An Empirical Study on the Relationship between Economic Openness and Economic Growth in China

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Abstract: Economic openness is the measure of economic activity in the country comprehensive index. How is economic openness indicator measured? Chinese economy has experienced rapid growth for more many years, what is on earth the effect of economic opening on Chinese economic growth? The answer to this question will provide instructive revelation about the selection of Chinese reasonable opening policy. Economic openness is measured by trade openness, foreign investment openness and financial openness in this paper. Based on Solow economic growth model and beginning with foreign trade, foreign investment and financial development, this paper made regression analysis using Chinese data from 1985 to 2004. The empirical analysis indicates that the domestic capital input is still the primary element that promotes Chinese economic growth, by contrast, the effect of foreign trade and foreign investment on Chinese economic growth is faint. Again, financial development on the impetus of economic growth in China has a room to rise.

Keywords: Economic opening; Financial development; Chinese economic growth; Empirical analysis

1. INTRODUCTION
Since the Chinese Economic Reform and open up, China's economic development has made remarkable achievements. Foreign trade and foreign investment have increased significantly. The level of financial development has also been continuously improved. The degree of integration of finance and trade in the real economy has also deepened, and future economic growth will depend on more effective expand and deepen opening to the outside world. However, opening up to the outside world is a double-edged sword. On the one hand, it will bring economic benefits to a country and it will also need to pay a corresponding price. The process of economic opening in each country is the coexistence of benefits and costs, besides opportunities and challenges. Therefore, the problem we face is not whether to open to the outside world, but how to effectively and rationally implement opening up to the outside world. Specifically, we should evaluate whether a country's openness is based on whether it is conducive to promoting domestic economic growth. However, all along, new methods and viewpoints have emerged in the field of measurement and measurement of openness, and the practice and understanding of openness have continued to enter a new stage. The requirements of foreign economic opening have involved exchange rate policy, monetary policy, the finance system and macroeconomic. Therefore, this paper constructs a new openness index system from three aspects of trade openness, foreign capital openness and financial openness, and adopts data from 1985 to 2004 on economic growth and the empirical analysis was conducted on the relationship between openness to the outside world.

2. A REVIEW OF THE RESEARCH ON THE RELATIONSHIP BETWEEN OPENING UP AND ECONOMIC GROWTH
The research on the relationship between the degree of opening up to the outside world and economic growth has a long history. In general, most of the viewpoints believe that opening to the outside world can promote economic growth. However, there are significant differences in the views of different schools on the specific process of opening up to economic growth and the internal mechanism.

2.1 Theoretical Research Review
Earlier economists looked at the relationship between openness and economic growth mainly from the perspective of foreign trade. In the 1930s, British scholar Robertson (D.H. Robertson) proposed for the first time that foreign trade is the engine for economic growth (engine for growth) proposition. The main focus is that the backward countries can promote their own economic growth through foreign trade, especially export growth. Harrison analyzed the relationship between trade openness and economic growth using seven indicators of trade openness. [1] In 2003, domestic scholars Bao Qun et al. selected the five indicators of trade dependence, actual tariff rate, black market transaction fees, Daulas index and revised trade dependence to measure the degree of trade openness to economic growth since China’s reform and opening up. [2] Foreign direct investment (FDI) mainly affects its economic growth by promoting the capital accumulation and technological progress of the host country. The conclusion that FDI contributes to the accumulation of capital in the host country stems from the double-gap theory proposed by Chen (1966), DeMello (1999) studied the relationship between FDI and economic growth in OECD countries. The conclusion is that only when FDI and domestic investment are complementary, FDI has a positive impact on economic growth. He Zhengxia started from the perspectives of foreign investment and foreign trade, and examined the actual effect of economic opening on China’s economic growth. [3]

2.2 Empirical Research Overview
Early empirical research on the relationship between external development and economic growth mainly focused on the test of export-led economic growth (ELG). In the past 20 years, scholars have conducted extensive research using different models and analysis methods for different countries and regions. The relevant studies can be divided into the following two categories.
Among them, EO is China's economic openness, TO is China's trade openness, IO is China's foreign capital openness, and FO is China's financial openness.

\[
TO = \frac{\text{Commodity trade import and export} + \text{Total import and export of service trade}}{\text{GDP}}
\]

\[
IO = \frac{\text{IO accept} + \text{IO outside}}{\text{China actually accepts total foreign direct investment + Total foreign direct investment}}
\]

\[
FO = \frac{\text{FO currency} + \text{FO capital} + \text{FO other}}{2}
\]

3. CONSTRUCTION AND ANALYSIS OF OPENNESS INDEX SYSTEM

The degree of economic openness is an important indicator for measuring the level of open economy. At present, the research on the relationship between openness and economic growth has received increasing attention from the academic community, but no consensus has been reached on the selection of indicators for economic openness. Earlier economists, when measuring openness to the outside world, often only examined the dependence on foreign trade, that is, the ratio of total import and export trade to gross domestic product (GDP). Although this method is intuitive and simple, in the course of the study, people gradually measure the degree of openness with the degree of trade dependence, because a country’s trade dependence is affected by factors such as the country’s capital level, financial conditions, and government policies. Therefore, the degree of trade dependence does not fully reflect the level of openness. Since then, more scholars have measured the degree of openness from the perspective of international openness in foreign trade, foreign direct investment, etc., and studied the internal relationship with economic growth, thus making great progress. However, with the acceleration of the free flow of financial capital in the world, virtual capital plays an increasingly important role in the foreign economy. Therefore, based on previous research, this paper integrates financial openness into the economic openness index system. The formula is as follows:

China's economic openness = (trade openness + foreign capital openness + financial openness) / 3

which is

\[
EO = \frac{(TO + IO + FO)}{3}
\]
The method of empirical analysis in this paper is mainly based on the economic growth model proposed by Solow in 1956. In this model, Solow assumes a two-factor production function:

\[ Y = F(K, L) = AK^\alpha L^\beta \]  

(7)

Among them, K is capital, L is labor force, Y is output, and \( \alpha \) and \( \beta \) are the output elasticities of capital and labor, respectively. From formula (7), we can see that in the Solow model, FDI and domestic capital are seen as homogeneous elements in the capital variable K, and Solow does not consider the impact of technological progress on output. In order to explain continued economic growth, it is necessary to consider external factors that have long increased factor productivity. Therefore, when the formula (7) incorporates the time factor, then:

\[ Y = F(K, L, t) = e^{rT}K^\alpha L^\beta \]  

(8)

From table (8), where \( e \) is the base of the natural logarithm; t is the time; the rest is the same as the definition of formula (7). In fact, after the introduction of the time factor, all factors such as technological progress, changes in industrial structure, and institutional changes are attributed to the time coefficient. Therefore, it is called the total factor productivity and is the growth rate of total factor productivity. Take the logarithm form of e in the formula (8), and add a random variable, you can get:

\[ Y = F(K, L, t) = e^{rT}K^\alpha L^\beta \]  

(9)

In fact, formula (9) assumes that domestic capital and foreign direct investment are homogeneous capital, which is inconsistent with China's actual economic conditions. Since the reform and opening up in 1978, the total capital used by China for investment has not only originated in China, but a considerable part of it has come from FDI. The inflow of FDI brings about advanced technology, management experience and institutional innovation in the investing countries. These intangible factors can be absorbed to a certain extent, thus affecting economic growth. Therefore, we cannot simply include FDI and domestic capital as homogeneous capital in the capital variable. Instead, FDI should be considered as a separate variable that affects China's economic growth.

Secondly, as the financial openness influencing the virtual economy, it is not considered in the formula (9). The impact of the accuracy of the results in the current period has had a considerable influence on the new century. The real economy in China has not only been greatly developed, but also the financial market is booming. The impact of economic growth has become increasingly apparent, so we will use it as a separate variable to influence economic growth. At the same time, the time factor t is introduced and changes accordingly. For the sake of simplifying the analysis, assume that domestic capital is a homogeneous capital, that is, it can only be deployed in the form of capital in the domestic scope. FDI flows in the international scope in the form of capital and technology. It is different from domestic capital and is a heterogeneous capital. We can define the total capital level of a country as the weighted average of domestic capital and FDI. The mathematical formula specifically states:

\[ K = K_d^\lambda + K_f^{1-\lambda} \]  

(10)

\[ Y = f(K_d^\lambda, K_f^{1-\lambda}, L, t) = e^{rT}t^{rT}f_s(t)(K_d^\lambda)^{\alpha(1-\lambda)}L^\beta \]  

(11)

At the same time, in order to examine the role of foreign trade in China's economic growth, we include the import and export amount T as a variable in the production function, which is the output elasticity of T. Thus we obtain the final model:

\[ Y = f(K_d^\lambda, K_f^{1-\lambda}, L, T, t) = e^{rT}t^{rT}f_s(t)(K_d^\lambda)^{\alpha(1-\lambda)}L^\beta \]  

(12)

Where \( K_d^\lambda \) and \( K_f^{1-\lambda} \) represent the total capital level, domestic
capital, and FDI respectively. \( \lambda \) represents the weight of domestic capital in the total capital composition. After incorporating FDI as an input variable of the production function into the Cobb-Douglas production function, the financial openness \( f \) is also taken as a new factor, and it is tied to the time coefficient \( \gamma \) along with factors such as institutional changes, technological advances, and changes in the industrial structure, referred to as the new total factor productivity, and \( \gamma \) is the growth rate of total factor productivity, and \( f \) is the logarithmic form of the increase in financial openness, and is obtained by adding a random variable:

\[
\ln(Y_t) = \gamma t + \ln(f_t) + a\ln(K_t^\theta) + b\ln(L_t) + a(1 - \alpha)\ln(T^\theta) + \theta LnT + \mu_t \tag{13}
\]

Table 3 GDP, Domestic Capital Investment, Labor Force Input, FDI and Import and Export Volume from 1985 to 2004

<table>
<thead>
<tr>
<th>Years</th>
<th>GDP (Billion)</th>
<th>K (Billion)</th>
<th>L/10 thousand (people)</th>
<th>K' (Billion)</th>
<th>T/10 thousand (people)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1985</td>
<td>8064.4</td>
<td>2494.45</td>
<td>46873</td>
<td>48.73</td>
<td>2066.7</td>
</tr>
<tr>
<td>1986</td>
<td>8092.8</td>
<td>2515.31</td>
<td>51225</td>
<td>56.15</td>
<td>2083.9</td>
</tr>
<tr>
<td>1987</td>
<td>8160.7</td>
<td>2576.72</td>
<td>52785</td>
<td>55.84</td>
<td>2064.2</td>
</tr>
<tr>
<td>1988</td>
<td>8182.9</td>
<td>2582.56</td>
<td>54233</td>
<td>52.15</td>
<td>2047.8</td>
</tr>
<tr>
<td>1989</td>
<td>8090.2</td>
<td>2422.64</td>
<td>53292</td>
<td>51.73</td>
<td>2037.9</td>
</tr>
<tr>
<td>1990</td>
<td>8154.7</td>
<td>2450.18</td>
<td>64749</td>
<td>46.62</td>
<td>2007.1</td>
</tr>
<tr>
<td>1991</td>
<td>8162.7</td>
<td>2438.11</td>
<td>69755</td>
<td>44.04</td>
<td>2035.9</td>
</tr>
<tr>
<td>1992</td>
<td>8163.8</td>
<td>2475.78</td>
<td>66152</td>
<td>42.12</td>
<td>1912.6</td>
</tr>
<tr>
<td>1993</td>
<td>8412.4</td>
<td>2552.08</td>
<td>68072</td>
<td>41.12</td>
<td>1905.9</td>
</tr>
<tr>
<td>1994</td>
<td>8570.5</td>
<td>2491.25</td>
<td>73455</td>
<td>42.03</td>
<td>2078.9</td>
</tr>
<tr>
<td>1995</td>
<td>5807.3</td>
<td>1685.88</td>
<td>65065</td>
<td>37.24</td>
<td>2359.9</td>
</tr>
<tr>
<td>1996</td>
<td>6388.4</td>
<td>2068.43</td>
<td>65950</td>
<td>40.10</td>
<td>2413.5</td>
</tr>
<tr>
<td>1997</td>
<td>7144.2</td>
<td>2318.79</td>
<td>69280</td>
<td>37.72</td>
<td>2662.7</td>
</tr>
<tr>
<td>1998</td>
<td>7132.5</td>
<td>2380.24</td>
<td>70617</td>
<td>37.72</td>
<td>2669.7</td>
</tr>
<tr>
<td>1999</td>
<td>8206.7</td>
<td>2656.99</td>
<td>71304</td>
<td>33.73</td>
<td>2209.6</td>
</tr>
<tr>
<td>2000</td>
<td>8846.1</td>
<td>2504.74</td>
<td>72085</td>
<td>37.75</td>
<td>2292.7</td>
</tr>
<tr>
<td>2001</td>
<td>9126.5</td>
<td>3531.51</td>
<td>73605</td>
<td>38.09</td>
<td>2413.4</td>
</tr>
<tr>
<td>2002</td>
<td>10517.3</td>
<td>3924.37</td>
<td>77240</td>
<td>40.54</td>
<td>3175.8</td>
</tr>
<tr>
<td>2003</td>
<td>11731.9</td>
<td>4152.90</td>
<td>82432</td>
<td>41.15</td>
<td>3556.2</td>
</tr>
<tr>
<td>2004</td>
<td>15987.0</td>
<td>5039.65</td>
<td>92502</td>
<td>41.35</td>
<td>39562.8</td>
</tr>
</tbody>
</table>

Sources of data: China Statistical Yearbook and the National Bureau of Statistics website

Using the statistical data of China’s economy from 1985 to 2004 to regression (using Eviews software) for the model (13), the following estimation model can be obtained:

\[
\ln(Y_t) = -2.1038 + 0.9821\ln(K_t^\theta) + 0.46107\ln(L_t) + 0.53327\ln(K_t) + 0.07538\ln(T) + 0.211\ln(T) \tag{13}
\]

\[
R^2 = 0.9948 \text{ Adjusted-} R^2 = 0.9934 \text{ F-statistic=711.2} \quad (P>F<0.0001)
\]

After estimating the parameters of the model, we found that after introducing the two variables of FDI and import and export volume, of the six factors affecting economic growth, at the 5% level of significance, only domestic capital investment and financial openness are significant. Each additional unit of domestic capital investment will increase GDP by 0.461 units. Every percentage point increase in financial openness will boost GDP growth by 0.98 units. The labor input is not significant. Each additional unit will increase the GDP by 0.533 units. In contrast, the amount of imports and exports and foreign direct investment are not significant. For each additional unit of the import and export volume, the GDP is increased by 0.211 units; for each additional unit of FDI, the GDP is increased by 0.075 units. Total factor productivity is very insignificant. However, from the whole model, the degree of quasi-optimization reached 0.99, and the model itself is also very significant. This shows that the six selected factors can explain China’s economic growth situation well.

Through the above empirical analysis, the following basic conclusions can be drawn:

1. At present, domestic capital investment is still the primary factor in promoting China’s economic growth. At the same time, China's financial level needs to be further improved in the first phase. In contrast, the current FDI amount and import and export volume are not the main factors affecting China’s economic growth.

2. Foreign trade has a slightly stronger driving effect on economic growth than FDI and financial openness.

3. The inadequacy of China’s trade, finance, and exchange rate systems has distorted the prices of trade products to a certain extent, hindered the effective allocation of resources through domestic price trade through foreign trade of foreign trade, and have created inadequate domestic market development and utilization. The situation of excessive dependence on trade, in addition, the unsound system also increased the transaction costs in China's foreign trade and further reduced the efficiency of foreign trade. Therefore, we must further deepen structural reforms in trade, finance, and exchange rates, reduce foreign trade transaction costs, and improve the effective distribution mechanism of resources in the domestic and international markets. At the same time, we must pay full attention to the construction of domestic consumer markets, expand the proportion of domestic consumption in GDP, implement a strategy of winning with quality, and use precious resources for domestic economic construction.

5. POLICY IMPLICATIONS

This paper uses Eviews analysis software to examine the actual effects of economic opening on China’s economic growth from the perspective of foreign investment and foreign trade and the level of China’s financial liberalization. The following basic conclusions are reached: At present, domestic capital investment is still driving China’s economic growth. The most important factor is that the contribution of labor input to China’s economic growth is not significant, while FDI, FDI, and imports and exports have little effect on China’s economic growth. Based on the empirical research in this paper, we can obtain the following policy implications by further analyzing the problems in China’s open economy:

1. At present, domestic capital investment is still the primary factor that promotes China’s economic growth, and total factor productivity, which embodies the factor of technological progress, even has a negative correlation with GDP. The role of investment in promoting economic growth based on inputs of production factors has the nature of diminishing marginal returns, and it requires long-term economic growth rates. From the perspective of economic growth strategy, we must attach importance to the role of technological progress (The role of technological progress factors in promoting economic growth has a marginal effect. The nature of income that is constant or increasing).

2. The current role of FDI in China’s economic growth is very limited. As FDI promotes a country’s economic growth mainly through capital formation, technology spillovers and structural adjustment effects, given that the quantitative effect of China’s foreign investment has become quite significant, to further enhance FDI’s catalytic role in China’s economic growth, we can start with enhanced technology spillovers, actively guide foreign investment, selectively attract multinational corporations with strong industry linkage effects and basic science and technology development orientation to make direct investment in China, and at the same time, enhance technological attraction and strengthen the regional advantages of high-tech industrial zones.

3. There is still much room for increase in the contribution rate of financial openness to China's economic growth. China must further increase its control and direction of financial policies. Due to the unsoundness of China’s trade, finance, and

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exchange rate systems, the prices of trade products have been distorted to a certain extent, and resources have been hindered from effectively integrating domestic trade and foreign trade through the price mechanism. This has led to a lack of development and utilization of the domestic market and an excessive dependence of economic growth on trade. In addition, the unsound system also increased the transaction costs in China's foreign trade and further reduced the efficiency of foreign trade. Therefore, we must further deepen structural reforms in trade, finance, and exchange rates, reduce foreign trade transaction costs, and improve the effective distribution mechanism of resources in the domestic and international markets. At the same time, we must pay full attention to the construction of domestic consumer markets, expand the proportion of domestic consumption in GDP, implement a strategy of winning with quality, and use precious resources for domestic economic construction.

In addition, the role of foreign trade in promoting China’s economic growth at this stage is not yet significant. Further analysis shows that: China's processing trade accounts for a large proportion, the quantitative expansion of trade structure and the adverse impact of foreign trade on China's independent technological innovation, makes foreign trade increase the efficiency of factor use through technology spillover effects and thus promote the economic growth of a country. The effect is also not ideal. Specifically, we can start from the following aspects to enhance the role of foreign trade in promoting economic growth in China: (1) Strengthen the industrial linkage effect of processing trade. We will vigorously develop the processing trade of high-tech products and promote the upgrading of processing trade. (2) Encourage comparative advantage enterprises to carry out the second venture while vigorously developing competitive advantage enterprises. (3) Take effective measures to protect and cultivate the independent innovation capabilities of Chinese enterprises and eliminate the negative impact of foreign trade on China's technological innovation.

6. REFERENCE


