Abstract

This paper analyzes the contribution of exports to economic growth in Russia and China. We find that the contribution of exports to economic growth in Russia is far less than it is in China because the real growth rate of exports in Russia is far lower than in China. This paper points out that the difference in the growth rate of exports results from the fact that the export structure and revealed comparative advantage (RCA) did not show signs of change in Russia while they were rapidly changing in China.

Keywords: Exports; Economic growth; Export structure; RCA

JEL Classification: F14; P52

1. Introduction

Russia and China, the two largest transitional economies, had different economic reform policies: China has implemented gradual economic reforms since 1978 and Russia has employed rapid economic reforms by shock therapy since 1992. As a result, China recorded high economic growth, and Russia fell into negative economic growth from 1990 through 1998 (with the exception of 1997), finally realizing positive economic growth since 1999. This paper will concentrate on the contribution of exports to economic growth in Russia and China so as to explain why Russia and China have shown differences in economic growth.

Using a modified version of the decomposition method for gross output pro-
vided by Syrquin (1988), Imai (2001) decomposes Hong Kong’s output growth into domestic demand, the share of domestic demand supplied from domestic sources, domestic exports of goods and exports of services, and then analyzes the contribution of each element. Making use of a modified version provided by Imai (2001), we decompose real GDP of Russia and China into two elements. The first is the real domestic demand supplied from domestic source and the second is real exports that are the sum of domestic exports of goods and services. We find that the average contribution of exports of goods and services decomposed from Russia’s real economic growth from 1992 through 2002 is about 1.6% and the counterpart in China from 1978 through 2002 reached about 3.6%.

Why is the contribution of exports to economic growth in Russia far less than that it is in China? The principal reason is that the growth rate of exports in Russia has been far less than that in China. The average growth rate of exports from 1992 to 2002 in Russia was 6.5%, while from 1978 to 2002 in China it reached 11%. Djankov and Freund (2002) used a gravity model to analyze the trade flows in the former Soviet Union from 1987 to 1996. They found that the slow adjustment of production and of infrastructure had limited trade reorientation in the Russian regions away from the former Soviet republics. In this paper, by comparing the export structure and revealed comparative advantage (RCA) in Russia and China, we find that the export structure and RCA did not change in Russia, but that these did change in China. This consequently brought about a different growth rate for exports that is one of the fundamental explanations as to why the real economic growth rate in Russia has been far less than that in China.

Section 2 provides a summary of GDP and exports in Russia and China and analyzes the contribution of their exports to economic growth by decomposing economic growth. Section 3 explains why the contribution of exports to economic growth is different in Russia and China by comparing the export structure and RCA in both countries. Section 4 provides conclusions.

2. Exports and Economic growth decomposition in Russia and China

In this section, we will first summarize GDP and exports in Russia and China after different economic reforms were conducted in both countries, and then analyze how exports contributed to economic growth in the two counties.
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Figs. 1 and 2 show the change in GDP, the exports of goods and services and the share of exports in GDP and the growth rate of exports in Russia and China in 1995 prices. After the shock therapy economic reforms began in 1992, Russia’s GDP continued to slide downward to US$381.3 billion in 1996 from US$516.7 billion in 1992. In 1997, positive real economic growth of 1.4% was achieved for the first time since the introduction of economic reforms. In 1998, however, GDP fell to US$366.1 billion with real economic growth of -5.3% from US$386.6 billion in 1997. Nevertheless, the real economic growth has begun to recover since 1999. In 2002, Russia’s real GDP recovered to post US$469.3 billion. However, compared to real GDP in 1992, Russia’s real GDP in 2002 decreased by US$47.4 billion with an average real economic growth rate of -1%. On the other hand, Russia’s exports of goods and services gradually increased from US$90.4 billion in 1992 to US$169.3 billion in 2002 with an average growth rate of 6.5%. After continuously registering high growth rates of 11.0% in 1995, 10.1% in 1996 and 4.4% in 1997, Russia’s exports registered negative growth rates of -2.3% in 1998 and -1.7% in 1999 and have remained at about 2.6% since 2000. The share of exports in GDP increased to 36.1% in 2002 from 17.5% in 1992. However, the increase in the share of the exports of goods and services in the GDP has clearly contributed to the drop in the GDP.

In China, after economic reforms began to be conducted gradually and experimentally in 1978, China’s GDP showed continual growth, reaching US$1208.9 billion in 2002 from US$141.1 billion in 1978, with an average growth rate of 9.4%. China’s exports of goods and services in 2002 reached US$468.7 billion from US$38.5 billion in 1978, with an average growth rate of 11%. In all the years from 1978 through 2002 (except 1983 and 1996), China’s exports maintained a positive growth rate and registered two-digit growth rates in about half of the 25 years. Nevertheless, the share of exports of goods and services in the GDP continued to slide downward from 30% of GDP in the early 1980’s to 20% of the GDP in 1996 due to the rapid growth of the GDP. However, the share of exports in the GDP recovered since 1997 and grew up to about 40% of the GDP in 2002.
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Figure 1 Russia's GDP and Exports

Data source: World Development Indicators CD-ROM (2004), World Bank

Figure 2 China's GDP and Exports

Data source: World Development Indicators CD-ROM (2004), World Bank
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From the above comparative analysis of GDP and exports in Russia and China, we can see that the average growth rate of exports in Russia is only half of that in China. We can then analyze how the difference in the growth rate of exports between Russia and China influences their economic growth. In order to analyze the contribution of exports of goods and services to GDP, we decompose the economic growth rates of Russia and China into two growth rate elements in keeping with the method as discussed by Imai (2001).

Let \( Y_t, D_t, X_t, \) and \( M_t \) denote GDP, domestic demand, domestic exports of goods and services and domestic imports at period \( t \). Thus, GDP can be represented by

\[
Y_t = D_t + X_t - M_t
\]

(1)

When considering the contribution of domestic demand supplied from domestic sources, we let \( \alpha_t = (D_t - M_t) / D_t \), which represents the share of domestic demand supplied from domestic sources in domestic demand. Thus, Eq. (1) can be rewritten as follows:

\[
Y_t = \alpha_t D_t + X_t
\]

(2)

Differentiating between \( Y_t \) and \( Y_{t-1} \) and dividing by \( Y_{t-1} \), we can obtain

\[
\dot{Y}_t = \theta_{t-1} (\alpha_{t} \dot{D}_t) + \theta_{t-1}^X \dot{X}_t
\]

(3)

where \( \dot{Y}_t, \alpha_{t} \dot{D}_t \) and \( \dot{X}_t \) are growth rates of GDP, domestic demand supplied from domestic sources, exports of goods and services and imports of goods and services at period \( t \), \( \theta_{t-1} \) and \( \theta_{t-1}^X \) are shares of domestic demand supplied from domestic sources and exports of goods and services in GDP at period \( t - 1 \), respectively. Eq. (3) means that the domestic demand supplied from domestic sources and exports of goods and services contribute to economic growth through the product of their growth rate at period \( t \) and share in GDP at period \( t - 1 \).

Using Eq. (3), we can analyze the effect of the export of goods and services on economic growth in Russia and China, respectively. The data on GDP, exports of goods and services and imports of goods and services measured at constant 1995 US$ is taken from World Development Indicators CD-ROM (2004). The results of these estimates are shown in Figs. 3 and 4 for Russia and Figs. 5 and 6 for China.
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Figure 3 Russia's GDP growth decomposition

![Graph showing Russia's GDP growth decomposition.](image)

Data source: World Development Indicators CD-ROM (2004), World Bank

Figure 4 The contribution rates of exports and domestic demand supplied from domestic resources to economic growth in Russia (%)

![Graph showing the contribution rates of exports and domestic demand.](image)

Data source: World Development Indicators CD-ROM (2004), World Bank
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Figure 5 China's GDP growth decomposition

[Graph showing China's GDP growth decomposition with labels: GDP, exports, domestic demand supplied from domestic sources.]

Data source: World Development Indicators CD-ROM (2004), World Bank

Figure 6 The contribution rates of exports and domestic demand supplied from domestic resources to economic growth in China (%)

[Graph showing contribution rates with labels: domestic demand supplied from domestic sources, exports.]

Data source: World Development Indicators CD-ROM (2004), World Bank

Fig. 3 shows that Russia's GDP growth rate can be decomposed into two elements. The first is the contribution of exports of goods and services and the
second is the contribution of domestic demand supplied from domestic sources. The exports of goods and services made a positive contribution to economic growth from 1993 through 2002 (except 1997) with three peaks of 2.9% in 1995, 3.7% in 1999 and 3.5% in 2002. On the other hand, the domestic demand supplied from domestic source adversely effected economic growth negatively until 1998 (except 1997) but has become a positive influence since 1999. From 1992 through 2002, Russia's average economic growth rate was -1.0% and the average contribution of exports of goods and services to the economic growth rate was 1.6% while that of domestic demand supplied from domestic sources was -2.6%. Fig. 4 shows the contribution rates of exports of goods and services and domestic demand supplied from domestic sources to economic growth, measured in terms of the respective shares of the export of goods and services and domestic demand supplied from domestic sources in the GDP growth rate. Figure 4 shows that Russia's economic growth rate is more dependent upon the contribution rate of domestic demand supplied from domestic sources than on the exports of goods and services.

Fig. 5 shows China's GDP growth decomposition. Exports of goods and services positively contributed to economic growth from 1978 through 2002, except in 1983 and 1996. Further, the contribution of exports tended to be greater since 1986, and especially in recent years. On the other hand, domestic demand supplied from domestic source also positively contributed to economic growth from 1978 through 2002, except in 2001 and 2002. From the early 1980's through the middle of the 1990's, the contribution of domestic demand supplied from domestic sources surpassed the contribution of exports of goods and services. However, the contribution of domestic demand supplied from domestic sources showed a downward trend since 1996 and registered a negative contribution of -0.02% in 2000 and -1.5% in 2002, while the contribution of exports of goods and services began to lead economic growth and registered high contribution levels of 8.0% in 2000 and 9.5% in 2002. From 1978 through 2002, China's average economic growth rate reached 9.4%, the average contribution of exports of goods and services was 3.6% and that of domestic demand supplied from domestic sources was 5.8%. Fig. 6 shows the contribution rates of exports of goods and services and domestic demand supplied from domestic sources to economic growth. From the early 1980's through 1996, China's economic growth was more dependent on the contribution rate of domestic demand supplied from
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domestic sources than it was on the exports of goods and services. However, the contribution rate of domestic demand supplied from domestic sources showed a downward trend since 1986 and the contribution rate of exports of goods and services to economic growth began to increase since 1996, surpassing the contribution rate of domestic demand supplied from domestic sources in most years in the late 1990's and early 2000's.

The comparative analyses above show that the contribution of exports of goods and services to economic growth plays an important part in both Russia and China, even though the economic growth rate is more dependent upon the contribution rate of domestic demand supplied from domestic sources in both countries. The contribution of exports in Russia, however, is far less than that in China. In the next section, we will analyze why the growth rate of exports have been different in Russia and China by comparing the structure of exports and RCA in the two countries.

3. Export structure and RCA in Russia and China

In the previous section, we analyzed the contribution of exports to economic growth in Russia and China. We found that the contribution of exports in Russia has been far less than that in China. From Eq. (3), we know that the domestic demand supplied from domestic sources and exports of goods and services contributed to economic growth through the product of their growth rate at period t and ratio to GDP at period t - 1. Comparing the ratio of exports of goods and services to GDP in Russia and China in Figs. 1 and 2, we find that the ratio of exports to GDP in Russia is a little less than that in China only in 1991, 1992 and 2002, and a little higher in other years. Thus, the growth rate of exports is the principal reason for the difference in the contribution of exports in Russia and China. In this section, we will analyze why the growth rate of exports is so different by comparing export structure and the RCA of exports in Russia and China.

Figs. 7 and 8 show the export structures of Russia and China by industry sector. In Russia, the export structure has kept relatively stable from 1994 to 2002. Mining products continued to account for more than 50% and manufactures and agricultural products accounted for approximately 30% and less than 10% of Russia's exports, respectively. The relatively stable export structure in Russia implies that Russia's export structure remained unchanged after the 1992
economic reforms. On the other hand, China's export structure began to change since 1986 in keeping with the economic reforms in industry that have been initiated in 1984. The share of manufactures in China's exports rapidly increased while the shares of mining and agricultural products decreased from 1986 to 2002. China first introduced its economic reforms into agriculture sector in 1978. As economic reforms in the agriculture sector succeeded, a series of economic reforms in the industry sector were conducted beginning in 1984. Therefore, after the share of manufactures sliding downward to 36.3% in 1985 from 48.1% in 1978, it recovered to 43.6% in 1986 and continued to increase to 89.9% in 2002. The exports of agricultural and mining products continued to decrease since 1986 though the exports of agricultural products accounted for about 20% of China's exports and the exports of mining products accounted for about 25% of China's exports from 1978 through 1985. In 2002, the share of agricultural products dropped to 5.8% from 22.8% in 1985 and the share of mining products dropped to 4.2% from 28.4% in 1985. Such changes in China's export structure show that it has been rapidly altered from agriculture and mining into manufacturing.

Comparing the export structures in Russia and China, the unchanged export structure in Russia and the changing export structure in China are a fundamental source of the difference in export growth between the two countries.

Figure 7 Russia's exports structure (%)
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Figure 8 China's exports structure (%)

Data source: http://www.wto.org

Although the export structure can explain why the growth rate of exports in Russia and China is so different, it cannot provide us with any information as to whether export products have a comparative advantage in world markets or not. Therefore, making use of the RCA theory as discussed by Balassa (1988), we will explain why the export growth rate in Russia and China is so different by reviewing their comparative advantage positions in world markets. The RCA index of a country’s exports in a particular commodity category is defined as the ratio of a share of the particular commodity category in the country’s total exports to a share of the same commodity in the world’s total exports:

\[ RCA_{ik} = \frac{X_{ik}}{X_i} / \frac{X_{wk}}{X_w} \]  

where \( X \) stands for exports and the subscripts \( i, w \) and \( k \) refer to a country, the world and a product category, respectively. If RCA index is greater than 1, then it means that the relative share of the exports of the particular product category in the country are larger than that in the world, that is, the country has a RCA in the particular category. Using this index, we can analyze how the RCA changed in Russia and China after different economic reform policies were conducted in both countries. The results are shown in Figs. 9 and 10.

In Russia, the RCA in agricultural products, mining products and manufactured products did not change from 1994 through 2002. Mining products main-
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tained a RCA while agricultural and manufactured products had no RCA from 1994 through 2002 since the RCA index of mining products remained greater than 1 and that of agriculture products and manufactured products were less than 1 for each of the nine years. On the other hand, the RCA index of agricultural products tended to increase even though agricultural products showed no RCA. This suggests that the RCA of agricultural products showed a tendency to increase. In China, the RCA rapidly changed after a series of economic reform policies in the industry sector were conducted since 1984. The RCA tended to increase in manufactured products and to decrease and gradually be lost in agricultural products and mining products from 1986 through 2002. After the RCA index of the exports of manufactured products continued to slide downward to 0.65 in 1985 from 0.90 in 1980, it began to recover and has surpassed 1 since 1989. In 2002, it reached 1.24. On the other hand, after the RCA index of exports of agricultural and mining products reached their peak in 1985, the index tended to decrease in both sectors. However, the exports of agricultural products maintained its RCA until 1994 and the exports of mining products maintained its RCA only until 1987. This implies that the economic reforms in industry, since 1984, were a key turning point from which the RCA began to rapidly change from agricultural and mining products into manufactured products.

Figure 9 The revealed comparative advantage of Russia's exports

Data source: http://www.wto.org
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Figure 10 The revealed comparative advantage of China's exports

Data source: http://www.wto.org

The above analysis of the RCA of exports by industry sector remains rough, however. We must next make use of Eq. (4) to analyze the RCA of exports by major merchandise in Russia and China. Major merchandise includes food, fuels, iron and steel, chemical products, machinery and transport equipment, textiles and clothing. Data on China are taken from 1990 to 2002 due to restrictions on the data available. The results are shown in Tables 1 and 2.

In Russia, fuels and iron and steel maintained a RCA since their RCA indices stayed greater than 1, while the remainder of products had no RCA since their RCA indices were less than 1. The RCA of food tended to increase and that of chemical products, machinery and transport equipment, textiles and clothing did not show any change. In China, textiles and clothing maintained their RCA from 1990 to 2002 since their RCA indices stayed greater than 1 and food kept its RCA until 1994. Other products showed changes in the RCA though the RCA index remained less than 1: the RCA index of machinery and transport equipment grew to approach 1 in 2002 while the RCA indices of fuels, iron and steel and chemical products tended to drop.

Thus, we find the analysis of the RCA in Russia and China reveals the same results as were found in our analysis of their respective export structures. While the main exports in Russia are mining products with low-added values, the main exports in China have changed from agricultural and mining products with low-added values into manufactured products with high-added values.
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Therefore, differences in the export structure and RCA can explain why the growth rate of exports in Russia has been far less that in China.

Table 1 The revealed comparative advance of Russia's exports by major merchandise

| Year | Food | Fuels | Iron and steel | Chemical products | Machinery and transport equipment | Textiles | Clothing |
|------|------|-------|----------------|-------------------|----------------------------------|----------|----------|
| 1994 | 0.11 | n.a   | 3.06           | 0.65              | 0.13                             | 0.30     | 0.07     |
| 1995 | 0.10 | 7.71  | 2.92           | 0.74              | 0.16                             | 0.16     | 0.10     |
| 1996 | 0.49 | 5.22  | 3.38           | 0.69              | 0.20                             | 0.21     | 0.11     |
| 1997 | 0.43 | 5.67  | 3.28           | 0.61              | 0.16                             | 0.19     | 0.10     |
| 1998 | 0.55 | 6.25  | 3.35           | 0.76              | 0.25                             | 0.21     | 0.11     |
| 1999 | 0.59 | 5.63  | 3.46           | 0.80              | 0.23                             | 0.20     | 0.14     |
| 2000 | 0.55 | 4.92  | 3.03           | 0.74              | 0.19                             | 0.19     | 0.08     |
| 2001 | 0.54 | 5.26  | 2.92           | 0.73              | 0.22                             | 0.19     | 0.08     |
| 2002 | 0.51 | 5.71  | 2.74           | 0.66              | 0.22                             | 0.21     | 0.08     |

Data source: http://www.wto.org

Table 2 The revealed comparative advance of China's exports by major merchandise

| Year | Food | Fuels | Iron and steel | Chemical products | Machinery and transport equipment | Textiles | Clothing |
|------|------|-------|----------------|-------------------|----------------------------------|----------|----------|
| 1990 | 1.38 | 0.78  | 0.67           | 0.70              | 0.50                             | 3.84     | 4.97     |
| 1991 | 1.32 | 0.66  | 0.79           | 0.62              | 0.54                             | 3.60     | 5.11     |
| 1992 | 1.21 | 0.59  | 0.56           | 0.59              | 0.43                             | 3.25     | 5.61     |
| 1993 | 1.21 | 0.51  | 0.41           | 0.58              | 0.46                             | 3.16     | 5.89     |
| 1994 | 1.13 | 0.45  | 0.49           | 0.57              | 0.49                             | 3.22     | 6.03     |
| 1995 | 0.95 | 0.51  | 1.17           | 0.65              | 0.56                             | 3.18     | 5.27     |
| 1996 | 0.93 | 0.51  | 0.91           | 0.64              | 0.62                             | 2.83     | 5.38     |
| 1997 | 0.84 | 0.46  | n.a            | 0.93              | 0.61                             | 2.71     | 5.46     |
| 1998 | 0.80 | 0.45  | 0.68           | 0.60              | 0.67                             | 2.56     | 4.83     |
| 1999 | 0.78 | 0.32  | 0.63           | 0.57              | 0.73                             | 2.61     | 4.77     |
| 2000 | 0.81 | 0.30  | 0.80           | 0.53              | 0.81                             | 2.71     | 4.74     |
| 2001 | 0.75 | 0.32  | 0.55           | 0.52              | 0.89                             | 2.67     | 4.41     |
| 2002 | 0.69 | 0.27  | 0.47           | 0.46              | 0.99                             | 2.69     | 4.09     |

Data source: http://www.wto.org
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4. Conclusions

This paper analyzes the contribution of exports to economic growth in Russia and China after different economic reform policies had been carried out in both countries. We found that the contribution of exports to economic growth in Russia was far less than that in China though exports positively contributed to economic growth in both countries. The difference in the contribution of exports to economic growth resulted from the far lower growth rate of real exports in Russia because of an unchanged export structure and RCA. This, in turn, made it more difficult for Russia to promote export growth. Following economic reforms that began in 1992 in Russia, the main export products continued to be mining products and the export structure and RCA remained unchanged. On the other hand, the export structure and RCA have changed in China. When economic reforms in industry began in 1984, manufactured products’ share in China’s total exports rapidly increased while the shares of agricultural and mining products in China’s total exports rapidly decreased, since 1986. With the change in China’s export structure, RCA has decreased for agricultural and mining products and has increased for manufactured products. This changing export structure and RCA are the source of the rapid growth of China’s exports.

Of course, the difference in export structure and RCA between Russia and China has contributed to the difference in the promotion policies on exports in both countries. Compared to Russia’s laissez-faire policy on exports, China initiated a series of policies to introduce foreign direct investment (FDI) so as to promote the growth of exports. In 2002, FDI in Russia was only US$3461.1 million, while FDI in China was US$52743 million. FDI contributed to the growth of exports and the changing export structure and RCA in China. The share of exports created by FDI enterprises in China’s total exports has grown rapidly, reaching 52.2% of China’s total exports in 2002. Therefore, Russia should not only rely on mining products to promote its export growth, but also should increase investments in secondary industry, and work to attract FDI to invest in secondary industry as China did.

Notes

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