

## **Comparison of Internationalization Promotion Patterns of Region Economic Growth in China**

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### **Abstract**

*Internationalization patterns promote economic growth by the impact on factors efficiency. China's economic growth pattern that depends on exports and factors investment has suffered the dual pressures at home and abroad. By the empirical economic data from 1997-2008, this paper tests the economical promotion patterns in eastern, central and western region in China from a two-dimensional views of the internationalization evolution (import-driven, FDI-driven, export-driven) and the promotion mode of economic growth (the traditional factors promotion, innovative factors promotion, internationalization pattern promotion). The Comparative research shows that FDI effect on the economic growth in eastern region is very limited which is mainly based on export-driven while innovation effect has appeared; the export effect and innovation on economic growth in western region are very limited which is mainly based on import-drive; with the relatively balanced relation between three internationalization patterns' effects on the economic growth in central region, innovation effect is very limited. Research has concluded that the internationalization promotion effects on economic growth are closely related to the level of economic development and the stage of industrialization. Import, FDI, export and ODI have different roles and status of economy promotion in different areas and stages. Internationalization patterns drive and factors drive in economy growth in three regions present clear their stages change. Regional difference of internationalization promotion patterns reveals the adjusting direction of internationalization policy and strategy in eastern, central, western region.*

**Keywords:** Economic growth; Internationalization pattern; Economic growth promotion pattern; Economic development stage; Innovation-driven

### **1. Introduction**

With 30 years of reform and opening up, China has made great achievements in economy. But internal resource constraints and external trade barriers have restricted the sustainability of extensive economic growth that China's economy depends on external export and factor investment. During the Twelfth Five-Year Period, the Chinese government emphasizes the sustainable and harmonious development goal of dependent on technological innovation and expansion of domestic demand, stressing industrial transformation and upgrading in the growth model. In the internationalization promotion patterns, China's economic development will be no longer confined to the promoting role of exports and inward foreign direct investment (FDI), but more emphasizes the role of import and outward foreign direct investment (ODI) than before, which is the new requirement for China's sustained economic development and industrial transformation and upgrading under new situation. Then how about the promotion effect of import, export, FDI and ODI for China's economic growth? How great effect of import and ODI in China' industrial transformation and upgrading in the future?

About the promoting effect of internationalization for economic growth, many scholars at home and abroad have made many empirical researches. However, most researches inspect the relation between import, or FDI, or export, or ODI and economic growth separatively, without considering the stage of economic development and the dynamic evolution law of internationalization promotion pattern. Therefore, the results obtained are very different. In the economic growth promotion of import, import is the factor for home output according to traditional theory of national income. But from the perspective of development economics and international economics, if the import structure is mainly based on new products, technology, equipments, and rare raw materials (China is the case), import will be an important way for introducing new industries, new technologies, and promoting industrial growth in the industrialization.

Therefore import plays an important role in promoting economic growth. However Conclusions on the empirical tests are not consistent. Zhang and Zou (1995) believes that the economic growth effect of introduction of technology and equipment is greater than independent innovation in developing countries. Lee (1995), Coe (1997) verify the positive effect of import for economic growth. But Qiao Yu (1998) thinks that there is no significant direct relationship between import and the total output. Chinese scholar, Li Bing (2008) indicates that import of industrial products has a long-term stable effect on China's economic growth while import of has a restraining result.

In the economic growth promotion of FDI, foreign investment makes up the capital and technology gaps of national economic growth with a technology spillover on local firms to promote economic growth. In the empirical tests, on the same conclusions are contradictory. De Gregorio (1992) 、Borensztein (1998) find that FDI can promote the economic growth while the FDI effect Carkovic and Levine (2002) get is not significant. But Easterly (1993) 、Kawai (1994) conclude that FDI has a restraining influence. Chinese scholars, Shen Kunrong (2001), Yao Shujie (2006) think that FDI is conducive to China's economic growth while Wei Houkai (2002), Guo Xibao (2009) hold that the effect of FDI has regional differences. Besides, Guo Xibao (2009) thinks that the role of foreign investment on economic growth needs foreign technical content to meet a certain critical value.

In the economic growth promotion of export, breaking through the domestic market boundary, export achieves the scale economy and promotes economic growth by international competition. In the empirical tests, research of Dollar (1992), Edwards (1998) supports export's promotion on economic growth while Jung and Marshall (1985), Bahmani et al (1991) believe that there is no causal relationship between export and economic growth. However, Dhawan and Biswal (1999) find that export on economic growth is only a short-term phenomenon rather than a long-term trend. Researches of Michaely (1977), Kohli and Singh (1989) discover that there is a critical level of export on economic growth. Domestic scholars, such as Liu Xuewu (2000), Shen Kunrong (2003) believe export is conducive to China's economic growth. But Shen Chengxiang (1999), Zhao Ling (2001) think that the promotion of export for China's economy is not significant or exists in a short period, not obvious in the long term. Yang Quanfa (1998), Bao Qun (2008) found the non-linear relation between trade openness and economic growth.

In the economic growth promotion of outward foreign direct investment (ODI), ODI breaks through local resources and market limitations for local enterprises and searches for superiority positions and optimal allocation of resources to provide favorable conditions for utilizing local resources, which can promote local economic development. Markusen (2002) believes that enterprises voluntarily choosing ODI can improve their overall welfare level and economic strength. But Helpman (2004) thinks that ODI may reduce the overall economic level and of the home country and the average productivity of home-country enterprises. Dong Quan (2008) study the promotion effect of ODI in stimulating the local per capita GDP in Guangdong Province. But Wei Qiaoqin (2003) finds that the relation between China's economic growth and ODI is not obvious.

Many empirical researches indicate that the relationship between economic growth and internationalization patterns is nonlinear, inconsistent and complicated. That is to say that internationalization patterns in promoting economic growth and dominant effect are related with evolution in stage of economic development. By the data of China's economic development from 1995 to 2008, this paper tries to start with the theory and mechanism analysis of economic growth promotion patterns. It mainly focuses on the internationalization promotion patterns of China's economic growth and reveals the relation between promotion patterns, development stage and internationalization patterns, so as to provide adjusting ideas for internationalization policies.

## **2. Theory and mechanism analysis of internationalization promotion patterns in economic growth**

### **2.1 Relative theory and practice**

We can trace to the relevant classical theories about the relation between evolution of internationalization patterns and economic growth. Kaname Akamatsu (1932) proposed that Flying Geese Paradigm discussed the change of promotion patterns from import to export in catching up of developing countries (The process of import → domestic production → export). In his book "the theory of foreign trade", Kiyoshi Kojima (1950) summarized the dynamic changes of promotion patterns from export to FDI of marginal industries in Japan. From the perspective of industrial lifecycle theory, Vernon (1966) expound the effect and promotion patterns evolution of import, FDI, export and ODI four patterns in the industrial lifecycle and development process.

The Stage theory of investment development of Dunning (1981) reveals the promotion of inward FDI and outward ODI in the relative economic developing stage. Combing the classical economic theory, it's concluded the role and status change of import, FDI, export and ODI four internationalization patterns in different stages of economic development. Besides, import is the Initial leading pattern in internationalization development for developing countries while ODI is the highest mode of international development in developing countries.

In the study of the relation between catch-up process of developing countries and the level of economic openness, Jeffrey Sachs (2000) concludes that at the initial stage of international development, import and FDI is a widely used way of many countries because a country with lower technological level and income will introduce advanced technology and capital to narrow the gap. But import and FDI is the most important way to absorb technology spillover and the capital inflow. Paul W. Beamish (1995) thinks that with the raising of internationalization level, outward-oriented internationalization will abide by the following path: export → primary ODI → senior ODI. Rafael Rob (2003) thinks that although ODI has a lower marginal cost than export, it also may face the risk arising from unused capital of reduced demand for foreign market. Therefore, under uncertain preference in demand, the multinational companies will first select the export to launch a new business in foreign markets and then choose whether to take further foreign direct investment according to foreign demand. Through the survey data, Merritt (1994) found that 60% of the samples follow the path of outward-oriented internationalization: export → ODI. Industry experience in international development researches tells us that prior to the establishment of new industries, we should depend on import to meet domestic needs. When the domestic market reaches a certain scale and is recognized by domestic and foreign enterprises, FDI, foreign technology and equipments and raw materials will be introduced in large number. When the domestic industry reaches a considerable scale and forms competitive advantage, the country will increase export. Finally, with the gradual decline of dominant position in export, ODI emerges. Therefore, the path of evolution and transformation of industry-led internationalization patterns is as follows: import dominant → FDI dominant → export dominant → ODI dominant. This evolution path is closely related to the industrialization development stage and economic development level.

## **2.2 Mechanism analysis of internationalization promotion in economic growth**

In the National Competitive Advantage, Porter (1990) divides the economic growth promotion into four patterns in economic development stage: factors promotion, investment promotion, innovation promotion and wealth promotion. In the open condition, international trade and international investment play the corresponding role in various stages. China's economic development is far from innovation phase. However, since 2001 joining into the WTO, China's industrialization level increases rapidly with the international development. Though export and FDI have a tremendous drive on the development of industrialization in China, domestic resource and environmental constraints and international trade barriers have significantly limited the China's factors investment and export-driven growth pattern.

The following section analyzes the relation between investment pattern, internationalization pattern and economic growth. Traditional production theory holds that the growth of output depends on labor and capital input. Modern growth theory emphasizes more on R&D investment. In opening economy, many empirical researches of foreign trade and international investment indicate that by changing the environment, improving the efficiency of factor allocation and promoting of international technology and knowledge transfer, it ultimately promotes local economic growth. Therefore, economic growth promotion here will be divided into factors promotion and internationalization promotion while factors promotion into the traditional factors promotion and innovative factors promotion. Internationalization promotion includes inward-oriented import promotion and FDI promotion, outward-oriented export promotion and innovative factor promotion. See details in figure 1. This category is also consistent with empirical research.

Left part of Figure 1 is the four internationalization patterns: the general internationalization path and development stage from inward-oriented internationalization pattern to outward-oriented. At the initial stage of economic opening and development, it's always import promotion, ODI stage as the senior stage. At present, internationalization promotion in China includes export promotion and FDI promotion while import and ODI promotion are relatively weak. The right part is economic growth of factor promotion under internationalization environment. The middle part is the basic factors for promoting economic growth. Thereinto, the second half of the middle part is about the traditional labor, capital, land, environment and other basic factors while the first half concludes R&D, human capital, intellectual property and other innovative factors. With the improvement of level of economic development, factor promotion patterns change.

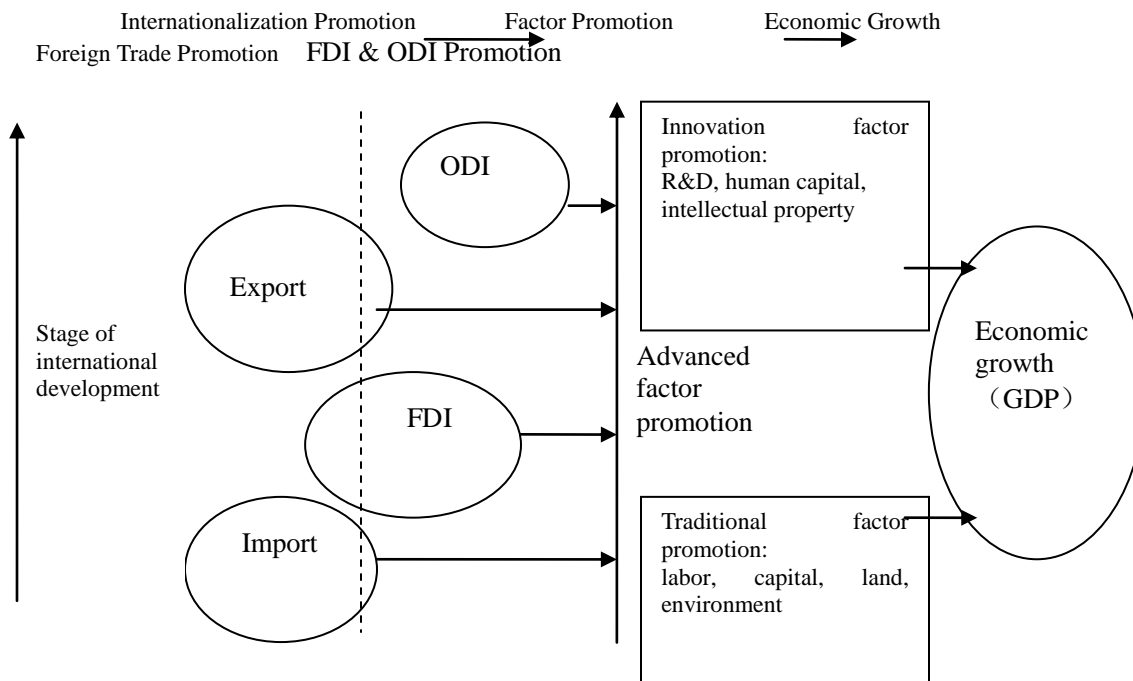


Figure 1: Scheme for internationalization promotion and economic growth promotion

Economic growth promotion in primary stage depends on traditional factor promotion while the main driving force of economic growth at higher economic level depends on the innovation factor promotion, which is called advanced factor promotion. The four internationalization patterns can promote allocative efficiency. In particular, it should be noted that these four patterns are the main channels for international advanced technology, knowledge transfer and spillover. International channels and environment improvement can be more effective in promoting the efficiency of factor allocation, so as to promote economic growth. Thus economic growth promotion can be divided into three patterns: basically traditional factor promotion (labor promotion, capital promotion), advanced innovation factor promotion, internationalization promotion in opening conditions (includes import, FDI, export and ODI promotion).

Different from the known literatures, this paper tries to put import, FDI, export and ODI into a unified analytical framework. By comparative analysis of internationalization patterns for economic growth in China's three regions with different economic level, on the one hand, this paper reveals the different effects of internationalization patterns on regional economic growth. On the other hand, it shows the difference and transformation of internationalization promotion patterns in economic development to provide ideas for policies adjustment of internationalization and promote regional economic growth more effectively.

### 3. Descriptive analysis of internationalization patterns comparison in China's economic growth

Firstly, the paper compares the export, import, foreign investment and R&D data with GDP in each province and gets the export intensity, import intensity, foreign investment intensity and R&D intensity. Then through a comparison of size and changes of intensity index, it analyzes the role of export, import, FDI in regional GDP growth. First of all, we definite the index of export intensity, import intensity, FDI intensity and R&D input intensity.

Export intensity in i region = (export value in i region/ export value in China) / (GDP in i region/ GDP in China) or = (export value in i region/ GDP in i) / (export value in China/ GDP in China), namely, equal to **ratio of dependence on export in i region/ ratio of dependence on export in China**. **Export intensity index** in i region reflects the relative position of export in i region comparing with national economy. If export intensity index is greater than 1 in i region, it's indicated that the position of export in this region is greater than the national average in economy. But if it's smaller than 1, it's showed that position is lower than the national average.

Import intensity in  $i = (\text{import value in } i / \text{import value in China}) / (\text{GDP in } i / \text{GDP in China})$  or  $= (\text{import value in } i / \text{GDP in } i) / (\text{import value in China} / \text{GDP in China})$ , namely, equal to ratio of dependence on import in  $i$  / ratio of dependence on import in China). Import intensity index reflects the relative position in the economy. Import intensity index in  $i$  reflects that position of import in  $i$  is relatively more important than in national economy. FDI intensity in  $i = (\text{FDI value in } i / \text{FDI value in China}) / (\text{GDP in } i / \text{GDP in China})$  or  $= (\text{FDI value in } i / \text{GDP in } i) / (\text{FDI value in China} / \text{GDP in China})$ , namely, equal to ratio of dependence on FDI in  $i$  / ratio of dependence on FDI in China). FDI intensity index reflects the relative position in the economy. Foreign investment index in  $i$  reflects that position of foreign investment in  $i$  is relatively more important than in national economy.

R&D input intensity in  $i = (\text{R\&D value in } i / \text{R\&D value in China}) / (\text{GDP in } i / \text{GDP in China})$  or  $= (\text{R\&D value in } i / \text{GDP in } i) / (\text{R\&D value in China} / \text{GDP in China})$ , namely, equal to ratio of dependence on R&D in  $i$  / ratio of dependence on R&D in China). R&D input intensity index reflects the relative position in the economy. R&D input index in  $i$  reflects that position of R&D in  $i$  is relatively more important than in national economy. Since index of labor input intensity and capital input intensity can be calculated, it's omitted here. Index of export intensity, import intensity, FDI intensity and R&D input intensity of each year in China's eastern, central and western area is collected in table 1.

Table 1: Change and comparison of export, import, FDI, R&D intensity of the east, the central, the west in China

	1997	1999	2001	2002	2004	2006	2008	1997 -2008 Average	1997 -2001 Average	2002 -2008 Average	Ratio before and after accession to the WTO
Export intensity in east	1.61	1.61	1.59	1.55	1.55	1.54	1.54	1.57	1.60	1.54	-0.06
Export intensity in central	0.22	0.18	0.19	0.19	0.19	0.20	0.24	0.20	0.20	0.20	0.00
Export intensity in west	0.27	0.22	0.20	0.21	0.20	0.21	0.26	0.22	0.24	0.22	-0.02
Import intensity in east	1.68	1.63	1.61	1.58	1.57	1.56	1.57	1.60	1.64	1.56	-0.08
Import intensity in central	0.16	0.16	0.16	0.17	0.17	0.17	0.21	0.17	0.15	0.18	0.02
Import intensity in west	0.16	0.20	0.19	0.17	0.16	0.17	0.20	0.18	0.18	0.18	0.00
FDI intensity in east	1.43	1.43	1.39	1.32	1.21	1.22	1.22	1.31	1.42	1.22	-0.20
FDI intensity in central	0.57	0.54	0.62	0.76	1.06	0.91	0.84	0.79	0.57	0.95	0.38
FDI intensity in west	0.31	0.26	0.24	0.22	0.17	0.36	0.48	0.29	0.28	0.30	0.02
R&D intensity in east	1.19	1.19	1.20	1.18	1.21	1.22	1.23	1.20	1.19	1.21	0.02
R&D intensity in central	0.61	0.64	0.62	0.67	0.63	0.66	0.68	0.65	0.63	0.66	0.03
R&D intensity in west	0.99	0.92	0.89	0.84	0.77	0.70	0.66	0.83	0.94	0.75	-0.19

Comparing the export, import, FDI and R&D intensity in east, central and west, the effect of export, import, FDI and R&D input for promoting economic growth in eastern area is much greater than it in central and western part. Thereinto, from 1997 to 2008, average intensity of export is 1.57, import is 1.60, FDI is 1.31, R&D is 1.20, which are all larger than 1 and greater than the intensity in central and west (all indexes in central and west are all lower than 1 ). But from dynamic perspective, take before and after WTO accession for example, export, import and FDI intensity have decreased (The difference between average intensity from 1997 to 2001 to average intensity from 2002 to 2008, is respectively -0.06, -0.08, -0.02), which reflects the declining role of economic growth. Comparing promotion factors of export, import and FDI in economic growth, decline of FDI is most obvious while then import and export. But the effect of R&D on economic growth has improved.

For the average intensity index from 1997 to 2008 in the central, export is 0.20, import is 0.17, foreign investment is 0.79, and R&D is 0.65. Though these are all smaller than 1, but FDI is relatively greater and then is R&D intensity while export and import is relatively lower. For the intensity index from 1997 to 2008 in the west, export is 0.22, import is 0.18, FDI is 0.29, and R&D is 0.83. Though these are all smaller than 1, but R&D is relatively greater and then is FDI, export and import. On the whole, the promotion of FDI has decreased the most, and then import and export in the east part. FDI intensity has increased significantly in central area with a slight increase in import while export has barely changed. FDI intensity has increased in western area while import has barely changed and obvious decrease in R&D.

Considering about promotion pattern of economic growth, there are regional differences of patterns change of internationalization promotion in economic growth. For the promotion of export, the most significant decline is in the eastern area while there is no change in central area with a slight increase in the west. For the promotion of import, there is decline in the east, increase in the central and no change in the west. For the promotion of FDI, there is decrease in the east, significant increase in the central and a slight increase in the west. For the promotion of R&D, there is significant increase in the east and obvious decrease in the west.

Descriptive analysis can broadly reflect the changes of internationalization promotion patterns in economic growth. However, analysis of measurement is more accurate and reasonable. The next part analyzes in-depth with panel data model.

Table 2: Comparison of export, import, foreign investment and R&D for economic growth in eastern, central, western regions in China

	Export	Import	FDI	R&D
Eastern area	Important; decrease of dynamic role	Important; large decrease of dynamic role	Most important; decrease of dynamic role	Most important; a slight increase of dynamic role
Central area	Unimportant; stable dynamic promotion	Lowest; increase of dynamic promotion	Important; increase of dynamic promotion	Lowest; increase of dynamic promotion
Western area	Unimportant; a slight decrease of dynamic role	Important; unchanged dynamic role	Lowest; a slight decrease of dynamic role	Centered; obvious decrease of dynamic role

#### 4. Econometric analysis of internationalization promotion patterns in regional economic growth

##### 4.1 Specification of econometric model

The econometric model depends on the mechanism of internationalization in economic growth. In the late 1980s, as the representative of the new growth theory, Romer (1986) and Lucas (1988) define the promotion of innovation factors in economic development. But Fosu (2006) and Omisakin (2009) believe that internationalization patterns of FDI and trade (TR) promote the economic growth by changing the efficiency of various factors. Therefore, this analysis will be based on an aggregate production function containing internationalization patterns.<sup>1</sup> This function assumption not only includes traditional factors such as labor and capital, but also contains non-traditional factors such as internationalization patterns and technological innovation. The traditional aggregate production function is as follows:

$$Y = F(K, L) = AK^\alpha L^\beta \quad (1)$$

<sup>1</sup> The standard model of aggregate production function is often widely used to estimate and study the impact of FDI inflows and trade for economic growth in many developing countries.

Y represents output while A, K, L shows total factor productivity, capital stock and labor stock. Internationalization patterns are usually regarded as institutional factors that influence innovation allocation efficiency and technological progress, such as traditional labor, capital factors and R& D, human capital. It then influences total factor productivity A and influence the economic growth. So assume that A is the function of technological innovation R&D, four internationalization patterns and other exogenous factors C:

$$A = G ( R\&D, IM, EX, FDI, ODI, C ) \quad (2)$$

Combined (1) and (2), we can get an aggregate production function about the capital stock K, labor stock L, import IM, export EX, foreign investment FDI, foreign direct investment ODI and other exogenous factors C:

$$Y = F ( L, K, R\&D, IM, EX, FDI, ODI, C ) \quad (3)$$

As China's outward foreign direct investment (ODI) in the different regions has just started with severe lack of data, this article neglects the role of the ODI pattern.

Many literatures considered some variable hysteresis in studying the impact of foreign investment, capital and R&D input for economic growth. For example, N.Fabry, S.zeghni (2002), L.P.King and R.Varadi (2002) think that the promotion of FDI, R&D and domestic investment for economic is not significant within the period. But the promotion of FDI, R&D and domestic investment for economic growth is great while lagged for one phase. Utilizing the data of 30 provinces from 1988 to 1998, the research of Zhong Changbiao (2000) discovers that the effect of FDI and domestic capital with 1 year lag on GDP is greater. Besides, the research of Zhang Liqun (2005) shows that growth rate in the present year is 0.65% with the 10% increase of China's FDI on GDP while the next year is 1.36%. Bode and Moreno (2003) holds that there is one, two or even three-year lag in R&D. But a year lag also helps to promote its economic growth. First of all, this paper estimates the variable with VAR model. A variety of test (AIC, SC and LR statistics) have shown that reasonable lag of FDI, R&D and the three variables of domestic capital is lag 1 year. So it needs to deal with FDI, R&D and domestic capital variable K for lag 1 year. The econometric model is as follows:

$$\begin{aligned} \ln GDP(I, j, t) = & a_0 + a_1 \ln K(I, j, t-1) + a_2 \ln L(I, j, t) + a_3 \ln RD(I, j, t-1) \\ & + a_4 \ln IM(I, j, t) + a_5 \ln EX(I, j, t) + a_6 \ln FDI(I, j, t-1) + \mu_t \quad (4) \end{aligned}$$

i (i=1, 2, 3) shows the eastern, central and western part in China. j represents the provinces in the east, central and west. t (t=1997, 1998, ..., 2008) indicates the year while  $\mu$  is random error in the model.

Thereinto factor of K and L reflect the promotion index of traditional factors in economic growth while RD is the promotion index of innovative factors. Besides IM, EX and FDI represent the promotion indexes of three internationalization patterns.

## 4.2 Variables and data processing

According to China Statistical Yearbook and the reports of foreign investment, this paper chooses the provincial panel data of GDP, export, import and the industrial worker number in China's eastern, central and western from 1998 to 2008 and the provincial panel data of FDI, domestic investment and R&D from 1997 TO 2007 (For little absorption of foreign capital in Tibet, we haven't counted it). Analysis data is from the "China Statistical Yearbook" and the provincial Statistical Yearbook. Before the quantitative analysis, we do corresponding data processing of the variables to enable more accurate measurement results.

GDP, dependent variable, represents the gross domestic product of each province and is calculated by the formula: GDP Deflator= Nominal GDP / constant-price GDP.

K represents domestic capital is calculated by the total fixed investment minus FDI, which is converted on the base of fixed assets investment index in 1996 in this paper. Since the lag impact of domestic capital on China's economic growth, this paper uses the lag domestic capital to express.

L is the number of employees in the provinces.

RD is intensity of provincial R&D expenditure. Since the lag impact of R&D input on China's economic growth, this paper uses the lag R&D to express.

IM is the total import in the province, converted on the base of the consumer price index in 1997 in this paper.

EX is the total export in the province, converted on the base of the consumer price index in 1997 in this paper.

FDI represents the foreign direct investment inflows in each province with the data in accordance with the average exchange rate of RMB against USD in the very year.

It is conversed on the base of fixed assets investment index in 1996 in this paper. Since the lag impact of foreign investment on China's economic growth, this paper uses the 1 year lag FDI to express. The division of the east, central and west regions is as follows: The eastern area includes 11 provinces and cities, such as Beijing, Tianjin, Hebei, Liaoning, Shanghai, Zhejiang, Jiangsu, Fujian, Shandong, Guangdong, and Hainan. The central part includes 8 provinces and cities, such as Shanxi, Jilin, Heilongjiang, Anhui, Jiangxi, Henan, Hubei, and Hunan. The western area includes 11 provinces and cities, such as Inner Mongolia, Guangxi, Sichuan, Chongqing, Guizhou, Yunnan, Shaanxi, Gansu, Qinghai, Ningxia, and Xinjiang.

#### 4.4 Econometric analysis of panel data Model of the east, central and west regions

The key of application of panel data analysis is to select the appropriate type of panel model, namely, individual fixed-effect model or individual random-effect model. According to selection principles of econometric panel model, firstly, we establish the hybrid regression model, individual fixed model and individual random model by utilizing EVIEWS5.0 software for panel data in three regions. Then we use F statistic value to test whether we should choose hybrid regression model or individual fixed regression model in each area. Thirdly, we use Hausman statistic value to test whether the east area should choose individual fixed regression model or individual random model. Because of space limitations, selection process is omitted here. At last the result is that east area chooses individual fixed-effect model while individual random-effect model in the central and individual fixed-effect model in the west. For the least squares regression of east, central and west part respectively, the results are presented in table 3.

If  $R^2$  and F statistics value are very high in China's eastern, central and western region, it's indicated that the goodness of fit of the model is greater. If the explanatory variables at least 10% pass the t test and DW values are close to 2 with no autocorrelation, explanation of the model is strong.

Table 3 : Model regression results in China's east, central and west area

Model	Eastern area (individual fixed-effect )	Central area (individual random-effect)	Western area (individual fixed-effect)
Constant	9.064703* (11.26667)	14.79630* (28.31205)	13.36887* (47.13010)
K lag 1	0.324557* (7.478220)	0.381282* (9.717463)	0.500346* (20.95415)
L	0.534178* ( 23.264819)	0.441354* (42.547723)	0.648545* (32.078739)
RD lag 1	0.434277*** (1.673700)	0. 104285*** (-2.072202)	0.090172*** (-2.167743)
IM	0.157048* (2.864748)	0.147857* (2.897115)	0.235937** (2.692518)
EX	0.310315*** (1.707830)	0.159996* (3.595071)	0.108668* (5.703476)
FDI lag 1	0.058854* (-2.618095)	0.150918* (-4.085898)	0. 170904*** (-1.900959)
$R^2$	0.936640	0.970684	0.959928
Adjusted $R^2$	0.914898	0.969056	0.949918
S.E. of	0.113378	0.068154	0.067774
D-W test	1.9309213	2.042264	1. 964991
F statistic	566.1920	596.0082	1044.960
Prob(F-statistic)	0.000000	0.000000	0.000000

Note: Number in brackets is the t-test value for the coefficient, \*, \*\*, \*\*\* indicate that coefficient have passed the level of significance test respectively, by 1%, 5%, 10%

From the regression results in table 1, we can get the following points:



In the eastern part, the promotion of three internationalization channels, export, import and lagged FDI for economic growth is positive with the coefficient of export greater than import and FDI. It reveals that for the geographical location and perfect economic base and implementation, economy in the east has firstly entered the intermediate stage of development, namely, internationalization promotion pattern of export-oriented. With the rapid development of the manufacturing industry, export significantly boosts the regional economic growth. Besides, import in eastern can bring advanced technologies and products which will help to upgrade the manufacturing industry in eastern region and indirectly promote economic growth. The impact of Lagged FDI on economic growth is very small. Although technological innovation of enterprises is driven with the increase in FDI, but the marginal utility of foreign investment introduction is diminishing. What's more the quality and technical content of FDI may affect the driving force of FDI. At the same time, the development of private enterprises in eastern part may also squeeze the contribution of FDI. In addition, with the relatively fast economic growth and rising costs of labor and resources, it has weakened the advantages of attracting FDI in eastern part to a certain extent. For the other factors that influence economic growth, lagged domestic capital, labor and R&D input all promote the economic growth in the east, which shows that factors gathering of the eastern region are still a major force for growth.

In the central part, the promotion of three internationalization channels, export, import and FDI for economic growth is positive with the balanced coefficient. For the central region between the eastern and western, the economic growth level is relatively much lagged than the east and advanced than the west. Coupled with the gradual reform and opening up further in the Midwest, export in the central region is gradually improved. Through imports, the central area introduces the foreign advanced technology and narrows the technology gap with the eastern region, driving the development of related industries, especially high-tech industries. The effect of FDI for economic growth is slightly smaller than export. But compared with the east, the effect of FDI in the region is much larger. With the introduction of a series of preferential policies to attract foreign investment over the past decade, the eastern part of the original foreign investment tends to shift to the central region, which brings advanced technology and management experience and promotes economic growth. Comparison of economic growth effect of three international channels in the central region, we find that compared with the east area, the structure of overall internationalization pattern in the central region is more balanced. But it still hasn't entered into the international promotion pattern of export-oriented, indicating that the level of economic development in the central region is between the primary and intermediate stages. For the other factors that influence economic growth, labor and domestic capital has effectively promoted economic growth while the elasticity of R&D input is relatively small with an insignificant promotion in the central region. In recent years, policies, revived by the country to develop the central, may have led to a strong domestic capital transfer to the central region, so as to contribute to economic growth. But it's far from the arrival of innovation-driven promotion.

In the western part, the promotion of three internationalization channels, export, import and FDI for economic growth is positive, which indicates that all three international channels play a positive effect on economic growth. Impact of import on the western economy is the greatest while export is minimal while relevant industries are still relatively backward. Most of industrial technology, machinery and equipment also depend on import. In recent years, in addition to the important role in the western economy, aggressively introduction of FDI also brings advanced technology and management experience and promotes economic development in western region. The above analysis shows that the level of economic development in the western region is at an early stage. So import is the main way of international promotion pattern for economic growth, which is at the early stage of internationalization development. For the other factors, labor and lagged domestic capital promote the economic growth significantly in the west. Along with the further implementation of the development policies in the western region, many domestic investors are optimistic about prospects the development of the western region. As a result, many of the original investors in the eastern coastal area have turned to the western region. Factor promotion is the key driver of economic growth while there is almost no effect of R&D investment on economic growth in West, which indicates that it's far from the stage of innovation-driven promotion.

In conclusion, as different stages of economic development in three regions, there are great differences of internationalization promotion patterns in economic growth. The main internationalization promotion pattern for economic growth in the east is export, three balanced patterns in the central and import in the west.

## **5. Conclusion**

By comparing the three models of driving force for economic growth in the eastern, central, western area, the level of economic development determines the promotion pattern of regional economic growth. The traditional factor promotion is the major driving force of the region with lower economic level while innovation factor promotion is the main force of region with a higher economic level. Since China is still in the initial stage that heavily dependent on traditional factor promotion, innovation factor promotion of the eastern region has become an important factor. Internationalization promotion of economic growth mainly allocates domestic resources, improves the innovation factors, thereby promotes economic growth with results cross-border transfer and learning effects. There are also promotion patterns of economic and internationalization level corresponding to the pattern in economic growth. Import is the primary internationalization promotion pattern while outward foreign direct investment is the senior mode. At present, China's internationalization pattern of economic growth in the eastern region is export while import in the western backward region. The internationalization pattern of economic growth has shifted from internal-oriented internationalization, import, FDI to external-oriented internationalization, export, ODI. But in the upgrade process of many new and existing industries, the promotion of import and FDI continues to be an important driving force of economic growth for few leading international technical innovation. Besides, for the regional differences and the imbalance of industrial technology development, internal-oriented internationalization, such as import and FDI is still the indispensable driving force of economic growth and an important way to upgrade.

From the late 90s of last century, the characteristics of the major forces for economic growth are as follows: (1) There are obvious regional differences of promote internationalization pattern for economic growth. Import is the major force for promoting economic growth in western backward areas while export in eastern developed areas. Driving force of export shows significant decreasing trend, from east, central to west while an increasing trend of FDI promotion. But the promotion of FDI in the eastern region has been significantly weakened. (2) The impulsive force of promotion for economic growth is still from labor and traditional capital factors in which labor intensity is greater than capital factor. There is a significant increasing trend of the capital promotion while the labor intensity in west is greater than in central. (3) There is a significant decreasing trend of the innovation factor from east, central to west. Differences of economic development level determine the promotion intensity of innovation factors for economic growth. Innovation factor of R&D has become a major force in the eastern region.

The regional differences of internationalization promotion pattern for economic growth indicate that in China's economic transformation and upgrading process, it's needed to consider the imbalance of economic development in three regions. China should not apply the sweeping approach of internationalization policies. On the basis of internationalization promotion pattern of local economic growth and evolution trend, each region should select appropriate encouragement policies.

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