Comparison of Economic Growth and Industrial Structural Change between China and Russia

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1. Introduction

Since the disintegration of the Soviet Union, many countries, including Poland, Romania, Bulgaria, Hungary, Czech Republic, and Vietnam, have transformed their economic systems from a planned economy to a market economy. Some countries, such as China, experienced quick economic growth and industrial structure change, while others, such as Russia, did not and still suffer from economic stagnation and slow development. It is important to analyze the economic factors that contribute to the economic growth in countries experiencing economic transition.

Reasons for China’s success and Russia’s failure have been analyzed by previous literature. Yue and Hua (2002) computed the economic comparative advantage index for all industry sectors (i.e., RCA [relative comparative advantage]) and analyzed the effects of RCA on exports in China. They found that China experienced an industrial structure change from labor-intensive or resource-intensive sectors to capital-intensive sectors and acquired a comparative advantage in those sectors to enhance exports. Ickes and Ofer (2003) found that regional conditions, such as natural resources, cold temperatures, and major industry sectors, prevented the growth of manufacturing sectors in Russia. Based on case studies of firms, Buck et al.
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(2000) argued that the amount of inward foreign domestic investment (FDI) determined the contrasting economic growth in China and Russia. Bhaumik and Estrin (2005) analyzed enterprise microdata and found that enterprise sales were enhanced by production factors, such as labor and capital, in China, although regional demand and agglomeration factors determined sales growth in Russia.

Although previous literature discovered important factors for economic growth, there is still room for expanded analysis. First, most research used data from the 1990s, and research based on data from the 2000s has not been thoroughly analyzed. Second, previous analyses were based on case studies or different data resources, making comparison of the two countries difficult. Third, research has considered factors, such as export, FDI, and production factors, separately, yet comprehensive research that includes all factors together is more persuasive.

Given these issues, we investigate the factors that enhance economic growth in countries experiencing economic transition by comparing China and Russia based on the same data set. First, we provide an overview of the economic circumstances of the two countries by examining GDP, FDI, exports and imports, RCA, and oil prices between 1990 and 2011. Then, we empirically analyze the effects of these factors on GDP. These analyses provide effective policy to encourage economic growth in countries experiencing economic transition.

We find that FDI and production factors, such as labor and capital, expanded GDP in both China and Russia. China experienced an industrial structure change from agriculture to manufacturing sectors, gradually expanded exports, and acquired an international comparative advantage in manufacturing sectors, all of which enhanced GDP. On the other hand, Russia failed to shift its main industry from agriculture to manufacturing sectors and could not develop manufacturing sectors to expand exports. Russia’s economy heavily relies on fuel exports, and the growth of the nation’s GDP is attributed to the increase in oil prices.

The remainder of the paper is organized as follows: Section 2 provides an overview of the two countries’ economies. Section 3 provides empirical analysis of the effects of economic factors on GDP, and Section 4 concludes.
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2. Data Analysis

This section provides an overview of economic conditions in China and Russia by examining GDP, FDI, exports and imports, and RCA index. The data period is between 1990 and 2011 for China and between 1993 and 2011 for Russia since Russia was established in 1992. GDP data include total amount and gross product of each industry sector. Exports and imports data include total amount and each industry sector's trade amount, but industry sector data and the RCA index are only available after 1996. Industrial sector categories for GDP are different from industrial sector categories used for classifying trade products, and the latter is based on the SITC code of the United Nations. All variable resources are listed in Table 1.

Table 1. Data Resources

| Variable          | Data resources                  | web page                                                                 |
|-------------------|---------------------------------|---------------------------------------------------------------------------|
| GDP               | United Nations statistical database | http://unstats.un.org/unsd/dnsna/dflList.asp                               |
| FDI               | World Investment Report          |                                                                            |
| exchange rate     | World Bank website               |                                                                            |
| exports and imports| United Nations statistical database | http://comtrade.un.org/db/                                                  |
| population        | United Nations statistical database | http://unstats.un.org/unsd/dnsna/dflList.asp                               |
| labor force       | Data book of international statistics |                                                                            |
| oil price         | U.S. Energy Information Administration website | http://www.eia.gov/nep/epet_pri_gpt_01_d.htm                              |

2.1 GDP

Figures 1 and 2 provide a visual comparison of GDP for China and Russia. China introduced market-based principles in 1978 and conducted market reforms, labeled “socialist market economy,” in 1993. These reforms expanded the inflow of foreign investments and firms, which encouraged economic growth. On the other hand, the Soviet Union changed from a planned economy to a market economy in 1990, but this rapid economic reform produced economic depression, political corruption, and an increase in the number of poor, leading to economic crisis in 1998. After 2000, Russia’s economy recovered by exporting oil, but after the South Ossetia War and Lehman shock around 2008, Russia again experienced economic recession, which was especially notable in declines in the manufacturing sectors. As a result, Russia could not enhance its industrial structure to
change from resource-intensive sectors to capital-intensive sectors, and its dependency on oil trading increased.

Figures 3 and 4 illustrate the share of gross product for each industry sector among the GDP and explain industrial structure changes in China and Russia. Concrete numbers are listed in Tables I and II in the Appendix. Figure 3 shows that China shifted its main industry from agriculture to manufacturing and other sectors. For example, the share of agriculture sectors declined from 26.8% to 10.1% over 22 years, and the share of mining and manufacturing sectors increased from 36.7% to 40%. On the other hand, Figure 4 shows that Russia decreased the share of agriculture sectors but failed to expand manufacturing sectors. The share of agriculture sectors declined from 8.6% to 4.3%, and the share of mining and manufacturing sectors also decreased from 35.2% to 30.5%. In contrast, the share of other activities increased from 18.5% to 29.9%.
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2.2 FDI

Buck et al. (2000) argued that foreign domestic investment (FDI) dramatically encouraged economic growth and that China’s rapid economic growth and Russia’s failure to experience the same growth depended heavily on the amount of FDI. Figure 5 shows the amount of FDI for both China and Russia. It is obvious that these amounts are totally different, with China receiving about 10 to 50 times as much FDI as Russia in the 1990s. China received 3,487 billion in FDI in 1990; this amount increased to 40,714 billion in 2000 and 114,734 billion in 2010. On the other hand, Russia received only 1,211 billion in FDI in 1993; this amount increased to 2,714 billion in 2000 and 43,288 billion in 2010. FDI in both countries decreased in 2009 because of Lehman shock. Buck et al. (2000) explained that high country risk and high commitment cost of guaranteeing employment prevented FDI in Russia, although low country risk and high expected market return encouraged FDI in China.
2.3 Exports and Imports

It is important to examine the trends of international trade and the main export and import products when investigating economic development. Once countries develop economically and acquire international competitive power, the amount of trade increases, and the products of trade change.

Figure 5 depicts the amount of exports and imports and the ratio of export and import amounts to GDP in China. Both exports and imports rapidly expanded. The amount of exports increased from 61 billion in 1990 to 2,238 billion in 2011, while the amount of imports increased from 50 billion in 1990 to 1,983 billion in 2011. The share of exports and imports also gradually increased. The ratio of exports expanded from 16% to 31%, and the ratio of imports expanded from 13% to 27% as China acquired international competitive power. Both exports and imports rapidly decreased in 2009 because of Lehman shock.
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Figures 7 and 8 compare China’s main export and import products in 1996 and 2011. Concrete numbers are listed in Table III in the Appendix. The main features of Figure 7 are the large increase in the machine transport sector (which increased from 23.4% to 47.5% over 15 years) and the decline of food, crude material, fuels, and miscellaneous manufacture sectors. The main features of Figure 8 are an increase in the production factors sectors, such as crude material and fuels, and the decline of the manufactured goods sector from 22.6% to 8.6%. These two figures illustrate that China shifted its industry from resource-intensive to capital-intensive sectors, such as manufacturing.
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Figure 9 depicts the amount of exports and imports and the ratio of export and import amounts to GDP in Russia. Both exports and imports expanded. The amount of exports increased from 74 billion in 1993 to 590 billion in 2011, and the amount of imports increased from 60 billion in 1993 to 423 billion in 2011. The big decline in 2009 was attributed to Lehman shock. The ratio of exports and imports gradually decreased, and Russia gradually lost international competitive power. The large increase in export share around 1998 was brought about by the rapid increase in oil prices and does not indicate economic structure change or acquisition of comparative advantage.

![Figure 9. Russia: Export and Import](image)

Figures 10 and 11 compare Russia’s main export and import products in 1996 and 2011. Concrete numbers are listed in Table IV in the Appendix. The main features of Figure 10 are the large increase in the fuel sector share, from 43.1% to 59.1%, and the decline of the manufactured goods sector share from 19.9% to 10.6%. The primary features of Figure 11 are the increase in the manufacturing sector, such as manufactured goods, machine transport, and miscellaneous manufacture, and the declines in the food and reimport and reexport sectors. These two figures illustrate that Russia lost international competitive power in manufacturing sectors, and its trade relies heavily on oil exports.
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Figure 10. Russia Export

Figure 11. Russia Import

2.4 RCA

This subsection computes the index of international competitive power, i.e., Revealed Comparative Advantage (RCA), for China and Russia. This index was created by Balassa (1965) and measures the relative strength of a country’s export power in a specific industry sector. The RCA of country j for export good i is expressed as follows:

\[ \text{RCA} = \frac{X_{ij}}{X_{jw}} \times \frac{X_{iw}}{X_{w}} \]

- \( X_{ij} \): j country’s exports of good i
- \( X_{jw} \): j country’s total export goods
- \( X_{iw} \): world’s exports of good i
- \( X_{w} \): world’s total export goods

RCA is the ratio of the share of good i among all the export goods of country j to the share of good i among all export goods of the entire world. If the value of RCA exceeds 1, country j has a larger share of good i among total exports compared with the average of the world, and country j has a comparative advantage for good i. That is, country j has international competitive power over good i. On the other hand, when the value of RCA is
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smaller than 1, country j has a comparative disadvantage of good i and does not have international competitive power over good i.

This RCA index does not perfectly measure comparative advantage and has some caveats, as explained in Kumakura (2009) and Hoen and Oosterhaven (2006). The RCA can be rewritten as follows:

$$RCA = \frac{X_{ij}/X_j}{X_{iw}/X_w} = \frac{X_{ij}}{X_{iw}} \times \frac{X_w}{X_j} = \frac{X_{ij}}{X_j} \times \frac{X_w}{X_{iw}}$$

The ratio of country j’s export to world export in an industry sector i (i.e., $X_{ij}/X_j$) and the ratio of an industry sector i’s export to total export goods in an country j (i.e., $X_{ij}/X_j$) always take a value between 0 and 1. On the other hand, the values of the inverse share of country j’s export to world export (i.e., $X_{iw}/X_j$) and the inverse share of industry sector i’s export to total export in the world economy (i.e., $X_{iw}/X_{iw}$) take any values and RCA has a wide range of values. In addition, RCA depends on the industry sector and the country and if the included countries or sectors change, the RCA values also change. Therefore, the value of RCA can only be used as an ordinal index and not as a perfect measurement of cardinal index. Nevertheless, this index is easy to compute and often used, such as by Yue and Hua (2002). We use this index to examine the comparative advantage of two countries’ industry sectors.

Figure 12 shows the RCA values of China. Detailed numbers are provided in Table V in the Appendix. The miscellaneous manufacture sector always takes a value larger than 2, so the number on the right side represents this sector, while the number on the left side represents other sectors. In 1996, the only industry sectors that had an RCA value larger than 1 were manufactured goods and miscellaneous manufacture sectors. Over the 15-year period, the RCA value of the machine and transport sector rapidly increased from 0.59 to 1.30, and China acquired a comparative advantage in this sector. On the other hand, RCA values for the food, tobacco and beverage, crude material, fuels, animal oils, and chemical products sectors declined. At the end of 2011, industry sectors that had RCAs larger than 1 were manufactured goods, machine and transport, and miscellaneous manufacture, and China acquired international competitive power in secondary industry sectors.
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Figure 12. China RCA

Figure 13 shows the RCA values for Russia. Detailed numbers are provided in Table VI in the Appendix. The fuels and reimport and reexport sectors show relatively large values; therefore, the numbers on the right represent these sectors, and the numbers on the left represent other sectors. In 1996, the industry sectors that had RCA values larger than 1 were crude material, fuels, manufactured goods, and reimport and reexport. Over 15 years, RCA values for crude material, chemical products, manufactured goods, machine transport, miscellaneous manufacture, and reimport and reexport sectors decreased, and the RCA for the food and animal oils sectors increased. In 2011, the industry sectors that had RCA values larger than 1 were fuels and reimport and reexport, and Russia lost international competitive power in the crude material and manufactured goods sectors. Fuel exports became the main engine of Russian trade over the 15-year period.
3. Empirical Analysis

In this section, we empirically analyze the economic factors that encouraged GDP growth in China and Russia. We use FDI, the share of capital expenditure among GDP, number of labor forces, share of export and import among GDP, exchange rate, and RCA as explanatory variables. FDI is included to confirm the ideas of Buck et al. (2000). Capital share and labor forces are used as production factors, as in Bhaumik and Estrin (2005). Exports, imports, and exchange rate are also included to show the effects of international trade on GDP. Considering the issue of co-integration, we use share rather than amount for capital, exports, and imports. In addition, we add oil prices for Russia. When RCA variables are included, capital, labor, exports, and import factors are excluded to avoid multicollinearity. The following equation is estimated for each country, and the results are listed in Tables 2 and 3.

\[ \text{GDP} = \alpha + \beta_1 \text{FDI} + \beta_2 \text{Capital} + \beta_3 \text{Labor} + \beta_4 \text{Exp} + \beta_5 \text{Imp} \\
+ \beta_6 \text{Exchange} + \beta_7 \text{RCA} + \varepsilon \]
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Table 2 shows the estimated results for China. The coefficient of FDI is positively significant, and the increase in FDI encouraged the GDP. Both capital and labor coefficients are positively significant, and if production factors increased, GDP also increased. The coefficients of exports and imports are positively and negatively significant, respectively. The increase in exports encouraged GDP, but the increase in imports discouraged GDP. The coefficient of exchange rate is negatively significant, and if the value of the yuan declined, GDP decreased. When RCA variables are included, the results of FDI and exchange rate are almost the same. The coefficient of the food sector RCA is negatively significant, and if China acquired comparative advantage in the food sector, GDP was prevented from expanding. The coefficient of the manufactured goods RCA is insignificant, and comparative advantage of the manufactured goods sector did not affect GDP. On the other hand, the coefficient of the machine transport RCA is positively significant, and if China acquired comparative advantage in the machine transport sector, GDP increased.

Table 2. Estimation Results of GDP in China

|                | Coef.  | Std Err. | Coef.  | Std Err. |
|----------------|--------|----------|--------|----------|
| Constant       | -18,678*** | 3,196    | 7,783  | 4,811    |
| FDI            | 0.011*** | 0.001    | 0.011*** | 0.001   |
| Capital        | 155***  | 28       |        |          |
| Labor          | 0.022*** | 0.004    |        |          |
| Exports        | 245***  | 36       |        |          |
| Imports        | -243*** | 47       |        |          |
| Exchange rate  | -484*** | 78       | -851** | 353      |
| RCA food       | -3,787** | 1,500    |        |          |
| RCA manufactured goods | 3,061  | 1,820   |          |          |
| RCA machine transport | 2,485** | 938     |          |          |
| R squared      | 0.997   |          | 0.997  |          |
| Observations   | 22      |          | 16     |          |

Notes: *** means 1% significant; ** means 5% significant; * means 10% significant

Table 3 shows the estimated results for Russia. The results for FDI, capital, labor, and exchange rate are the same as the results for China. The coefficient
of exports is positively insignificant, and the increase in exports did not expand GDP because the export expansion was attributed to oil price increase and was unrelated to acquiring comparative advantages. On the other hand, the coefficient of imports is positively significant, and the increase in imports contributed to expanding GDP. The coefficient of oil price is positively significant, and the increase in oil price contributed to enhancing GDP. When RCA variables are added as explanatory variables, only the result of the food sector RCA is positively significant, and the RCAs of the fuels, manufactured goods, and machine transport sectors have insignificant effects on GDP. That is, even if Russia acquired a comparative advantage in these sectors, it either did not contribute to GDP growth, or Russia did not acquire enough comparative advantage in these sectors to enhance GDP.

Table 3. Estimation Results of GDP in Russia

|                          | Coef.    | Std Err. | Coef.    | Std Err. |
|--------------------------|----------|----------|----------|----------|
| Constant                 | -329.364 | 29.282   | 21.155   | 6.803    |
| FDI                      | 0.010*** | 0.001    | 0.005    | 0.005    |
| Capital                  | 255***   | 47       |          |          |
| Labor                    | 3.358*** | 0.293    |          |          |
| Exports                  | 61       | 49       |          |          |
| Imports                  | 362**    | 92       |          |          |
| Exchange rate            | -94**    | 31       | 55       | 49       |
| Oil price                | 67***    | 13       | 166***   | 33       |
| RCA food                 | 16,282*  | 7,375    |          |          |
| RCA fuels                | -666     | 497      |          |          |
| RCA manufacture goods    | -510     | 3,040    |          |          |
| RCA machine transport    | -2,046   | 20,797   |          |          |
| R squared                | 0.998    | 0.989    |          |          |
| Observations             | 19       | 16       |          |          |

Notes: *** means 1% significant; ** means 5% significant; * means 10% significant

We also regress the ratio of exports to GDP on exchange rate and the share of gross products of industry sectors among GDP to see how industrial structure affects export patterns. Among all sectors, the other activities sector is excluded, and the following equation is estimated. The results are listed in
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Table 4.

Export share = $\kappa + \gamma_1 \text{Agriculture} + \gamma_2 \text{Manufacture} + \gamma_3 \text{Construction} + \gamma_4 \text{Wholesale} + \gamma_5 \text{Transport} + r_6 \text{Exchange} + \epsilon$

|             | Coef. | Std Err. | Coef. | Std Err. |
|-------------|-------|----------|-------|----------|
| Constant    | 48.94 | 37.54    | -9.92 | 17.71    |
| Agriculture | -1.44*** | 0.20     | 2.34*** | 0.54     |
| Manufacture | 2.28**  | 0.79     | 0.86*** | 0.26     |
| Construction| -8.46*** | 1.69     | -1.20  | 0.67     |
| Wholesale   | -1.11  | 1.18     | 1.11** | 0.41     |
| Transport   | -3.59*  | 1.89     | -1.58*** | 0.44     |
| Exchange rate| -1.66** | 0.69     | 0.16   | 0.10     |
| R squared   | 0.927  |          | 0.943  |          |
| Observations| 22     |          | 19     |          |

Notes: *** means 1% significant; ** means 5% significant; * means 10% significant

In China, the coefficient of the agriculture sector is negatively significant, and if the share of the agriculture sector increased, the share of exports decreased. On the other hand, the coefficient of the manufacturing sector is positively significant, and if the share of the manufacturing sector increased, the share of exports increased. The coefficients of both the construction and transport sectors are negatively significant, and increases in both sectors’ shares decreased the share of exports since both construction and transport would contribute to expanding domestic demand rather than exports. The coefficient of the wholesale sector is insignificant, and the wholesale sector did not have much influence on exports. Surprisingly, the coefficient of the exchange rate is negatively significant, and the increase of the value of the yuan decreased the share of exports, which is counterintuitive. We interpret this result to mean that China expanded exports by processing imported goods, and the increase in the value of the yuan raised the import cost, which hindered exports. Figure 3 shows the decrease in the agriculture sector share and the increase in the manufacturing sector share. This industrial structure...
change enhanced exports in China.

In Russia, the coefficients of the agriculture, manufacture, and wholesale sectors are positively significant, and as the shares of these sectors increased, the share of exports increased. On the other hand, the coefficient of the transport sector is negatively significant, which is same as the result for China. The coefficients of both the construction sector and exchange rates are insignificant, and the construction sector and exchange rate did not influence exports. Figure 4 shows decreases in the agriculture sector share and the manufacturing sector share, which explains why exports did not expand much in Russia.

4. Conclusion

In this paper, we analyzed the economic factors that enhance economic growth in countries experiencing economic transition by comparing China and Russia. We first investigated the economic circumstances of the two countries by examining GDP, FDI, exports, imports, RCA, and oil prices. Afterward, we empirically analyzed the effects of these factors on GDP.

The results are as follows: First, an increase in FDI and production factors expanded GDP, and the difference in the amount of FDI produced contrasting economic growth in China and Russia. Second, China experienced industrial structure change from the agriculture to manufacturing sectors, which enhanced exports and GDP. Third, Russia failed to transform its main industry sectors from agriculture to manufacturing. The manufacturing sector declined, resulting in a decrease of the ratio of exports to GDP and heavy dependence on the oil trade.

Two policy implications are derived from this analysis. First, it is important for countries experiencing economic transition to encourage foreign capital inflow to acquire advanced skills. Second, industrial structure change from primary sector industries to secondary sector industries is necessary to expand exports and GDP. China satisfied these two conditions and succeeded in rapid economic growth, while Russia failed to meet these two conditions and still suffers from slow economic development.
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Appendix

Table I. Share of gross products of industry among GDP in China

| Year | agriculture, forestry, fishing | mining, manufacturing | construction | wholesale, retail trade, restaurants and hotels | transport, storage and communication | other activities |
|------|--------------------------------|-----------------------|--------------|-----------------------------------------------|-------------------------------------|-----------------|
| 1990 | 26.8                           | 36.7                  | 4.4          | 8.9                                           | 6.6                                 | 16.6            |
| 1991 | 24.2                           | 36.9                  | 4.4          | 11.2                                          | 6.9                                 | 16.4            |
| 1992 | 21.4                           | 38.0                  | 5.0          | 11.9                                          | 6.6                                 | 17.1            |
| 1993 | 19.5                           | 40.1                  | 6.2          | 10.3                                          | 6.4                                 | 17.4            |
| 1994 | 19.8                           | 40.5                  | 6.0          | 9.9                                           | 6.0                                 | 17.8            |
| 1995 | 20.0                           | 41.2                  | 6.1          | 9.6                                           | 5.4                                 | 17.7            |
| 1996 | 19.8                           | 41.6                  | 6.2          | 9.3                                           | 5.3                                 | 17.8            |
| 1997 | 18.4                           | 42.0                  | 5.9          | 9.3                                           | 5.3                                 | 19.1            |
| 1998 | 17.6                           | 40.3                  | 5.9          | 10.3                                          | 5.5                                 | 20.4            |
| 1999 | 16.5                           | 40.0                  | 5.8          | 10.5                                          | 5.8                                 | 21.5            |
| 2000 | 15.1                           | 40.4                  | 5.6          | 10.4                                          | 6.2                                 | 22.4            |
| 2001 | 14.4                           | 39.7                  | 5.4          | 10.5                                          | 6.3                                 | 23.7            |
| 2002 | 13.7                           | 39.4                  | 5.4          | 10.6                                          | 6.2                                 | 24.7            |
| 2003 | 12.8                           | 40.5                  | 5.5          | 10.5                                          | 5.8                                 | 24.9            |
| 2004 | 13.5                           | 41.0                  | 5.0          | 10.1                                          | 5.8                                 | 24.6            |
| 2005 | 12.1                           | 41.8                  | 5.6          | 9.8                                           | 5.8                                 | 24.9            |
| 2006 | 11.1                           | 42.2                  | 5.7          | 9.9                                           | 5.6                                 | 25.4            |
| 2007 | 10.8                           | 41.6                  | 5.8          | 10.0                                          | 5.5                                 | 26.4            |
| 2008 | 10.7                           | 41.5                  | 6.0          | 10.4                                          | 5.2                                 | 26.2            |
| 2009 | 10.3                           | 39.7                  | 6.6          | 10.6                                          | 4.9                                 | 27.9            |
| 2010 | 10.1                           | 40.0                  | 6.6          | 10.9                                          | 4.8                                 | 27.6            |
| 2011 | 10.1                           | 40.0                  | 6.8          | 11.2                                          | 4.6                                 | 27.3            |
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Table II. Share of gross products of industry among GDP in Russia

| Year | Agriculture, forestry, fishing | Mining, manufacturing, utilities | Construction | Wholesale, retail trade, restaurants and hotels | Transport, storage and communication | Other activities |
|------|-------------------------------|---------------------------------|--------------|-----------------------------------------------|-----------------------------------|-----------------|
| 1993 | 8.6                           | 35.2                            | 8.3          | 20.5                                          | 8.8                               | 18.5            |
| 1994 | 6.9                           | 34.3                            | 9.6          | 19.9                                          | 10.1                              | 19.2            |
| 1995 | 7.7                           | 30.0                            | 9.1          | 21.3                                          | 12.3                              | 19.6            |
| 1996 | 7.7                           | 31.9                            | 9.0          | 19.8                                          | 12.7                              | 18.8            |
| 1997 | 6.9                           | 31.9                            | 8.4          | 18.8                                          | 12.5                              | 21.5            |
| 1998 | 6.1                           | 32.2                            | 7.4          | 20.7                                          | 11.0                              | 22.6            |
| 1999 | 7.7                           | 32.5                            | 6.1          | 23.4                                          | 9.6                               | 20.7            |
| 2000 | 6.8                           | 32.8                            | 6.6          | 23.9                                          | 9.1                               | 20.9            |
| 2001 | 6.9                           | 30.0                            | 7.4          | 22.5                                          | 9.1                               | 24.2            |
| 2002 | 6.3                           | 27.4                            | 5.4          | 23.8                                          | 10.2                              | 26.9            |
| 2003 | 6.3                           | 26.5                            | 6.1          | 22.9                                          | 10.7                              | 27.5            |
| 2004 | 5.6                           | 30.6                            | 5.7          | 21.2                                          | 11.1                              | 25.8            |
| 2005 | 5.0                           | 32.7                            | 5.3          | 20.4                                          | 10.2                              | 26.3            |
| 2006 | 4.5                           | 32.0                            | 5.2          | 21.2                                          | 9.8                               | 27.2            |
| 2007 | 4.4                           | 30.7                            | 5.7          | 21.2                                          | 9.7                               | 28.3            |
| 2008 | 4.4                           | 29.8                            | 6.3          | 21.3                                          | 9.3                               | 28.9            |
| 2009 | 4.7                           | 27.4                            | 6.2          | 18.9                                          | 9.6                               | 33.1            |
| 2010 | 4.0                           | 28.7                            | 6.7          | 20.0                                          | 9.6                               | 31.0            |
| 2011 | 4.3                           | 30.5                            | 6.5          | 20.0                                          | 8.9                               | 29.9            |
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Table III. China: Trade Share

|                 | Export 1996 | Export 2011 | Import 1996 | Import 2011 |
|-----------------|-------------|-------------|-------------|-------------|
| food            | 0.068       | 0.027       | 0.041       | 0.017       |
| tobacco & beverage | 0.009     | 0.001       | 0.004       | 0.002       |
| crude material  | 0.027       | 0.008       | 0.077       | 0.163       |
| fuels           | 0.039       | 0.017       | 0.050       | 0.158       |
| animal oils     | 0.002       | 0.000       | 0.012       | 0.007       |
| chemical products | 0.059    | 0.060       | 0.130       | 0.104       |
| manufactured goods | 0.189    | 0.168       | 0.226       | 0.086       |
| machine transport | 0.234   | 0.475       | 0.394       | 0.362       |
| miscellaneous manufacture | 0.372  | 0.242       | 0.060       | 0.073       |
| reimport & reexport | 0.001  | 0.001       | 0.005       | 0.028       |

Table IV. Russia: Trade Share

|                 | Export 1996 | Export 2011 | Import 1996 | Import 2011 |
|-----------------|-------------|-------------|-------------|-------------|
| food            | 0.010       | 0.020       | 0.148       | 0.109       |
| tobacco & beverage | 0.002     | 0.002       | 0.025       | 0.014       |
| crude material  | 0.055       | 0.036       | 0.038       | 0.023       |
| fuels           | 0.431       | 0.591       | 0.027       | 0.017       |
| animal oils     | 0.000       | 0.000       | 0.006       | 0.007       |
| chemical products | 0.059    | 0.046       | 0.072       | 0.125       |
| manufactured goods | 0.199    | 0.106       | 0.199       | 0.450       |
| machine transport | 0.070   | 0.025       | 0.069       | 0.108       |
| miscellaneous manufacture | 0.015  | 0.005       | 0.310       | 0.024       |
| reimport & reexport | 0.158   | 0.170       |             |             |
Comparison of Economic Growth and Industrial Structural Change between China and Russia

Table V. Chinese RCA

|        | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 |
|--------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| food   | 0.96 | 0.90 | 0.89 | 0.89 | 0.94 | 0.85 | 0.80 | 0.71 | 0.60 | 0.58 | 0.55 | 0.50 | 0.44 | 0.46 | 0.48 |
| beverage & tobacco | 0.77 | 0.51 | 0.49 | 0.38 | 0.34 | 0.35 | 0.32 | 0.25 | 0.24 | 0.19 | 0.16 | 0.15 | 0.14 | 0.16 | 0.16 |
| crude material | 0.72 | 0.63 | 0.58 | 0.51 | 0.59 | 0.34 | 0.29 | 0.27 | 0.24 | 0.31 | 0.24 | 0.14 | 0.14 | 0.16 | 0.17 |
| fuels | 0.54 | 0.59 | 0.59 | 0.51 | 0.32 | 0.24 | 0.27 | 0.24 | 0.14 | 0.19 | 0.14 | 0.14 | 0.14 | 0.16 | 0.16 |
| animal oils | 0.53 | 0.72 | 0.32 | 0.16 | 0.06 | 0.06 | 0.19 | 0.21 | 0.14 | 0.19 | 0.10 | 0.06 | 0.05 | 0.05 | 0.05 |
| chemical products | 0.63 | 0.59 | 0.57 | 0.55 | 0.54 | 0.52 | 0.46 | 0.42 | 0.42 | 0.44 | 0.45 | 0.46 | 0.53 | 0.45 | 0.46 |
| manufactured goods | 1.21 | 1.22 | 1.16 | 1.18 | 1.24 | 1.20 | 1.20 | 1.20 | 1.20 | 1.22 | 1.24 | 1.24 | 1.34 | 1.22 | 1.33 |
| transport | 0.59 | 0.59 | 0.65 | 0.71 | 0.80 | 0.88 | 0.96 | 0.96 | 0.96 | 1.15 | 1.21 | 1.27 | 1.25 | 2.27 | 2.22 |
| machine manufacture | 2.93 | 2.94 | 2.91 | 2.85 | 2.81 | 2.60 | 2.48 | 2.33 | 2.23 | 2.20 | 2.20 | 2.20 | 2.27 | 2.14 | 2.16 |
| miscellaneous | 0.04 | 0.07 | 0.00 | 0.06 | 0.09 | 0.07 | 0.06 | 0.04 | 0.02 | 0.02 | 0.02 | 0.02 | 0.05 | 0.08 | 0.06 |
| export & reimport | 0.72 | 0.63 | 0.58 | 0.59 | 0.57 | 0.53 | 0.46 | 0.38 | 0.31 | 0.24 | 0.21 | 0.18 | 0.16 | 0.17 | 0.16 |
| Year | Food | Tobacco & beverage | Crude material | Fuels | Animal oils | Chemical products | Goods manufactured | Machine transport | Machine manufacture | Miscellaneous | Reimport & export |
|------|------|-------------------|----------------|-------|-------------|-----------------|-------------------|------------------|-------------------|---------------|-------------------|
| 1996 | 0.14 | 0.19              | 1.47           | 5.92  | 0.09        | 0.64            | 1.28              | 0.18             | 0.12              | 5.25          |
| 1997 | 0.16 | 0.12              | 1.70           | 7.20  | 0.08        | 0.56            | 1.31              | 0.13             | 0.13              | 4.54          |
| 1998 | 0.18 | 0.07              | 2.31           | 7.07  | 0.08        | 0.56            | 1.68              | 0.18             | 0.16              | 4.02          |
| 1999 | 0.14 | 0.06              | 1.99           | 6.21  | 0.07        | 0.55            | 1.40              | 0.16             | 0.23              | 5.54          |
| 2000 | 0.17 | 0.09              | 1.49           | 5.09  | 0.25        | 0.67            | 1.30              | 0.15             | 0.16              | 2.90          |
| 2001 | 0.22 | 0.13              | 1.40           | 5.51  | 0.18        | 0.50            | 1.23              | 0.16             | 0.16              | 3.05          |
| 2002 | 0.32 | 0.17              | 1.50           | 5.86  | 0.12        | 0.42            | 1.15              | 0.19             | 0.14              | 2.83          |
| 2003 | 0.31 | 0.20              | 1.48           | 5.77  | 0.10        | 0.41            | 1.10              | 0.17             | 0.11              | 2.65          |
| 2004 | 0.21 | 0.17              | 1.53           | 5.33  | 0.14        | 0.41            | 1.21              | 0.15             | 0.09              | 2.53          |
| 2005 | 0.25 | 0.22              | 1.39           | 5.03  | 0.22        | 0.39            | 1.06              | 0.11             | 0.07              | 2.28          |
| 2006 | 0.26 | 0.23              | 1.15           | 3.61  | 0.38        | 0.37            | 1.08              | 0.10             | 0.06              | 5.44          |
| 2007 | 0.39 | 0.25              | 1.16           | 4.89  | 0.32        | 0.39            | 1.06              | 0.10             | 0.07              | 1.95          |
| 2008 | 0.27 | 0.25              | 1.01           | 4.06  | 0.31        | 0.46            | 0.88              | 0.10             | 0.06              | 1.70          |
| 2009 | 0.41 | 0.30              | 0.89           | 4.86  | 0.50        | 0.36            | 0.97              | 0.10             | 0.07              | 1.79          |
| 2010 | 0.29 | 0.22              | 0.78           | 4.83  | 0.29        | 0.37            | 0.87              | 0.08             | 0.06              | 2.23          |
| 2011 | 0.35 | 0.20              | 0.79           | 5.64  | 0.31        | 0.40            | 0.77              | 0.07             | 0.04              | 3.56          |