1	0.846121

From table 1. The first industrial jobs and fixed assets investment is negatively related to the weak period, the correlation coefficient of 0.37746 -. And the second and third industry employment with the fixed assets investment period has a strong positive correlation, correlation coefficient 0.883 and 0.846 respectively. This shows, fixed assets investment period, the influence of industrial employment, and has negative smaller. However, the investment in fixed assets in the second and third industry employment, can drive the second and third industry employment. Also, the first and the second industry that

industrial employment, the first industry and the third industry employment is weak, respectively 0.072 - and that was the first industry employment and the second industry employment, the third industry employment without too much influence each other. But known from table 1, second and third industry employment industrial jobs exist strong correlation, correlation coefficient for inverting links. This shows that the second industry and the third industry employment of employment and influenced each other. At the same time, according to the chart 2 also can see the second industrial jobs and the third industry employment trends have strong consistency.

3 Study of Fixed Assets Investment’s Effect on the Employment of Three Industries

For the fixed assets investment has lagged effect on pulling employment In order to quantify fixed assets investment’s impact on overall employment specifically and fixed assets investment’s effect on the employment of three industries , so we build a distribution lag model to analyze.

3.1 Test of the relationship between reason and result

It’s necessary to study the reason and result relationship of investment and employment for the reason of anal sizing the investment’s impact on employment .that is ,studying whether investment is the cause of employment .Here adopt Grange reason and result relationship to test.

Table 2 Grange test

Null Hypothesis:	Obs	F-Statistic	Probability
IFA does not Granger Cause TE	18	4.54942	0.03883
TE does not Granger Cause IFA		1.51248	0.33326

Known from the table2, under the conspicuous level of 5 percent ,investment is the cause of employment .

3.2 Study of fixed assets investment’s effect on the employment of three industries

3.2.1 Model building

$$Y_t = \alpha + \sum_{i=0}^s \beta_i X_{t-i} + \mu_t \tag{3.1}$$

Transform according to Almon, that is ,

$$\beta_i = \sum_{k=0}^m \alpha_k (i)^k \tag{3.2}$$

(3.1) and (3.2) correlated , so:

$$\begin{aligned} Y_t &= \alpha + \sum_{i=0}^s \left[\sum_{k=0}^m \alpha_k (i)^k \right] X_{t-i} + \mu_t \\ &= \alpha + \alpha_0 \sum_{i=0}^s X_{t-i} + \alpha_1 \sum_{i=0}^s (i) X_{t-i} + \alpha_2 \sum_{i=0}^s (i)^2 X_{t-i} + \dots + \alpha_m \sum_{i=0}^s (i)^m X_{t-i} + \mu_t \\ &= \alpha + \alpha_0 W_{0t} + \alpha_1 W_{1t} + \alpha_2 W_{2t} + \dots + \alpha_m W_{mt} + \mu_t \end{aligned} \tag{3.3}$$

Among these, $W_{0t} = \sum_{i=0}^s X_{t-i}$, $W_{1t} = \sum_{i=0}^s (i) X_{t-i}$, $W_{2t} = \sum_{i=0}^s (i)^2 X_{t-i}$, $W_{mt} = \sum_{i=0}^s (i)^m X_{t-i}$

3.2.2 Regression equation and analysis

On the basis of above model ,exploiting Views software to regress and the results of test (seen from table 1) are as following :

$$\begin{aligned} TE_t = & 6.3011 - 0.06956 IFA_{t-1} - 0.03047 IFA_{t-2} + 0.00862 IFA_{t-3} \\ & + 0.04771 IFA_{t-4} + 0.08680 IFA_{t-5} + 0.12582 IFA_{t-6} \\ & + 0.16498 IFA_{t-7} + 0.20407 IFA_{t-8} \end{aligned} \tag{3.4}$$

$$\begin{aligned}
 F D_t = & 3.5995.45 - 0.05798 IFA_{t-1} - 0.03494 IFA_{t-2} - 0.01190 IFA_{t-3} \\
 & + 0.01115 IFA_{t-4} + 0.03419 IFA_{t-5} + 0.05724 IFA_{t-6} \\
 & + 0.08028 IFA_{t-7}
 \end{aligned}
 \tag{3.5}$$

$$\begin{aligned}
 S D_t = & 1.4595.42 + 0.03069 IFA_{t-1} + 0.02234 IFA_{t-2} + 0.014 IFA_{t-3} \\
 & + 0.00566 IFA_{t-4} - 0.00269 IFA_{t-5} - 0.01103 IFA_{t-6} \\
 & - 0.01937 IFA_{t-7} - 0.02771 IFA_{t-8}
 \end{aligned}
 \tag{3.6}$$

$$\begin{aligned}
 T D_t = & 1.7132.41 - 0.01876 IFA_{t-1} - 0.01005 IFA_{t-2} - 0.00133 IFA_{t-3} \\
 & + 0.00738 IFA_{t-4} + 0.01609 IFA_{t-5} + 0.02481 IFA_{t-6} + 0.03352 IFA_{t-7} \\
 & + 0.04223 IFA_{t-8} + 0.05095 IFA_{t-9} + 0.05966 IFA_{t-10} \\
 & + 0.06837 IFA_{t-11} + 0.07709 IFA_{t-12}
 \end{aligned}
 \tag{3.7}$$

Table 3 Result of Test

Model 3.4			Model 3.5			Model 3.6			Model 3.7		
lag	Coe	T-Statistic	lag	Coe	T-Statistic	lag	Coe	T-Statistic	lag	Coe	T-Statistic
0	-0.05798	-4.79784	0	-0.01876	-3.77364	0	0.03069	3.27173	0	-0.06956	-2.16174
1	-0.03494	-5.32657	1	-0.01005	-2.80526	1	0.02234	3.98922	1	-0.03047	-1.58564
2	-0.0119	-7.98591	2	-0.00133	-0.60423	2	0.014	7.04342	2	0.00862	1.26444
3	0.01115	2.29342	3	0.00738	8.08554	3	0.00566	2.36704	3	0.04771	5.8191
4	0.03419	3.30146	4	0.01609	18.8416	4	-0.00269	-0.44362	4	0.0868	4.17924
5	0.05724	3.59761	5	0.02481	11.6247	5	-0.01103	-1.1211	5	0.12589	3.73028
6	0.08028	3.73827	6	0.03352	9.5553	6	-0.01937	-1.42011	6	0.16498	3.52545
			7	0.04223	8.62329	7	-0.02771	-1.58809	7	0.20407	3.40857
			8	0.05095	8.0965						
			9	0.05966	7.75846						
			10	0.06837	7.5233						
			11	0.07709	7.35033						
R2=	DW=1.25	F=49.587	R2=	DW=2.27	F=267.06	R2=	DW=1.25	F=49.59	R2=	DW=0.51	F=29.47
0.88			98			0.88			0.81		

In light of above regression equation ,analyzing the impact of investment against all employments of industries.

First, seen from the analysis of the same term about fixed assets investment’s impact on the employment of all walks of industries. Known from (3.4),fixed assets investment of the same period has minor and even negative impact on overall employment .contemporary increase of fixed assets investment lead to the descent of overall employment. Meanwhile, in line with (3.5)and (3.6),referring to fixed assist’s effect on the employment of first and third industry ,it’s influence is similar to fixed assets investment of the same term on overall employment ,which caused the decrease of the first and third industry ,while(3.6) shows that fixed assets investment of the same term has positive impact on the second industry , the investment in fixed assets has caused an increase in job creation of secondary industry.

Second, viewed from the analysis of fixed assets investment `s effect on each industry, (3.5) and (3.7) show that fixed assets investment `s effect on the first and third industry have transferred from negative to positive ,and also the effect is enlarging. Which indicate once fixed assets been in shape, it will pull the employment of the first and third industry .from (3.6), fixed assets investment `s impact on the second industry employment is called instant effect. Whereas, with the time passing by, the influence will decay and even take on negative effect

Third, the analysis of fixed assets investment’s long-term effect on each industry, here using total

distributed –lag multiplier, that is , $m = \sum_{i=0}^s \beta_i / s + 1$ to analyze. Total distributed –lag multiplier of

influence of fixed assets investment against each industry is $m_1=0.00502143$ (the first industry), $m_2=0.007105$ (the second industry), $m_3=0.02238417$ (the third industry)respectively .from the comparison of each industry’s total distributed –lag multiplier. We got that : $m_3 > m_2 > m_1$ so to expand fixed assets investment ,the long-term effect of each industry is different .which is largest on the third industry ,and least on the first industry.

At last, from each return equation ,(3.4) shows that ,with the time lagging ,fixed assets investment influence overall employment gradually increasing .which verify the influence has lagged effect and the

effect increase by degrees .the larger the pulling effect of the early stage investment against employment ,the pettier the pulling effect of current investment on employment ,even negative .(3.5) and (3.7) has the same rule with (3.4),which is ,fixed assets investment have pulling effect on the first and third industry. Whereas seen from (3.6), the pulling effect of fixed assets investment on the second industry has complete contrary rule with other equation. the same tern effect of fixed assets investment against the second industry is the biggest, and the lagged effect is decreasing gradually .which prove once fixed assets investment take shape, it's current effect as for the second industry is the largest, but with the time goes by ,it's effect decanting by degrees, and which will provide evidence for speeding up depreciation.

3 Analysis of Reason and Conclusion

Firstly, known from the above Correlation, fixed assets investment has weak correlation with the firth industry employment, the reason is it has not pull the rural employment to increase efficiently. Meanwhile, the raise of fixed assets investment spur on the upheaval o agricultural technology and then universal use of agriculture machine, so, it can reduce “squeezing effect “ of agriculture and degrade the need of labor in agriculture. Meanwhile, it can make the remain labor ascend .moreover, the input of fixed assets also hence the degree of agricultural technology, and the traditional hand –based way of agriculture is replaced by mechanism gradually. So ,compared with before ,agriculture need less and less labor ,which made the rural remain labor transfer into the second and third industry .therefore , form the short term ,fixed assets investment has negative effect on the employment of first industry ,but in the long run ,once fixed assets investment has been in scale ,it will pull the employment of first industry efficiently.

Secondly, the second industry is mainly consisted of industry and architecture ,the scale of fixed assets investment is very large ,and in need of considerable labors ,and the pulling effect on the employment of second industry can take on immediately . In the meantime, from the general rule of the process of industrial development, in the mid-phase of industrial development, capital industry such as metallurgy, machine ,motorcar ,iron and so on develop so fast ,the share of output value of capital industry in the total industry inclined to ascending . In this process, considerable capital is needed to meet then development of industry, the enlargement of industry itself also bring along employment effect. while, investment –caused exterior economy of second industry also drive to transform into industry correlation .expand industry chain to denotation .and than influence the employment structure of related industry .Therefore ,the second expand the third industry ,the chance of the secondary employment decreases and the third increases ,so once fixed assets investment been in shape ,it pulls the employment of second industry best, but with the time goes by ,the effect of the fixed assets investment on employment is reducing

Thirdly, the reasons for the fixed assets investment playing a positive leading role in the third industry employment as follows: firstly, the highly correlations between the third industry and the second industry employment (correlation coefficient is 0.955),the longer the industry chain related, the more multiplier investment process of the third industry in order to create much more employ opportunities. Secondly , the second industry can propel the development of the third industry in the process of the investment, the second industry can create the new third industry ,the second investment need lead to the” Effects on employment creation” in terms of the third industry development. However, the fixed assets investment has lag effects on employment .so, the effect the fixed assets investment is on the third industry employment can demonstrate only after the scale of investment formed.

According to the analysis of correlation between the fixed assets investment and the various industrial employment and the analysis of effect that fixed asset investment is on each industry employment show that, in the short run, the investment in fixed assets is only for the second industry employment promotion and does not have driven the first and third industry employment, even for the negative effects. But in the long run, the investment in fixed assets has positive effects on the first and third industry employment, and the effect increased. At the same time, the second industry and the third industry is strong positive correlation and fixed asset investment in the second and third industry employment effect analysis shows that, the investment in fixed assets is "create employment effect". Therefore, this paper verified the third industry is main "channel" for absorbing the employment, also cannot ignore the long-term effects of first industry employment. But only for short-term, investment in fixed assets has driving effect. on the second industry employment .

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