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Potential Impacts of Trade Liberalization in Korea's Motor Vehicle Industry

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Abstract

In recent years, the United States has accused Korea of having an “anti-import” bias when it comes to motor vehicles. In other words, imports of foreign motor vehicles in Korea is “artificially low” because Korean consumers will not purchase foreign vehicles due to “nationalistic” or “patriotic” reasons. In this paper, we look at what would happen if consumers, either Korean or worldwide, eliminate their preference for domestic vehicles and judge both domestic and imported vehicles on equal criteria. To examine this possibility, we see what happens when substitution elasticities concerning consumption behavior is changed in the GTAP model. When the entire world eliminates its preference for domestic motor vehicles with a 1% increase in productivity for Korea’s motor vehicle industry, motor vehicle industry imports and exports for all countries will increase. In addition, the domestic production and trade balance of the motor vehicle industry, welfare, and GDP will rise or improve for motor vehicle net-exporting countries such as “Korea,” “Japan” and “EU”, while the variables for motor vehicle net-importing countries such as “US,” “Other Asia” and “Rest of the World” will fall or worsen.

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Potential Impacts of Trade Liberalization in Korea's Motor Vehicle Industry

1. Introduction

The motor vehicle industry is considered as very important in a country's economic development because the development of the motor vehicle industry implies that the country has achieved a certain level of manufacturing skill and sophistication. There is also a belief, though it is disappearing quickly, that the motor vehicle industry is a strategic industry in the sense that it has many upstream and downstream industries, such as various industries required to make automobile parts, and various service industries which market and sell the vehicles, as well as to provide after-service. Any issues dealing with the motor vehicle industry is also politically sensitive because the industry is usually one of the largest employers in the national economy, and there is much global competition. In particular, for the last two or three decades, there has been tension between countries with newly developing motor vehicle industries such as Japan and Korea, and countries with mature motor vehicle industries such as United Kingdom and United States.

Because the motor vehicle industry is so important, both in economic and political terms, countries often get involved in trade disputes on whether one country or another is engaged in unfair trade. Unfair practices may include obvious trade barriers such as high tariffs, import restrictions, quotas or discriminatory import licensing. They may also include such practices as discriminatory technical or regulatory requirements.

In recent years, the United States has accused Korea of having an "anti-import" bias when it comes to motor vehicles. In other words, imports of foreign motor vehicles in Korea is "artificially low" because Korean consumers will not purchase foreign vehicles due to "nationalistic" or "patriotic" reasons.

It is true that some portion of the population tends to have a nationalistic preference for domestic motor vehicles. Even in the United States, some consumers held very negative opinions of Japanese imports during the 1980s. In terms of economic theory, it makes very little sense for consumers to hold such ideas. According to economic theory, welfare will be maximized if consumers make their purchasing decisions based only on the price, quality and performance of the motor vehicle. However, in most countries, it is a fact that consumers have some preference for domestically produced vehicles.

In this paper, we look at what would happen if consumers, either Korean or worldwide, eliminated their preference for domestic vehicles and judged both domestic and imported vehicles on equal criteria. To examine this possibility, we see what happens when substitution elasticities concerning consumption behavior is changed in the GTAP model.

However, before we start with the CGE model simulation, we first examine the trends of Korea-US trade in the motor vehicle industry, as well as the state of the Korea's motor vehicle industry in the world.

2. Korea and World Trade in the Motor Vehicle Industry

2.1 World Trade in the Motor Vehicle Industry

According to the *UN International Trade Statistics Yearbook*, total world exports in motor vehicles and motor vehicle parts (SITC[1] 781-784; hereafter, the motor vehicle industry) amounted to 483 billion dollars in 1998, which is about 9.0% of total world merchandise trade in the same year (see *Table 2-1*). Germany, Japan, the US, Canada and France take the largest proportions as these five countries account for 62.5% of total world motor vehicle industry exports. Korea's motor vehicle industry exports were about 11.2 billion dollars, or about 2.3% of total world motor vehicle industry exports, which makes Korea the 11th largest exporter in the world.

The two largest components of world motor vehicle industry exports are passenger cars (SITC 781) and motor vehicle parts (SITC 784) which took 57.6% (278.1 billion dollars) and 27.3% (132.1 billion dollars) of world motor vehicle industry exports in 1998, respectively. Korea's passenger car exports took about 3.1% (8.6 billion dollars) of world passenger car exports, which makes Korea the 10th largest passenger car exporter. Korea's motor vehicle parts exports were about 1.0% (1.3 billion dollars) of world motor vehicle parts exports, making Korea the 15th largest exporter.

The shares of the motor vehicle industry exports in total merchandise exports for Germany and Japan, the two largest motor vehicle industry exporters in the world, were 17.2% and 18.6%, respectively (see *Table 2-2*). The shares were even greater in other major motor vehicle industry exporters such as Mexico, Spain and Canada, with 29.1%, 23.5% and 22.1%, respectively. However, Korea's motor vehicle industry exports account only for 8.4% of its total merchandise exports in 1998, which are comparable to the US (7.9%) and Italy (7.1%).

2.2 National Comparative Advantage

Calculating the Revealed Comparative Advantage (RCA) index[2] for the motor vehicle industry, using 1998 data, Germany and Japan showed the highest RCA indices with 1.90 and 2.06, respectively. The US and Korea recorded 0.88 and 0.93 respectively, showing that the two countries were relatively neutral in terms of performances in trade (see *Table 2-3*). However, the RCA index numbers for Germany and Korea showed fast growth between 1990 and 1998, while the index number for the US remained relatively stable. The index number for Japan has declined considerably.

Computing the RCA indices for passenger cars separately, Japan, Germany and Korea show comparative advantage in passenger cars, as their index numbers for 1998 were 2.48, 2.11 and 1.25,

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[1] SITC stands for "Standard International Trade Classification." It was made by the United Nations Statistics Division to compile international trade statistics on all merchandise entering international trade, and to promote international comparability of international trade statistics. The last revision (revision 3) was made in 1986. *UN International Trade Statistics Yearbook*, based on SITC, is convenient since it gives total world trade as well as each country's trade statistics by commodity. However, there is about a 2year time lag compared to trade statistics issued by individual countries.

[2] The RCA index is to denote comparative advantage in terms of performances in trade. The RCA index of country i in commodity (or industry) j is calculated with a formula as
$RCA_{ij} = (X_{ij}/XW_j)/(X_i/XW)$,
where X_{ij} is country i's exports of commodity (or industry) j, XW_j is total world exports of commodity (or industry) j, X_i is aggregate exports of country i, and XW is aggregate world exports, respectively. If the index value is greater than 1, it implies that the country has a comparative advantage in the commodity (or industry) concerned.

respectively. The index number for the US was 0.46, which shows no indications of comparative advantage. The index numbers rose significantly between 1990-1998 for Germany and Korea, while the index number for Japan fell up to 1994-95, but recovered afterwards. The index number for the US rose until 1994, before falling.

For motor vehicle parts, the RCA index numbers for Germany, Japan and the US were 1.72, 1.33 and 1.68, respectively for 1998, showing comparative advantage. The index number for Korea was 0.39, showing no revealed comparative advantage. However, between 1990-1998, the index numbers grew quickly for Germany and Korea, while those for Japan and US remained relatively stable.

3. Korea's Trade in the Motor Vehicle Industry

3.1 The Motor Vehicle Industry

Using the HS (Harmonized System) trade commodity classification, Korea's exports in the motor vehicle industry (HS 87) grew from 3.8 billion dollars in 1988 to 15.3 billion dollars in 2000. Korea's imports in the motor vehicle industry during the same period grew from 0.7 billion dollars to 1.6 billion dollars (see *Table 3-1*). Accordingly, trade surplus in Korea's motor vehicle industry grew from 3.1 billion dollars in 1998 to 13.6 billion dollars in 2000.

Most of Korea's exports in the motor vehicle industry take place in categories HS 8703 (passenger cars) and HS 8708 (motor vehicle parts). For Korea in 2000, these two categories accounted for 89% of total motor vehicle industry exports and 84% of total motor vehicle industry imports (see *Table 3-2*).

3.2 Passenger Cars

3.2.1 Imports

Korea's imports of passenger cars (HS 8703) grew from 57 million dollars in 1988 to 440 million dollars in 1996, but fell to 16 million dollars in 1998 due to the sharp depreciation of the Korean won and economic slowdown following the financial crisis. Imports increased to 155 million dollars in 2000, and 206 million dollars for the first ten months of 2001.

By country of origin, imports from Germany and the US were 80 million dollars and 29 million dollars respectively in 2000, accounting for 51.8% and 18.5% of total passenger car imports, respectively. The share of the US is falling rapidly while that of Germany is rising. This trend has began to appear between 1994 and 1997, and reemerged after the financial crisis from 1999 (see *Table 3-3*). The share of the US in Korea's passenger car imports in 1989 and 1990 were 65.3% and 50.6%, respectively, but the share has been falling continuously, reaching 18.5% in 2000 and 13.0% in the first ten months of 2001. The share of Germany in Korea's passenger car imports in 1988 was 15.5%, but rose to 51.8% in 2000 and 55.9% in the first ten months of 2001. Relatively, the US share is being taken over by other countries, most notably Germany. The share of Japan in Korea's passenger car imports in 1988 and 1989 were 8.1% and 5.2%, respectively. The share fell to 1.9% and 3.7% in 1996 and 1997, but since the elimination of the Import Source Diversification Program (ISDP) that restricted motor vehicle imports from Japan, Japan's share has risen rapidly, reaching 7.7% in 2000 and 18.3% in the first ten months of 2001.

3.2.2 Exports

Korea's exports of passenger cars (HS 8703) in 1988 and 1989 were 3,336 million dollars and 2,048 million dollars, respectively. The numbers grew quickly to 11,896 million dollars and 9,918 million dollars in 2000 and the first ten months of 2001, respectively.

By destination, exports to the US are the largest component of Korea's passenger car exports with 5,036 million dollars, or 42% of Korea's total passenger car exports in 2000. The next largest destinations are Italy, Canada, Australia and Spain whose shares are in the 4-5% range. In 1988 and 1989, the US and Canada together took 80-90% of Korea's total passenger car exports. Their share fell to the 20-36% range between 1992 and 1999, but rose rapidly to around 50% in 2000 and the first ten months of 2001. (see *Table 3-4*). One reason for the drop in the share of the US and Canada in the 1990s was the rapid rise in exports to other regions such as Europe, Central and South America, and East Asia.

3.2.3 Trade Balance

Ratio of imports to exports typically ranged between 2-5% during 1988-1997, but dropped rapidly to below 0.2% after the financial crisis due to the depreciation of the Korean won and the domestic recession. The ratio has recovered to 2.1% in the first ten months of 2001. Accordingly, Korea's trade surplus in passenger cars rose from the 2-3 billion dollar range in the late 1980s and early 1990s to 11.7 billion in 2000.

3.3 Motor Vehicle Parts

3.3.1 Imports

With temporary lull during the financial crisis, Korea's imports of motor vehicle parts (HS 8708) rose steadily from 537 million dollars in 1988 to 1,206 million dollars in 2000. Korea's imports of parts have been consistently greater than its imports of completed passenger cars, and the parts imports tend to correspond to trends in motor vehicle exports and domestic consumption. Imports from Japan formed 82% of Korea's total parts imports in 1988, but that share has fallen to the 40-50% range recently, while the share of the US and Germany is rising.

3.3.2 Exports

Korea's exports of motor vehicle parts have grown from 185 million dollars in 1988 to 1,746 million dollars in 2000. The growth rate for parts exports has been much larger than parts imports or exports of completed passenger cars. The shares of parts going to the US and Japan have fallen from 50% and 13%, respectively in 1988 to 22% and 7% in 2000, while shares for Europe, Asia and Central and South American developing countries are growing.

3.3.3 Trade Balance

Between 1988 and 2000, the ratio of imports to exports in Korea's motor vehicle parts trade has fallen from 290% to 50-60%, implying a rapid replacement of imported parts for domestic parts in domestic motor vehicle production. Thus, the trade balance in motor vehicle parts has changed from a 352 million dollar deficit in 1988 to a surplus in 1997, and the surplus reached 539 million dollars in 2000.

3.4 US Trade in the Motor Vehicle Industry and Korea-US Trade[3]

3.4.1 The Motor Vehicle Industry (HS 87, see Table 3-5)

US exports in the motor vehicle industry grew steadily from 43.2 billion dollars in 1993 to 61.9 billion dollars in 2000, but its share in total US merchandise exports has fallen steadily from 9.6% to 7.9%. US motor vehicle industry exports to Korea have fallen from 750 million dollars in 1996 to 450 million dollars in 2000. Accordingly, Korea's share in U.S. motor vehicle industry exports fell from 1.3% to 0.7% during the same period.

US imports in the motor vehicle industry grew faster than exports, from 84.8 billion dollars in 1993 to 163.9 billion dollars in 2000. The share of the motor vehicle industry in total US merchandise imports fell from 14.6% to 13.5% during the same period. US motor vehicle industry imports from Korea grew rapidly between 1996 and 2000, from 2.0 billion dollars to 5.3 billion dollars. Thus, Korea's share in total US motor vehicle industry imports rose from 1.9% to 3.2% during the same period.

The US trade balance for the motor vehicle industry recorded a 41.5 billion dollar deficit in 1993 (equivalent to 31% of the total US trade deficit in 1993) but grew quickly especially after 1998, and reached 101.9 billion dollars in 2000 (equivalent to 23% of the total US trade deficit in 2000). While the amount has risen, the percentage equivalent compared to the total US trade deficit has fallen.

3.4.2 Korea-US Auto Trade Issues

Reviewing these trade performances, the recent auto trade tension between Korea and the US may be due to following causes. (1) The importance of the motor vehicle industry in US trade—US motor industry vehicle exports were 61.9 billion dollars in 2000, which explains 7.9% of total US merchandise exports. (2) Increase in US trade deficit, and rapid increase in the motor vehicle industry trade deficit—the US trade deficit for 2000 was 436.5 billion dollars, with motor vehicle industry trade accounting for 101.9 billion dollars, which is equivalent to 23.4% of total trade deficit. (3) Rapid decrease in the US share of Korea's motor vehicle imports market—the US share of Korea's imports in passenger cars fell steadily from 65.3% in 1989 and 50.6% in 1990 to 18.5% in 2000 and 13.0% in the first ten months of 2001. (4) Increase in Korea's motor vehicle exports to the US and increase in Korea's trade surplus with the US—US imports of Korea's passenger cars rose from 1.9 billion dollars in 1996 to 4.8 billion dollars in 2000. Korea's share of US passenger car imports rose from 2.8% to 4.4% during the same period.

However, the trends described here are not specific to Korea-US trade. US trade, especially in passenger cars, reveals an aggravation of comparative advantage. US motor vehicle industry exports as a proportion of total US merchandise exports is falling relatively, and the US is experiencing a general trade deficit in the motor vehicle industry which explains about 23-32% of the total US trade deficit.

3.5 The Elimination of the Import Source Diversification Program

The Import Source Diversification Program (ISDP) was established in 1978 as a way to accelerate

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[3] Based on data from *KOTIS Database* by KITA. US exports and imports by category were available from 1993 to Sept. 2001, while figures for Korean-US trade were available from 1996 to Sept. 2001.

market opening while minimizing adverse effects. The program was designed to diversify the sources of imports for those goods where Korea was running a chronic trade deficit from a single source. Effectively, the program served to reduce imports of certain goods from Japan with which Korea had been running chronic trade deficits. The number of goods covered by the ISDP had been falling since the early 1980s, and there had been no additional items to the ISDP since 1993. In the Uruguay Round (UR) negotiations, Korea agreed to eliminate the program in stages from June 1996 to the end of 1999. However, the elimination was brought forward to June 1999 after the financial crisis as part of the IMF program. Those items that could be produced domestically, had high domestic content, and/or gained competitiveness, or those items that could not be produced domestically were given high priority for removal from the ISDP list. About 75% of the final items removed from the ISDP list, on Dec. 31, 1998 and June 30, 1999 with the abolition of the program, were for electronic and electric goods, machinery and the motor vehicle industry items. The motor vehicle industry products removed from the ISDP list are summarized in *Table 3-6*.

With the abolition of the ISDP, imports of five motor vehicle items, mostly passenger cars, from Japan were liberalized. While motor vehicle imports from Japan are growing quickly, their absolute levels are still small. The reasons for the small import volume are the domestic recession; increased diversity of domestic models, improved domestic quality and price competitiveness, and better service network for Korean-made motor vehicles; and the Japanese companies' strategy to penetrate the Korean market with mostly high-end luxury cars. However, with the economic recovery and the World Cup games, which will encourage a closer bilateral relationship, an increase in imports is expected for mid- to –large-size Japanese cars, where Japan enjoys a competitive advantage.

Motor vehicle parts imports from Japan have been steadily declining since 1994 or 1995. Even with the import liberalization of some Japanese motor vehicle parts in June 1999, this trend has not changed significantly. The lack of increase in imports is due to the fact that most of the Japanese parts had already been allowed to use for producing exports, and increased competitiveness of domestic producers.

3.6 Industrial Linkages of Korea's Motor Vehicles Industry

To examine industrial linkages between motor vehicle sectors and various other sectors, and also between domestic production activities and international trade, input-output (IO) tables are used. Input-output tables are statistical data that show the flow of goods and services in connection with production and distribution activities between the various sectors of a national economy during a certain period. The 1995 input-output tables, the most recent ones based on actual industry survey, are broken down into 28, 77, 168 or 402 industry headings.

Examining the industrial linkages of motor vehicles in the IO tables of 168 industry headings, motor vehicles (category 115) and engines and parts (category 116) are hardly used as inputs for industries other than the motor vehicle industry itself (see *Table 3-7*). However, products from other industries such as plastics, tires, tubes, other rubber items, steel, metal products, air conditioners and heaters, other electric equipment, video and audio equipment are used as inputs to motor vehicles and motor vehicle engines and parts. In the motor vehicle industry, motor vehicle engines and parts are the major inputs to motor vehicles, and motor vehicle engines and parts, as their input coefficients are 0.36 and 0.27, respectively.

In the IO tables of 402 industry headings, most of the domestic production and most of the demand in the motor vehicle industry are again concentrated in passenger cars (category 282) and motor vehicle parts (category 287) (see *Table 3-8*). Passenger cars take a large portion of motor vehicle

industry exports while motor vehicle parts take a large portion of motor vehicle industry imports. The percentages of exports in domestic output for passenger cars, freight cars, trailers and containers are relatively high at 31.8%, 20.3%, and 73.8%, respectively, while those in engines for motor vehicles and motor vehicle parts are only 0.2% and 4.8%, respectively. The percentages of imports in domestic consumption (= domestic production – exports + imports) for passenger cars and motor vehicle parts are 1.8% and 10.5%, respectively. The percentages of exports in domestic output and those of imports in domestic consumption show wide divergence between, for example, passenger cars and motor vehicle parts. Thus, it may be inappropriate to examine the imports or exports of passenger cars separately, without considering motor vehicle parts and other related sectors at the same time.

3.7 Tariff Rates of the Motor Vehicle Industry

Using UNCTAD TRAINS database (version 8.0, 2001), MFN tariff rates of the motor vehicle industry are examined. The database contains the average MFN tariff rates and the range of the MFN tariff rates up to HS 6 digit commodity classifications.

Korea's MFN tariff rates are 10% for buses (HS 870210) and 8% for passenger cars (HS 870323 and HS 870324) 8%, which is high compared to the US (2~ 3%), Japan (0%) and Canada (6%), but lower than the EU (10~ 16%) and Mexico (20~ 23%) (see *Table 3-9. 1*).

Korea's MFN tariff rates for motor vehicle parts and components (HS 870829, HS 870840 and HS 870899) are 8%, which is higher than the US (0~ 3%), Japan (0%), the EU (3~ 5%) and Canada (0 ~ 9%), but lower than Mexico (13~ 18%) (see *Table 3-9. 2*).

4. Potential Impacts of Trade Liberalization

4.1 The GTAP Model

In order to examine the effects of trade liberalization in Korea's motor vehicle industry on other domestic industries and also on other countries, the GTAP model (version 5, 1997 based data set) was used to carry out a computable general equilibrium analysis. The GTAP model was developed at Purdue University, and the version 5 database can model the world economy for up to 66 countries and 57 industries.

4.2 Model Specifications

4.2.1 Country Classification

In order to simplify our analysis, 66 countries in the GTAP model were grouped and consolidated into 7 country/regions: (1) Korea, (2) US, (3) Americas (excluding US), (4) Japan, (5) Other Asia, Australia and New Zealand, (6) EU, and (7) Rest of the World (Eastern Europe, Russia, Middle East and Africa).

4.2.2 Industry Classification

To simplify the analysis, 57 industries in the GTAP were grouped and reclassified into 7 categories:

(1) Agricultural and food products, textiles and clothing, wood products, pulp and other manufactured goods; (2) Petrochemical and chemical goods; (3) Mining and metal goods; (4) Motor vehicles and parts[4] (5) Other transportation equipment; (6) Electronic and Electric equipment, Machinery and other equipment; (7) Construction and other services.

4.3 Parameters in Concern

4.3.1 Tariff rates

Trade-weighted bilateral tariff rates (weighted average based on trade value) for motor vehicles and parts between two countries (or group of countries) concerned are calculated from the GTAP version 5 as listed in *Table 4-1*.

4.3.2 Elasticities

In the GTAP model, the household demand elasticity of income for Korea's motor vehicles is 1.1, household demand elasticity of prices is -0.8. The elasticity of substitution between domestic and imported motor vehicles (including parts) is 5.2, and the elasticities of substitution between imports from various regions are 10.4, two times that between domestic and imported motor vehicles. Also, the elasticity of substitution for inputs in production (capital, labor, land) is 1.3.

4.4 Policy Simulation

In typical policy simulations concerning trade liberalization, tariff rates are assumed to be reduced or eliminated. So the effects of trade liberalization are calculated by directly lowering the domestic price of imports. However, Korea's MFN tariff rates on motor vehicles, especially passenger cars, are 8%, relatively low compared to other countries in a similar stage of economic development, and are also bounded at the same rate. Practically, consumer perception against foreign motor vehicles rather than tariff rates is one of the most important issues in the "US-Korea Memorandum of Understanding Regarding Foreign Motor Vehicles" of 1998 and recent trade talks between the two countries.

Our simulation experiment intended to examine what would happen if Korea's motor vehicle market were "liberalized" in the sense that the consumer preference for domestic motor vehicles over foreign motor vehicles was eliminated. We have modeled this change in preference by equalizing the elasticities of substitution; namely we set the elasticity of substitution between domestic and foreign motor vehicles (formerly 5.2) equal to the elasticity of substitution between imports from different sources (= 10.4).[5]

In order to see what effects this change in elasticity (= change in perception) will have, we set an exogenous shock, namely a 1% increase in the productivity of Korea's motor vehicle industry.[6] We

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[4] In the GTAP database, motor vehicles and parts is an industry sector that cannot be further disaggregated.

[5] Consumer preference bias for domestic vehicles over imports was significant in the abnormal situation of economic crisis, especially in 1998 and 1999. However, as the Korean economy recovered from the crisis, most of the temporary panic reactions to imports have disappeared rapidly. Actually, recent surveys show that most consumers have favorable perceptions of imported motor vehicles. They feel practically no reluctance to purchase imports as long as they can afford to buy them. If different consumer perceptions exist between domestic and imported motor vehicles, it might originate from the fact that imports are large, luxury and high-end products and not typical vehicles purchased by most Koreans.

[6] Changes in parameters don't produce any effects in the model. So, we introduce an exogenous shock with a 1%

compared the following scenarios:

In (Scenario I), we looked at the effect of a 1% increase in the productivity of Korea's motor vehicle industry, without changes in preference. In other words, Scenario I, as a base simulation, looks at what would happen if there was a 1% increase in the productivity of Korea's motor vehicle industry while Korean consumers maintained their preference for domestic motor vehicles.

(Scenario II) looks at what would happen if there were a 1% increase in the productivity of Korea's motor vehicle industry, and when Korean consumers had no particular preference between domestic and foreign motor vehicles. In other words, the preference for domestic cars was eliminated for Korean consumers. However, the consumer preferences for domestic cars in other countries were maintained.

(Scenario III) looks at what would happen if there were a 1% increase in the productivity of Korea's motor vehicle industry, and when all consumers had no particular preference between domestic and foreign motor vehicles. In other words, the preference for domestic cars was eliminated for all consumers worldwide.

By comparing (Scenario I) and (Scenario II), we can see what would happen if Korean consumers unilaterally eliminated preferences for domestic over foreign motor vehicles. By comparing (Scenario I) and (Scenario III), we can see what would happen if consumers worldwide eliminated their preferences for domestic over foreign motor vehicles in addition to the same improvement in Korea. Comparing (Scenario III) and (Scenario II) would show what would happen if the rest of the world eliminated their bias toward domestic motor vehicles, net of the effects from Korean consumers' unilateral elimination of preferences for domestic motor vehicles.

4.5 Results of the Simulation Experiments

4.5.1 Motor Vehicle Imports

With a 1% increase in the productivity of Korea's motor vehicle industry, in the case where the elasticity of substitution between domestic and foreign motor vehicles is equalized with the elasticity of substitution between foreign vehicles (comparing Scenario II and Scenario I), Korea's motor vehicle imports are estimated to fall by 5.1% (see *Table 4-2*). This result comes about because the improvement in Korea's productivity reduces the price of domestic motor vehicles, and since the substitutability between Korean and imported motor vehicles increases, on the whole, imports will fall (compared to Scenario I, which is our base case). Other regions will also undergo minor fall in imports from 0.002% to 0.009%, because while the increase in Korea's productivity will lower the price of imports for other regions, the increase in Korean demand due to the equal elasticities of substitution will cause prices to rise, undoing of the initial increase in imports due to increased productivity. Thus, imports by other regions will fall as well compared to Scenario I.

If the elasticity of substitution between domestic and foreign vehicles were equalized all over the world including Korea with the elasticity of substitution between foreign vehicles for all regions, with a 1% increase in the productivity of Korea's motor vehicle industry (comparing Scenario III and Scenario I), Korea's motor vehicle imports are estimated to fall by 5.0%. This result is due to

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increase in the productivity of Korea's motor vehicle industry. Korea revealed higher productivity growth relative to other Asia-Pacific countries, especially in steel, machinery, electronics, and transportation equipment sectors as well as manufacturing as a whole (see PECC (2000) and Nam (1999)).

the increased substitutability between domestic and imported vehicles and parts, and on the net, Korea's imports will fall. Imports for other regions will rise by 0.05-0.21%, with Other Asia and Rest of the World regions rising by 0.2%. The rise in Korean productivity will cause import prices to fall for other regions, and since the elasticity of substitution between domestic and foreign products has been equalized, they will replace more expensive domestic motor vehicles and parts for imports.

If we compare (Scenario II) and (Scenario III), i.e. if we consider the case where the entire world eliminated its preference toward domestic motor vehicles net of Korea's improvement in consumers' preference, Korea's imports will rise by 0.05%. This percentage is much lower than that of other regions. This result comes about because the price of the motor vehicle industry has fallen due to the productivity growth in Korea and the substitutability of domestic and foreign motor vehicles and parts has been increased everywhere except in Korea. Thus, demand in other regions for Korean motor vehicles goes up, but Korea's demand for Korean vehicles will not rise much since Korea has not changed its preference. The imports of other regions will rise by more than Korea, from 0.05 to 0.21%, especially those of motor vehicle non-producing regions such as Other Asia and Rest of the World whose imports will rise by around 0.2%.

4.5.2 Motor Vehicle Exports

With a 1% productivity increase in Korea's motor vehicle industry, comparing the case where Korea maintains its preference for domestic motor vehicles against the case where Korea loses its preference for domestic vehicles (comparing Scenario I and Scenario II), Korea's motor vehicle industry exports will fall by 0.17% since imports by other regions will fall (see *Table 4-3*). Exports of motor vehicles by other regions will fall as well, most notably in Other Asia, which will fall by 0.37%. This fall is due to decreased Korean imports with the increased substitutability between domestic and foreign motor vehicles and parts.

With a 1% productivity increase in Korea's motor vehicle industry, if all regions lost their preference for domestic products (Scenario I vs. Scenario III), Korea's motor vehicle industry exports would fall by 0.04. This result comes about because the increase in Korean productivity will initially reduce the prices of Korean motor vehicles and parts, but the resulting increase in domestic and foreign demand will raise prices. For other regions, exports of the motor vehicle industry by Other Asia will fall by 0.22%, but those for rest of the regions will rise by 0.03% - 0.12% since the increase in Korean productivity will reduce import prices for those regions, and the increased level of substitutability by the entire world will increase the demand for imported motor vehicles worldwide.

With a 1% productivity increase in Korea's motor vehicle industry, comparing the case where Korea loses its preference for domestic motor vehicles versus the case where the entire world loses its preference for domestic vehicles (comparing Scenario II and Scenario III), exports of the motor vehicle industry by all regions will rise by 0.09 - 0.015%.

4.5.3 Motor Vehicle Industry Trade Balance

Comparing Scenario II to Scenario I, Korea's trade balance in the motor vehicle industry will improve by 127 million dollars (see *Table 4-4*). The Motor vehicle trade balance for other regions will deteriorate by 2 to 33 million dollars, with the balance for major motor vehicle exporting regions such as EU (-33 million dollars), US (-31 million dollars) and Japan (-28 million dollars) more significantly affected.

Comparing Scenario III to Scenario I, Korea's trade balance in the motor vehicle industry will improve by 140 million dollars. The balance for motor vehicle net-exporting regions such as EU (58 million dollars) and Japan (37 million dollars) will improve, while those for motor vehicle net-importing regions such as US (-79 million dollars), Other Asia (-76 million dollars) and Rest of the World (-92 million dollars) will deteriorate. The change occurs because the rise in Korean productivity lowers the prices of imported motor vehicles and parts for other regions, and the increase in substitutability increases the imports of those regions.

4.5.4 Motor Vehicle Industry Production

Comparing Scenario II to Scenario I, Korea's motor vehicle industry production under Scenario II will rise by an additional 0.45%[7] (see *Table 4-5*). Regions other than Korea, especially such as Other Asia (-0.033%), Japan (-0.015%), US (-0.010%) and EU (-0.009%), will experience a fall in motor vehicle industry production.

Comparing Scenario III to Scenario I, Korea's motor vehicle industry production will increase by 0.49%. Motor vehicle net-importing regions such as Rest of the World (-0.14%), Other Asia (-0.14%) and US (-0.03%) will experience a further reduction in motor vehicle industry production, while motor vehicle net-exporting regions such as Japan (0.02%) and EU (0.02%) will experience an increase in domestic production.

Comparing Scenario III to Scenario II, motor vehicle net-exporting regions such as Korea, Japan and EU will experience an increase in motor vehicle industry production, while motor vehicle net-importing regions such as Rest of the World, Other Asia and US will experience a reduction in motor vehicle industry production.

4.5.5 Domestic Prices for Motor Vehicles

Comparing Scenario II to Scenario I, the prices of motor vehicles in the Korean market will rise by an additional 0.019% (see *Table 4-6*). All regions except for Rest of the World will experience a further reduction in prices under Scenario II than Scenario I, most notably in major motor vehicle producers such as Japan (-0.0007%), US (-0.0003%) and EU (-0.0002%).

Comparing Scenario III to Scenario I, prices of motor vehicles in the Korean market will rise by an additional 0.021%. The prices will fall for motor vehicle net-importing regions such as Rest of the World (-0.0019%), Other Asia (-0.0015%), and US (-0.0010%); while for motor vehicle net-exporting regions such as Japan (+0.0024%) and EU (+0.0006%), the prices of motor vehicles will rise.

Comparing Scenario III to Scenario II, domestic prices for motor vehicles will rise for motor vehicle net-exporting regions such as Korea, Japan and EU. The prices will fall for motor vehicle net-importing regions such as Rest of the World, Other Asia and US.

4.5.6 Welfare (Equivalent Variation: EV)[8]

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[7] While Korea's domestic motor vehicle production will rise, the increase in production of motor vehicles will result in less Korean production of electronics and machinery, other transportation equipment, and other goods.

[8] Welfare changes in the GTAP model are measured by equivalent variation (EV), which tries to see how much output is left over, or how much additional output is required in order to maintain the same consumption level after an

Comparing Scenario II to Scenario I, Korea's welfare will rise by an additional 31.8 million dollars (see *Table 4-7*). However, the welfare levels of other regions will fall, especially Other Asia (-12.6 million dollars), EU (-6.7 million dollars), and US (-6.6 million dollars).

Comparing Scenario III to Scenario I, Korea's welfare is estimated to rise by 36.9 million dollars. For other regions, welfare of motor vehicle net-importing regions such as US (-15.7 million dollars), Other Asia (-13.9 million dollars) and Rest of the World (-12.7 million dollars) will fall while welfare for motor vehicle net-exporting regions such as EU (16.1 million dollars) and Japan (12.8 million) will increase.

Comparing Scenario III to Scenario II, welfare for motor vehicle net-exporting regions such as Korea, Japan, and EU will rise, while welfare for motor vehicle net-importing regions such as Rest of the World, Other Asia and US will fall.

4.5.7 Summary of the Simulation Results (see Table 4-8)

Assuming a 1% increase in productivity for Korea's motor vehicle industry, the case where Korea maintains its preference for domestic motor vehicles (i.e., the elasticity of substitution between domestic and foreign motor vehicles is different from the elasticity of substitution between foreign motor vehicles from different import sources - Scenario I) and the case where Korea eliminates its preference for domestic motor vehicles (the two elasticities are equalized for Korea - Scenario II), under Scenario II relative to Scenario I, were compared for the following results.

- Motor vehicle industry imports and exports will be lower for all regions.
- Motor vehicle industry trade balance will be improved for Korea while aggravated for all other regions, especially major motor vehicle producing (net-exporting) regions.
- Korea's domestic production of the motor vehicle industry will rise, while the domestic production for all other regions will fall.
- Welfare and GDP for Korea will rise, while those for all other regions will fall.

Assuming a 1% increase in productivity for Korea's motor vehicle industry, the case where Korea and the world maintains its preference for domestic motor vehicles (Scenario I), and the case where the entire world eliminates its preference for domestic motor vehicles (the two elasticities are equalized for the entire world – Scenario III), under Scenario III relative to Scenario I, were compared for the following results:

- Korea's motor vehicle industry imports and exports will fall, while motor vehicle industry imports and exports for most of the other regions will rise. Motor vehicle net-exporters such as EU and Japan will experience a relatively large increase in their exports and relatively small increase in their imports compared to US.
- The motor vehicle industry trade balance for Korea and other motor vehicle net-exporting regions such as Japan and EU will improve, while that for US will worsen.
- Motor vehicle industry production, welfare levels and GDP for Korea will improve or increase. While those for Japan and EU will improve or increase, the same variables for US will fall or worsen.

Assuming a 1% increase in productivity for Korea's motor vehicle industry, the case where only Korea eliminates its preference for domestic motor vehicles (Scenario II), and the case where the

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exogenous shock as before the shock.

entire world eliminates its preference for domestic motor vehicles (Scenario III), under Scenario III relative to Scenario II were compared for the following results.

- Imports and exports for all regions including Korea will increase.
- Motor vehicle industry trade balance, domestic production of motor vehicles, welfare, and GDP will rise or increase for motor vehicle net-exporting regions such as Korea, Japan and EU, while the variables for motor vehicle net-importing regions such as US, Other Asia and Rest of the World will fall or worsen.

5. Summary and Implications

According to 1998 data, Korea accounted for 2.3% of total world exports in the motor vehicle industry (SITC 781-784). For passenger cars (SITC 781), Korea accounted for 3.1% of world exports. Korea typically imports parts and exports passenger cars. However, exports of Korean motor vehicle parts have been rising, and the trade balance in motor vehicle parts turned into a surplus in 1997. The range of exporting countries for Korean exports has been increasing as well.

The Revealed Comparative Advantage (RCA) index for Korea in 1998 for the motor vehicle industry as a whole was 0.93. The RCA for US was 0.88 signifying a relatively neutral comparative position, while RCAs for Germany and Japan were signifying comparative advantage with 1.90 and 2.06, respectively. Over the period of 1990-1998, RCAs for Germany and Korea rose quickly, while the RCA for US remained stable, and the RCA for Japan fell.

For passenger cars (SITC 781), the RCA for Japan, Germany and Korea in 1998 were 2.48, 2.11 and 1.25 respectively, showing comparative advantage. The RCA for US in 1998 was 0.46, showing no comparative advantage. Over 1990-1998, the RCA for Germany and Korea rose steadily, while for Japan, the RCA index fell until 1994-1995 before recovering. The RCA for US rose until 1994, but fell steadily thereafter.

Reviewing these results, the Korea-US trade friction over motor vehicles should be viewed in the context of structural changes in the world motor vehicle industry as a whole including parts as well as passenger cars.

The top exporters for motor vehicles in 1998 were Germany and Japan, where motor vehicles accounted for 17.2% and 18.6% of their total merchandise trade, respectively. Other countries where motor vehicles take a major proportion of total exports include Mexico (29.1%), Spain (23.5%) and Canada (22.1%). For Korea, the proportion of motor vehicles in total merchandise trade is 8.4%, comparable to the US (7.9%) and Italy (7.1%). The low proportion for Korea implies a potential for relative growth.

Comparing average applied tariff rates of motor vehicles, the rate for Korea is 8-10%, somewhat higher than other major motor vehicle producers such as the US (2-3%), Canada (6%) and Japan (0%), but lower than the EU (10-16%) and Mexico (20-23%). Major exporters including the US and EU regard consumer perceptions against imported automobiles rather than tariffs as the major trade barrier in Korea.

In a CGE model simulation of trade liberalization in the motor vehicle industry, the case where Korea maintains a preference for domestic vehicles (i.e., the elasticity of substitution between domestic and foreign motor vehicles are different from the elasticity of substitution between foreign motor vehicles from different import sources) and the case where Korea eliminates its preference

for domestic motor vehicles (the two elasticities are equalized in Korea) were compared. Assuming a 1% increase in productivity for Korea's motor vehicle industry, when Korea eliminates its preference for domestic vehicles the following results were found.

- Motor vehicle industry imports and exports will be lower for all countries.
- The motor vehicle industry trade balance will be improved for Korea while aggravated for all other countries, especially motor vehicle producing (net-exporting) countries.
- Korea's domestic output of the motor vehicle industry will rise, while domestic output of the motor vehicle industry for all other countries will fall.
- Welfare and GDP for Korea will improve or increase, while those for all other countries will aggravate or decrease.

Assuming a 1% increase in productivity for Korea's motor vehicle industry, the case where only Korea eliminates its preference for domestic motor vehicles (the two elasticities are equalized in Korea) and the case where the entire world eliminates its preference for domestic motor vehicles (the two elasticities are equalized for all the world) were compared for the following results.

- Motor vehicle industry imports and exports for all countries including Korea will increase.
- Motor vehicle trade balance, domestic production of motor vehicles, welfare, and GDP will rise or increase for motor vehicle net-exporting countries such as Korea, Japan and EU, while the variables for motor vehicle net-importing countries such as US, Other Asia and Rest of the World will fall or worsen.

Thus, if all countries could eliminate the bias favoring domestic products, it would bring significant improvements to the global economy as a whole. Imports and exports for all countries will increase relatively. The trade balance for motor vehicles, domestic production, welfare and GDP for Korea, Japan, EU and other motor vehicle net-exporters will rise and improve. However, those for motor vehicle net-importers such as US, Other Asia, and Rest of the World will fall or aggravate due to the elimination of bias favoring domestic products.

Korea, as a net-exporter of the motor vehicle industry, whose exports are growing fast, should try to reduce trade friction with its trading partners through concrete actions such as inviting foreign investment through global M&As, diversifying the range of exporting countries, increasing the imports of parts to offset exports of assembled vehicles, as well as increasing overseas production.

Table 2-1. Korea and World Trade in the Motor Vehicle Industry (1998)

(Unit: million dollars)

Exports by Category and by Country	Passenger Cars (SITC 781)	Freight and Specialty Vehicles (SITC 782)	Other Road Vehicles (SITC 783)	Motor Vehicle Parts (SITC 784)	Motor Vehicle Industry Total
World Total Exports	278,097.7	55,034.9	17,763.3	132,056.5	482,952.4
Germany	59,725.5 (21.5)	7,291.4 (13.2)	3,243.4 (18.3)	23,174.0 (17.5)	93,434.4 (19.3)
Japan	50,194.8 (18.0)	8,298.3 (15.1)	1,050.3 (5.9)	12,742.4 (9.6)	72,285.8 (15.0)
USA	16,436.4 (5.9)	7,640.9 (13.9)	1,753.2 (9.9)	28,324.9 (21.4)	54,155.4 (11.2)
Canada	29,620.8 (10.7)	6,321.2 (11.5)	2,804.7 (15.8)	8,679.0 (6.6)	47,425.7 (9.8)
France	19,414.4 (7.0)	3,074.0 (5.6)	1,370.6 (7.7)	10,894.0 (8.2)	34,753.0 (7.2)
Bel.-Lux.	17,373.1 (6.2)	2,133.3 (3.9)	1,815.7 (10.2)	3,515.1 (2.7)	24,837.2 (5.1)
Spain	16,264.8 (5.8)	3,683.2 (6.7)	345.7 (1.9)	5,400.2 (4.1)	25,693.9 (5.3)
UK	14,488.7 (5.2)	1,546.0 (2.8)	243.1 (1.4)	7,084.8 (5.4)	23,362.6 (4.8)
Mexico	10,974.2 (3.9)	3,595.8 (6.5)	331.4 (1.9)	4,173.7 (3.2)	19,075.1 (4.1)
Italy	6,883.7 (2.5)	2,770.1 (5.0)	124.7 (0.7)	7,504.1 (5.7)	17,282.6 (3.6)
Korea	***8,603.6 (3.1)***	***794.8 (1.4)***	***498.0 (2.8)***	***1,281.0 (1.0)***	***11,177.4 (2.3)***
Sweden	4,084.1 (1.5)	224.1 (0.4)	504.0 (2.8)	4,475.3 (3.4)	9,287.5 (1.9)
Netherlands	4,236.2 (1.5)	1,246.5 (2.3)	1,924.5 (10.8)	1,480.1 (1.1)	8,887.3 (1.8)
Korea's Rank	10	12	9	15	12

Note: Numbers in ( ) are % of total world exports.

Source: United Nations (1999), *1998 International Trade Statistics Yearbook*, New York and authors' calculation.

Table 2-2. Total Merchandise Exports and Motor Vehicle Industry Exports by Country (1998)

(Unit: million dollars)

Country	Total Merchandise Exports (A)	Motor Vehicle Industry Exports (B)	Proportion (%) (B/A*100)
Germany	543,292	93,434	17.2
Japan	388,117	72,286	18.6
USA	682,497	54,155	7.9
Canada	214,335	47,426	22.1
France	305,492	34,753	11.4
Bel.-Lux.	177,662	24,837	14.0
Spain	109,231	25,694	23.5
UK	271,850	23,363	8.6
Mexico	65,583	19,075	29.1
Italy	242,147	17,283	7.1
Korea	***132,313***	***11,177***	***8.4***
Sweden	84,739	9,288	11.0
Netherlands	182,733	8,887	4.9

Source: United Nations (1999), *1998 International Trade Statistics Yearbook*, New York and authors' calculation.

Note: 1997 data for Mexico, and the motor vehicle industry includes SITC 781-784.

Table 2-3. RCA Index for the Motor Vehicle Industry

1. The Motor Vehicle Industry (SITC 781-784)

Year	***Korea***	Germany	Japan	US
1990	***0.38***	1.24	2.49	0.87
1991	***0.40***	1.45	2.37	0.85
1992	***0.45***	1.38	2.36	0.89
1993	***0.67***	1.69	2.30	0.96
1994	***0.69***	1.79	2.15	1.00
1995	***0.87***	1.91	1.95	0.97
1996	***1.05***	1.88	1.96	0.95
1997	***1.05***	1.92	2.06	0.95
1998	***0.93***	1.90	2.06	0.88

Source: United Nations (various issues), *International Trade Statistics Yearbook*, New York and authors' calculation.

2. Passenger Cars (SITC 781)

Year	***Korea***	Germany	Japan	US
1990	***0.58***	1.37	2.94	0.56
1991	***0.59***	1.64	2.82	0.57
1992	***0.63***	1.48	2.74	0.63
1993	***0.93***	1.90	2.56	0.63
1994	***0.94***	1.99	2.29	0.66
1995	***1.24***	2.05	2.02	0.62
1996	***1.48***	2.08	2.05	0.58
1997	***1.42***	2.15	2.35	0.52
1998	***1.25***	2.11	2.48	0.46

Source: United Nations (various issues), *International Trade Statistics Yearbook*, New York and authors'

calculation.

3. Motor Vehicle Parts (SITC 784)

Year	***Korea***	Germany	Japan	US
1990	***0.16***	0.93	1.61	1.55
1991	***0.15***	1.20	1.51	1.43
1992	***0.16***	1.30	1.53	1.53
1993	***0.19***	1.54	1.71	1.71
1994	***0.21***	1.66	1.83	1.73
1995	***0.22***	1.78	1.83	1.68
1996	***0.34***	1.68	1.80	1.67
1997	***0.45***	1.70	1.53	1.74
1998	***0.39***	1.72	1.33	1.68

Source: United Nations (various issues), *International Trade Statistics Yearbook*, New York and authors' calculation.

Table 3-1. Korea's Trade Trend in the Motor Vehicle Industry (HS 87)

(Unit: thousand dollars)

Year	Exports (A)	Imports (B)	Balance (A-B)
1988	3,806,556	730,594	3,075,962
1989	2,462,882	760,434	1,702,448
1990	2,324,078	930,309	1,393,769
1991	2,686,259	1,278,213	1,408,046
1992	3,264,321	1,114,498	2,149,823
1993	5,080,650	1,117,094	3,963,556
1994	6,009,911	1,568,485	4,441,426
1995	9,358,465	2,070,184	7,288,281
1996	11,727,309	2,261,373	9,465,936
1997	12,328,440	1,925,629	10,402,811
1998	11,433,944	813,756	10,620,188
1999	13,144,857	1,257,748	11,887,109
2000	15,265,527	1,631,262	13,634,265
2001. 1~ 10	12,732,508	1,518,671	11,213,837

Source: Korea International Trade Association (KITA), *KOTIS Database.*

Table 3-2. Korea's Motor Vehicle Industry Trade by Sub-Categories (2000)

(Unit: thousand dollars)

HS Chapter or Heading	Exports (A)	Imports (B)	Balance (A-B)
Total	172,267,510	160,481,018	11,786,492
HS 87	15,265,527	1,631,262	13,634,265
HS 8702	465,518	694	464,824
HS 8703	11,896,007	154,904	11,741,103
HS 8704	737,246	22,900	714,346
HS 8705	42,753	44,512	-1,759
HS 8706	11,352	1,965	9,387
HS 8707	35,038	878	34,160
HS 8708	1,745,768	1,206,324	539,444

Note: HS Chapter 87 and headings 8702 to 8708 include commodities as follows.
HS 87 - vehicles other than railway or tramway rolling-stock, and parts and accessories thereof
HS 8702 - motor vehicles for the transport of ten or more persons, including the driver
HS 8703 - motor cars and other motor vehicles principally designed for the transport of persons (other than those of heading 8702), including station wagons and racing cars
HS 8704 - motor vehicles for the transport of goods
HS 8705 - special purpose motor vehicles, other than those principally designed for the transport of persons or goods
HS 8706 - chassis fitted with engines, for the motor vehicles of headings 8701 to 8705
HS 8707- bodies (including cabs), for the motor vehicles of headings 8701 to 8705
HS 8708 – parts and accessories of the motor vehicles of headings 8701 to 8705
Source: KITA, *KOTIS Database.*

Table 3-3. Trend of Korea's Passenger Car (HS 8703) Imports Share by Country

(Unit: %)

Year	Total Imports (1,000 dollars)	Germany	Japan	US	Sweden	UK	France	Italy
1988	56,972	15.5	8.1	31.1	3.8	0.3	1.3	22.5
1989	90,748	20.0	5.2	65.3	3.8	1.1	1.7	1.6
1990	98,472	22.3	6.6	50.6	5.9	3.3	2.8	1.3
1991	41,298	31.6	4.9	37.8	9.7	2.1	5.0	2.4
1992	57,765	26.4	4.3	47.4	9.2	1.6	1.6	2.4
1993	47,536	15.3	8.7	55.7	6.4	1.4	1.8	1.3
1994	120,844	27.6	4.8	42.9	11.2	1.5	3.1	0.0
1995	266,773	42.7	3.8	32.3	9.6	1.6	2.5	0.6
1996	440,329	44.1	1.9	29.3	8.2	1.9	2.1	1.6
1997	281,449	37.3	3.7	37.8	2.5	1.8	1.5	0.9
1998	16,344	31.5	13.1	37.5	2.6	0.0	1.1	0.0
1999	74,585	52.2	5.8	19.5	6.2	0.0	0.2	0.0
2000	154,904	51.8	7.7	18.5	6.4	3.7	0.2	0.1
2001.1~ 10	205,579	55.9	18.3	13.0	4.1	0.8	0.1	0.1

Source: KITA, *KOTIS database* and authors' calculation.

Table 3-4. Trend of Korea's Passenger Car (HS 8703) Export Share by Country

(Unit: %)

Year	Total Exports (1,000 dollars)	US	Canada	UK	Germany	Italy	Spain	Australia
1988	3,336,190	87.2	4.6	1.1	0.0	0.6	0.0	0.5
1989	2,048,412	70.0	11.2	3.6	0.0	0.6	0.0	2.2
1990	1,856,336	60.3	15.4	1.2	0.0	1.0	0.1	2.8
1991	2,143,389	46.7	13.5	2.8	2.6	2.8	0.1	3.0
1992	2,537,447	26.6	6.8	3.7	9.1	4.0	1.2	3.4
1993	3,892,256	17.4	3.7	2.7	7.7	1.5	1.7	3.7
1994	4,471,773	32.1	3.8	2.8	6.5	1.4	2.2	5.2
1995	7,242,785	20.3	1.2	5.1	8.6	1.9	2.8	5.7
1996	9,089,240	18.5	1.5	4.1	7.5	1.5	3.3	7.1
1997	9,263,652	20.2	1.7	5.5	5.9	4.9	3.4	7.6
1998	8,604,470	19.4	2.5	5.2	5.0	6.8	5.9	5.6
1999	9,968,966	32.8	2.9	5.0	4.3	6.1	5.8	4.4
2000	11,896,007	42.3	4.5	3.5	2.4	4.7	4.1	4.2
2001.1~ 10	9,918,223	48.6	5.4	3.2	2.7	4.2	3.2	2.9

Source: KITA, *KOTIS Database* and author's calculation.

Table 3-5. US Trade in the Motor Vehicle Industry (HS 87)

1. Exports

(Unit: million dollars)

Year	US Total Merchandise Exports (A)	Motor Vehicle Industry Exports		Motor Vehicle Industry Exports to Korea	
		Value (B)	Share (%) (B/A*100)	Value (C)	Share (%) (C/B*100)
1993	464,858	43,210	9.30	-	-
1994	512,411	49,209	9.60	-	-
1995	582,077	51,776	8.90	-	-
1996	622,814	55,554	8.92	744	1.34
1997	687,598	60,539	8.80	735	1.21
1998	680,474	59,086	8.68	363	0.61
1999	692,821	58,563	8.45	471	0.80
2000	780,419	61,928	7.94	450	0.73
2001.1~ 9	556,912	43,824	7.87	327	0.75

Source: KITA, *KOTIS Database* and authors' calculation.

2. Imports

(Unit: million dollars)

Year	US Total Merchandise Imports (A)	Motor Vehicle Industry Imports		Motor Vehicle Industry Imports from Korea	
		Value (B)	Share (%) (B/A*100)	Value (C)	Share (%) (C/B*100)
1993	580,469	84,758	14.60	-	-
1994	663,746	97,018	14.62	-	-
1995	743,500	102,329	13.76	-	-
1996	791,313	105,016	13.27	2,025	1.93
1997	870,213	114,904	13.20	2,102	1.83
1998	913,885	123,777	13.54	1,917	1.55
1999	1,024,766	148,129	14.45	3,300	2.23
2000	1,216,888	163,854	13.47	5,306	3.24
2001.1~ 9	867,192	118,021	13.61	4,903	4.15

Source: KITA, *KOTIS Database* and authors' calculation.

3. Balance

(Unit: million dollars)

Year	Total US Trade Deficit (A)	Motor Vehicle Industry Trade Balance		Motor Vehicle Industry Trade Balance with Korea	
		Value (B)	Share (%) (B/A*100)	Value (C)	Share (%) (C/B*100)
1993	-155,610	-41,548	26.70	-	-
1994	-151,335	-47,809	31.59	-	-
1995	-161,423	-50,553	31.32	-	-
1996	-168,499	-49,966	29.65	-1,281	2.56
1997	-182,615	-54,365	29.77	-1,367	2.51
1998	-233,411	-64,691	27.72	-1,554	2.40
1999	-331,945	-89,566	26.98	-2,829	3.16
2000	-436,469	-101,926	23.35	-4,856	4.76
2001.1~ 9	-310,280	-74,197	23.91	-4,576	6.17

Source: KITA, *KOTIS Database* and authors' calculation.

Table 3-6. Motor Vehicle Industry Products Recently Liberalized from ISDP

Elimination Date / Item	Dec. 31, 1998	June 30, 1999	No. of Items
Motor Vehicles	Station Wagon (1,000cc-1,500cc), Jeep (1,500cc-3,000cc), Jeep (Diesel, 1,500cc-2,500cc)	Sedans (1,000cc-1,500cc), Sedans (1,500cc-3,000cc), Sedans (More than 3,000cc), Station Wagons (1,500cc-3,000cc), Jeep (Diesel, More than 2,500cc)	8
Parts, etc.		Parts for Motor Vehicles, Tires for Passenger Cars	2
No. of Items	3	7	10

Note: Raw material for parts, samples, and items not produced domestically were allowed to be imported from Japan despite the ISDP as exceptions.

Source: MOCIE.

Table 3-7. Input Coefficients of the Motor Vehicle Industry in the IO Tables (1995) with 168 Industry Headings

Output Sector / Input Sector	115 Motor Vehicles	116 Engines and Parts	121 Other Transport Equipment	138 Other Road Transport Equip.
73 Plastic Products	0.0146	0.0503		
74 Tires and Tubes	0.0188	0.0003		
75 Other Rubber Products	0.0050	0.0215		
84 Hot Rolled Steel Products	0.0027	0.0499		
85 Cold Rolled Steel Products	0.0178	0.0198		
89 Non-Ferrous Metal Primary Products	0.0011	0.0149		
97 Heaters & Air Cond.	0.0234	0.0002		

103 Other Electric Equip.	0.0324	0.0292		
107 Audio / Visual Equip	0.0193	0.0000		
115 Motor Vehicles	0.0000	0.0000	0.0000	0.0000
116 Engines & Parts	0.3617	0.2737	0.0721	0.0572

Note: Blank space implies input coefficient of zero, or value very close to zero.
Source: Bank of Korea (1998), *Input-Output Tables (1970-1995)*, CD-ROM.

Table 3-8. Selected Variables of the Motor Vehicle Industry in the IO Tables (1995) with 402 Industry Headings

(Unit: million won, nominal)

Sector / Variable	282 Passenger Cars	283 Multiple Passenger Vehicles	284 Freight Vehicles	285 Specialty Vehicles	286 Engines for Motor Vehicles	287 Parts for Motor Vehicles	288 Trailers and Containers
Total Demand	17,972,905	2,417,150	3,026,408	1,075,048	2,937,435	13,635,992	879,211
Exports	5,534,238	280,210	592,884	92,701	6,100	584,750	621,825
Total Output	17,426,436	2,414,266	2,916,661	964,840	2,664,698	12,180,258	842,599
Imports	225,688	2,056	83,485	85,463	253,317	1,356,998	31,420
Total Domestic Consumption	12,317,886	2,136,112	2,407,262	957,602	2,911,915	12,952,506	252,194
Exports / Total Production	31.8%	11.6%	20.3%	9.6%	0.2%	4.8%	73.8%
Imports/Total Domestic Consumption[1]	1.8%	0.1%	4.1%	8.9%	8.7%	10.5%	12.5%

Notes: 1. Total Domestic Consumption = Total Production – Exports + Imports
2. Transportation equipment not denoted in this table include ships, railway cars, airplanes, motor cycles, and bicycles.

Source: Bank of Korea (1998), *Input-Output Tables (1970-1995)*, CD-ROM.

Table 3-9. MFN Tariff Rates for the Motor Vehicle Industry

1. Completed Motor Vehicles

HS 870210: Buses (10 or more passengers, internal combustion, diesel or semi-diesel engine)
HS 870323: Passenger cars, internal combustion engine, 1,500cc - 3,000cc
HS 870324: Passenger cars, internal combustion engine, more than 3,000cc

Country	Year	HS 870210		HS 870323		HS 870324	
		Range	Average	Range	Average	Range	Average
Canada	2000	6-6	6.1	6-6	6.1	6-6	6.1
EU	2000	10-16	13.0	10-10	10.0	10-10	10.0
Japan	2000	0-0	0.0	0-0	0.0	0-0	0.0
Korea	***1999***	***10-10***	***10.0***	***8-8***	***8.0***	***8-8***	***8.0***
Mexico	2000	23-23	23.0	20-20	20.0	20-20	20.0
USA	2000	2-2	2.0	3-3	2.5	3-3	2.5

Source: UNCTAD (2001), *TRAINS Version 8.0*, Spring.

2. Motor Vehicle Parts and Components

HS 870829: Other Parts for Motor Vehicles, Components (Airbags, Doors, Body Stampings, etc.)
HS 870840: Gearbox
HS 870899: Agricultural Tractor Parts

Country	Year	HS 870829		HS 870840		HS 870899	
		Range	Average	Range	Average	Range	Average
Canada	2000	0-9	4.3	0-6	3.0	0-6	3.7
EU	2000	3-5	4.0	3-5	3.8	3-5	3.6
Japan	2000	0-0	0.0	0-0	0.0	0-0	0.0
Korea	***1999***	***8-8***	***8.0***	***8-8***	***8.0***	***8-8***	***8.0***
Mexico	2000	13-18	16.2	13-18	16.3	3-18	15.4
USA	2000	3-3	2.5	0-3	1.9	0-3	0.8

Source: UNCTAD (2001), *TRAINS Version 8.0*, Spring.

Table 4-1. Trade-weighted Bilateral Tariff Rates for Motor Vehicles and Parts

(Unit: %)

Importer / Exporter	Korea	US	Other Americas	Japan	Other Asia	EU	Others
Korea	0	2.4	25.8	0	40.4	9.8	16.6
US	8.4	0	1.6	0	14.4	6.8	13.2
Other Americas	8.7	0	24.1	0	15.0	6.8	14.6
Japan	8.0	2.6	15.2	0	26.0	8.9	14.7
Other Asia	7.9	1.9	10.3	0	11.3	7.6	13.9
EU	8.4	2.2	17.9	0	20.9	0	12.9
Others	7.6	1.5	17.6	0	12.2	6.5	14.1

Note: Weighted average of MFN applied tariff rates; 1997 basis for most countries.
Source: *GTAP Database (version 5.0)*

Table 4-2. Changes in Motor Vehicle Industry Imports

(Unit: %)

Experiments / Countries	Experiment			Comparison between Experiments		
	Scen. I (1)	Scen. II (2)	Scen. III (3)	(2)-(1)	(3)-(1)	(3)-(2)
Korea	-2.842	-7.907	-7.862	-5.065	-5.020	0.045
US	0.058	0.055	0.145	-0.003	0.087	0.090
Other Americas	-0.063	-0.066	0.005	-0.003	0.068	0.071
Japan	0.023	0.019	0.099	-0.004	0.076	0.080
Other Asia	0.051	0.042	0.247	-0.009	0.196	0.205

EU	-0.027	-0.030	0.021	-0.003	0.048	0.051
Others	0.104	0.102	0.313	-0.002	0.209	0.211

Notes: Scen. denotes Scenario. For definition, see text.

Table 4-3. Changes in Motor Vehicle Industry Exports

(Unit: %)

Experiments / Countries	Experiment			Comparison between Experiments		
	Scen. I (1)	Scen. II (2)	Scen. III (3)	(2)-(1)	(3)-(1)	(3)-(2)
Korea	10.730	10.558	10.686	-0.172	-0.044	0.128
US	-0.350	-0.410	-0.320	-0.060	0.030	0.090
Other Americas	-0.171	-0.183	-0.088	-0.012	0.083	0.095
Japan	-0.344	-0.381	-0.283	-0.037	0.061	0.098
Other Asia	-0.553	-0.921	-0.768	-0.368	-0.215	0.153
EU	-0.267	-0.284	-0.202	-0.017	0.065	0.082
Others	-0.307	-0.325	-0.189	-0.018	0.118	0.136

Notes: Scen. denotes Scenario. For definition, see text.

Table 4-4. Changes in Motor Vehicle Industry Trade Balance

(Units: million dollars)

Experiments / Countries	Experiment			Comparison between Experiments		
	Scen. I (1)	Scen. II (2)	Scen. III (3)	(2)-(1)	(3)-(1)	(3)-(2)
Korea	1300.1	1426.8	1440.0	126.7	139.9	13.2
US	-263.7	-294.4	-342.9	-30.7	-79.2	-48.5
Other Americas	-69.2	-75.2	-60.7	-6.0	8.5	14.5
Japan	-261.5	-289.0	-224.3	-27.5	37.2	64.7
Other Asia	-54.4	-77.5	-130.0	-23.1	-75.6	-52.5
EU	-561.3	-593.8	-503.3	-32.5	58.0	90.5
Others	-97.0	-98.6	-188.8	-1.6	-91.8	-90.2

Notes: Scen. denotes Scenario. For definition, see text.

Table 4-5. Changes in Motor Vehicle Industry Production

(Unit: %)

Experiments / Countries	Experiment			Comparison between Experiments		
	Scen. I (1)	Scen. II (2)	Scen. III (3)	(2)-(1)	(3)-(1)	(3)-(2)
Korea	4.497	4.944	4.986	0.447	0.489	0.042
US	-0.099	-0.109	-0.126	-0.010	-0.027	-0.017
Other Americas	-0.104	-0.109	-0.098	-0.005	0.006	0.011
Japan	-0.147	-0.162	-0.126	-0.015	0.021	0.036
Other Asia	-0.180	-0.213	-0.317	-0.033	-0.137	-0.104
EU	-0.157	-0.166	-0.142	-0.009	0.015	0.024
Others	-0.215	-0.216	-0.359	-0.001	-0.144	-0.143

Notes: Scen. denotes Scenario. For definition, see text.

Table 4-6. Changes in Domestic Prices for the Motor Vehicle Industry

(Unit: %)

Experiments / Countries	Experiment			Comparison between Experiments		
	Scen. I (1)	Scen. II (2)	Scen. III (3)	(2)-(1)	(3)-(1)	(3)-(2)
Korea	-1.2266	-1.2077	-1.2058	0.0189	0.0208	0.0019
US	-0.0046	-0.0049	-0.0056	-0.0003	-0.0010	-0.0007
Other Americas	-0.0114	-0.0115	-0.0113	-0.0001	0.0001	0.0002
Japan	-0.0072	-0.0079	-0.0048	-0.0007	0.0024	0.0031
Other Asia	-0.0080	-0.0082	-0.0095	-0.0002	-0.0015	-0.0013
EU	-0.0078	-0.0080	-0.0072	-0.0002	0.0006	0.0008
Others	-0.0157	-0.0155	-0.0176	0.0002	-0.0019	-0.0021

Notes: Scen. denotes Scenario. For definition, see text.

Table 4-7. Changes in Welfare (EV)

(Unit: million dollars)

Experiments / Countries	Experiment			Comparison between Experiments		
	Scen. I (1)	Scen. II (2)	Scen. III (3)	(2)-(1)	(3)-(1)	(3)-(2)

Korea	771.6	803.4	808.5	31.8	36.9	5.1
US	-26.4	-33.0	-42.1	-6.6	-15.7	-9.1
Other Americas	20.4	17.5	24.5	-2.9	4.1	7.0
Japan	-54.3	-59.2	-41.5	-4.9	12.8	17.7
Other Asia	-15.8	-28.4	-29.7	-12.6	-13.9	-1.3
EU	-51.6	-58.3	-35.5	-6.7	16.1	22.8
Others	63.6	61.4	50.9	-2.2	-12.7	-10.5

Notes: 1. Scen. denotes Scenario. For definition, see text.
2. Welfare changes in the GTAP model are measured by equivalent variation (EV), which tries to see how much output is left over, or how much additional output is required in order to maintain the same consumption level after an exogenous shock as before the shock.

Table 4-8. Potential Impacts of Liberalization in the Motor Vehicle Industry (Summary)

	Scen II vs. Scen. I (A)				Scen. III vs. Scen. I (B)				Net Effects (B-A)			
	Korea	US	net mv exporters	net mv importers	Korea	US	net mv exporters	net mv importers	Korea	US	net mv exporters	net mv importers
mv imports	(-)	(-)>	(-)>	(-)	(-)	(+)>	(+)	(++)	(+)<	(+)>	(+)	(++)
mv exports	(-)<	(-)<	(-)	(--)	(-)	(+)<	(+)	(+/-)	(++)	(+)	(+)	(++)
mv trade balance	(++)	(-)	(-)<	(-)	(++)	(-)	(+)	(-/+)	(+)	(-)	(++)	(-)
overall trade balance	(--)	(+)>	(+)	(++)	(-)	(+)	(-)	(++)	(-)	(+)	(--)	(++)
dom. mv production	(++)	(-)	(-)	(-)	(++)	(-)	(+)	(--)	(+)	(-)	(+)	(--)
dom. mv price	(++)	(-)>	(-)<	(-)	(++)	(-)	(+)	(-)	(+)	(-)	(+)	(-)
welfare (EV)	(++)	(-)	(-)>	(-)	(++)	(-)	(+)	(-)	(+)	(-)	(++)	(-/+)
GDP	(++)	(-)	(-)<	(-)	(++)	(-)	(+)	(-)	(+)	(-)	(+)	(-)
TOT	(+)	(-)	(-)>	(-)	(++)	(-)	(+)	(-/+)	(+)	(-)	(+)	(-)

Notes: 1. mv = motor vehicle industry; dom. = domestic
2. (++), (+), (-), (--) indicate a large relative increase, a relative increase, a relative decrease, and a large relative decrease compared to a base case of Scenario I or Scenario II, respectively.
3. Note that "net mv importers" and "net mv exporters" include more than one country or region. (+/-), (-/+) indicate that the relative gains and losses for these countries or regions are mixed. The former sign indicates that countries or regions that gain outnumber the countries or regions that lose, and the latter indicates that the countries or regions that lose outnumber the countries or country groups that gain.
3. > or < indicates the magnitude of the relative changes between neighboring countries or regions.

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