Chapter III

Macroeconomic Impacts under FTA Configuration
In the APEC Region

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Abstract

Comparing with Uemura (2000), this paper provides a more broken down APEC Link model. In the previous paper, seven sub-group (SG) models have been constructed in a demand-oriented manner. This paper tries to decompose the Asian NIES 3 SG model into each member economy model, i.e., South Korea, Hong Kong and Taiwan. NAFTA (NF), Oceania (OC) and Latin America (LA) models remain to be decomposed in the future. Totaling ten SG models are linked to one another through the trade block in the model. A couple of simulations will be held thereafter.

Introduction

Member economies of the APEC region vary in their phase of economic development. The APEC region can be categorized into several sub-groups, tied by economic treaties and/or geographical proximity. Uemura (2000) separates this region into seven sub-groups and analyzes how some initial impacts in certain sub-groups affect on other members through their trade behavior.

This paper decomposes the Asian NIES 3 SG model in the previous paper into three individual models, i.e., South Korea, Hong Kong and Taiwan models.

In line with the change in the number of SG models, change in the trade block was also performed. Simulation analysis which evaluates effects of price change impact into the whole region will be enabled further. Another trial, making domestic (or intra-sub-group) demand endogenous, was failed, since the whole model became unstable with endogenous domestic demands.

The data integration procedure is discussed in Uemura (2000). Trade data will be
The compiled data will be used in our simulations which measure the total region-wide effect caused by the primary economic impact. Section 2 provides an overview of trade structures in the APEC region. In section 3, our model is explained. In sections 4 and 5, exogenous conditions which will be given to the Link model, and simulation results are shown. Specifically, the section deals with the case of Japan-Korea FTA and its expansion into the case of ASEAN+3 tariff abolition. Section 6 contains concluding remarks.

The details of the sub-group models and trade link system are shown in the appendix.

1. APEC Link Model: 21st Century Version

1.1. Model Improvement
Comparing to the model used in Uemura (2000), this version of the total link model includes price dummies which can be used for simulation putting an initial shock in certain price variables. In this sense, our link model has been improved since one year earlier.

Dummy variables themselves have just a series of unity in every single year. A price dummy variable, for example, is incorporated in the model as shown in a typical import function below.

\[ XXMZZ = f[XXYD*ZZYD, (XXPM*XXPMP)/XXPY ] \]

where
- \( XXMZZ \): Sub group XX’s import from sub group ZZ.
- \( XXYD, ZZYD \): XX and ZZ’s GDP denominated in US$
- \( XXPM \): XX’s import price
- \( XXPMP \): Price Dummy
- \( XXPY \): GDP deflator of XX

When we wish to estimate the effect of tariff reduction, for example, we can set JPPMP (price dummy for Japan) for some years to be a figure less than 1. In this version of trade link model, we have more than one price dummies so that we can alternate the price effects by trade partners.
1.2. Sub-Groups

Sub-grouping of economies are as follows (abbreviation of the name of each sub-group is shown in the parentheses). ASEAN 7 (A7) consists of Brunei, Indonesia, Malaysia, the Philippines, Singapore, Thailand and Vietnam. NAFTA contains Canada, Mexico and United States. Oceania (OC) sub-group has three economies, Australia, New Zealand and Papua New Guinea. Latin America (LA) consists of Chile and Peru. Japan (JP), China (CN), Korea (KR), Hong Kong (HK), Taiwan (TW) and Russia (RU) are single country sub-groups. The rest of the world (RW) is also considered as a sub-group although it is purely exogenous. World total (WL) is a subset of sub-groups though it contains everything.

Brunei and Vietnam in ASEAN 7 as well as Papua New Guinea in Oceania have very poor dataset for their national account related series. Those economies, therefore, cannot be included in compiling the "Group GDP."

As mentioned in Uemura (2000), it is impossible to compile a "reliable" dataset for Latin America (LA). The paper treats LA sub-group as exogenous, i.e., no functions are estimated. In this paper, however, several import functions are estimated to embody a Latin American SG model.

<table>
<thead>
<tr>
<th>Sub-Group Name</th>
<th>Abbr.</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>ASEAN 7</td>
<td>(A7)</td>
<td>Brunei, Indonesia, Malaysia, Philippines, Singapore, Thailand, Vietnam</td>
</tr>
<tr>
<td>NAFTA</td>
<td>(NF)</td>
<td>Canada, Mexico, United States</td>
</tr>
<tr>
<td>Oceania</td>
<td>(OC)</td>
<td>Australia, New Zealand, Papua New Guinea</td>
</tr>
<tr>
<td>Latin America</td>
<td>(LA)</td>
<td>Chile, Peru</td>
</tr>
<tr>
<td>Japan</td>
<td>(JP)</td>
<td>Japan</td>
</tr>
<tr>
<td>China</td>
<td>(CN)</td>
<td>China</td>
</tr>
<tr>
<td>Korea</td>
<td>(KR)</td>
<td>South Korea</td>
</tr>
<tr>
<td>Hong Kong</td>
<td>(HK)</td>
<td>China, Hong Kong</td>
</tr>
<tr>
<td>Taiwan</td>
<td>(TW)</td>
<td>Taiwan</td>
</tr>
<tr>
<td>Russia</td>
<td>(RU)</td>
<td>Russia</td>
</tr>
<tr>
<td>Rest of the World</td>
<td>(RW)</td>
<td></td>
</tr>
<tr>
<td>World Total</td>
<td>(WL)</td>
<td></td>
</tr>
</tbody>
</table>
1.3. Data Compilation
For constructing sub-group models, it is critical to integrate the data series of member economies into the SG data set. SG models for Japan, China, Korea, Hong Kong, Taiwan and Russia are identical with each country model. For other four groups, namely, ASEAN 7, NAFTA, Oceania and Latin America, newly compiled datasets will be required to construct SG models.
Trade data picked up from *Direction of Trade (DOT)* for every single pair of the APEC economies were used in order to compile group-by-group (such as ASEAN 7 to/from Japan and so on) export/import figures. For each sub-group model, we need to estimate the 1995 constant price trade data series. We have adopted the export/import deflators in the national account base or export/import unit value for this purpose. Real trade values are first calculated by country and the sub-group figures are then calculated summing up the country-wise figures. The "GDP" series for each sub-group, on the other hand, is the sum of US dollar based real GDP (1995 price) of the member economies\(^1\). Nominal GDP will be calculated in same manner. The GDP deflator is their proportion, i.e. \([\text{Nominal GDP}]/[\text{Real GDP}]\).

2. Tariff Structure in Asia
The following table shows the average rate of import duties of East and Southeast Asian economies to be mentioned later. In the simulation analysis, our assumptions on import price decline are based on these figures.

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\(^1\) As mentioned above, several members are omitted from the total GDP because of the poor quality of available data.
Table 2.  Average Rate of Import Duties

<table>
<thead>
<tr>
<th>Country</th>
<th>Import Priority</th>
<th>Import Rate (mil.$)</th>
<th>Duties (mil.$)</th>
<th>Rate (%)</th>
<th>Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>Japan</td>
<td></td>
<td>6488</td>
<td>291512</td>
<td>2.2%</td>
<td>1997</td>
</tr>
<tr>
<td>Korea</td>
<td></td>
<td>3943</td>
<td>116778</td>
<td>3.4%</td>
<td>1999</td>
</tr>
<tr>
<td>China</td>
<td></td>
<td>3854</td>
<td>142189</td>
<td>2.7%</td>
<td>1997</td>
</tr>
<tr>
<td>Singapore</td>
<td></td>
<td>448</td>
<td>132412</td>
<td>0.3%</td>
<td>1997</td>
</tr>
<tr>
<td>Malaysia</td>
<td></td>
<td>1242</td>
<td>15351</td>
<td>8.1%</td>
<td>1999</td>
</tr>
<tr>
<td>Indonesia</td>
<td></td>
<td>234</td>
<td>27337</td>
<td>0.9%</td>
<td>1998</td>
</tr>
<tr>
<td>Thailand</td>
<td></td>
<td>1597</td>
<td>42895</td>
<td>3.7%</td>
<td>1998</td>
</tr>
<tr>
<td>ASEAN</td>
<td></td>
<td>6738</td>
<td>256671</td>
<td>2.6%</td>
<td>---</td>
</tr>
</tbody>
</table>

Source: International Financial Statistics, IMF.  
Government Financial Statistics, IMF.

3.  The Sub-Group Model and Trade Link

3.1.  Structure of Models and Variables
Each one of the sub-group models follows Uemura (2000). No major changes in the model have been caused. Model variables, however, progress a bit. 21st century version of APEC link model can treat price changes, especially those of import prices. When we investigate the effect of a fall in import prices due to tariff abolition, this version of the model will serve us a set of fruitful outputs.

3.2.  Linking Equations
Import functions are basically specified in the form of (1) shown above. The Link block (D13 in Appendix D) contains identical equations to sum up world imports from each sub-group. For example, world import from ASEAN 7 is defined as shown below.
\[ WLMA7 = \sum SG_i MA7, \quad i = 1, \ldots, 11 \] (2)

where: \( SG_i \) represents the \( i \)th sub-group and the 11th represents Rest of the World (RW), which is given in the equation exogenously.

This variable is connected with the ASEAN7 total exports (A7XD). The comparison of WLMA7 and A7XD serves as the iteration benchmark for the ASEAN7 model. Equation linkage is similarly done in other sub-group models.

4. Exogenous Conditions ---Japan-Korea FTA and Its Expansion into ASEAN+3

Three kinds of simulation analysis will be performed. We will see the effect of income and trade expansion associated with sub-regional trade liberalizing arrangements such as Japan and South Korea FTA and AFTA on the one hand. On the other hand, we will see the effects of fall in the import price derived from tariff reduction between or among the concerned economies.

The effect of the Japan and South Korea FTA on these two countries will be measured firstly. Then some “expanded” cases when the FTA is blown up to East Asia including China, and furthermore, to Southeast Asia, i.e., ASEAN, will be considered later.

In case 1, in order to see the amount increase of trade between Japan and South Korea as what reaction appear within a model, the case where the South Korean export for Japan increases by 2 billion dollars is seen. This corresponds to the case of “preparatory measures” of Japan-Korea FTA. Yamazawa (2000) points out that Korea’s huge bilateral trade deficit with Japan is somewhat making Korean skeptical toward forming the FTA.

As the next step, in case 2-1, Japan and South Korea’s GDP growth rates will be exogenously pushed up. Conserving the difference in the GDP sizes, the margin is set 1 percentage point for Korea, and 0.1 percentage point for Japan. This is translated as a productivity effect of FTA. Furthermore, in case 2-2, we measure, also taking a fall of the import prices by the tariff rate reduction between Japan and South Korea into consideration.

About tariff rate reduction, the amount of average rate of import duties shown in Table 2 is assumed to be removed from import prices.

In case 3, our assumption spreads further, the tariff rate reduction (abolition) within
Japan and Korea is expanded to China and ASEAN to make a large economic block tied by a steady trade relationship (ASEAN+3). Firstly, imports between East Asia (Japan, Korea and China) and AFTA members are assumed to increase independently (Case 3-1). And then, in Case 3-2, we assume the tariff reduction analogous to Case 2-2.

These assumptions are adopted cumulative, i.e., assumption in the case 1 will be effective in cases 2 and 3. Impacts are given in the year 1995, the base year of the trade matrix. Simulated figures will be compared with those from the base case simulation, where no impacts are given.

**Chart 1: Exogenous Conditions Given in the System**

<table>
<thead>
<tr>
<th>Case 1</th>
<th>Case 2-1</th>
<th>Case 2-2</th>
<th>Case 3-1</th>
<th>Case 3-2</th>
</tr>
</thead>
<tbody>
<tr>
<td>JPMKR</td>
<td>JPMKR + 2000</td>
<td>JPDDEX + 5086</td>
<td>KRDDEX + 4796</td>
<td>JPPMP2 * 0.978</td>
</tr>
<tr>
<td>Case 2-1</td>
<td>JPDDEX + 5086</td>
<td>KRDDEX + 4796</td>
<td>JPPMP2 * 0.978</td>
<td>KRPMP2 * 0.967</td>
</tr>
<tr>
<td>Case 2-2</td>
<td>JPPMP2 * 0.978</td>
<td>KRPMP2 * 0.967</td>
<td>DAMC + 493</td>
<td>A7PMP3 * 0.974</td>
</tr>
<tr>
<td>Case 3-1</td>
<td>KRPMP2 * 0.967</td>
<td>DAMC + 493</td>
<td>DJMA + 2762</td>
<td>CNPMP3 * 0.973</td>
</tr>
<tr>
<td>Case 3-2</td>
<td>DAMC + 493</td>
<td>DJMA + 2762</td>
<td>DKMA + 574</td>
<td>JPPMP3 * 0.978</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>KRPMP3 * 0.967</td>
</tr>
</tbody>
</table>

*) Unit: US$ million for cases 1, 2-1 and 3-1.
5. Simulation Results

Simulation 1: *Trade Creation effects between Japan and Korea.*
In order to see what reaction of the total link model appears, we put a 2 billion export acceleration from Korea to Japan as an initial shock. The variable JPMKR stands for “Japan’s import from Korea” which is translated to be “Korea’s export to Japan” in the model. In this case, JPMKR is exogenously increased by 2 billion dollars calculating the effect of Japan-Korea FTA. Our initial shock, 2 billion dollars, however, will not appear in the final output table as exact 2 billion dollars since the variable, JPMKR, is endogenously determined in the total model.

<table>
<thead>
<tr>
<th></th>
<th>Japan Import</th>
<th>Korea Export</th>
<th>GDP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total</td>
<td>2309</td>
<td>434</td>
<td>72</td>
</tr>
<tr>
<td>Korea ASEAN</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Japan ASEAN</td>
<td>2026</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Japan</td>
<td>2.03</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Korea</td>
<td>0.72</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

(*) Figures in the parentheses indicate the percentage points from the base case.

Thus, Japan's total imports increase by 2.3 billion dollars in line with the imports from Korea finally increase by 2.03 billion dollars while our initial impact is 2 billion. On the contrary, Korean imports from Japan increase just 72 million dollars. As a result, Japanese GDP, compared to base case simulation, declines 2.27 billion dollars and Korean GDP increases almost same amount, 2.19 billion dollars.

Simulation 2-1: *Productivity Improvement (income accelerate) in Japan and Korea.*
In addition to the exogenous condition put in the model in case 1, case 2 incorporates two additional conditions. One measured in simulation 2-1 productivity improvement effect in Japan and South Korea grasping the Japan-Korea FTA. The relative impact
of the productivity effect is considered to differ in the two countries: Korea, the smaller economy, is thought to benefit more intensively than Japan. Such productivity effect can be translated into independent increase in GDP. Here, Korea’s GDP is pushed up by 1 percentage point, and Japan’s GDP by 0.1 percentage point. In the APEC link model, an exogenous increase in GDP is translated into the corresponding increase in the domestic demand. Since GDP itself is an endogenous variable, final (solved) figure of GDP is not identical to the assumed values of 1 and 0.1 percentage points, respectively.

Table 4. Income Accelerate Effects on Japan and Korea (Case 2-1)

<table>
<thead>
<tr>
<th></th>
<th>Japan</th>
<th>Korea</th>
<th>ASEAN 7</th>
<th>China</th>
</tr>
</thead>
<tbody>
<tr>
<td>Exports</td>
<td>564</td>
<td>2826</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Imports</td>
<td>(0.13)</td>
<td>(2.11)</td>
<td>240</td>
<td>7</td>
</tr>
<tr>
<td>GDP</td>
<td>2712</td>
<td>1287</td>
<td></td>
<td>7</td>
</tr>
<tr>
<td>Total</td>
<td>2093</td>
<td>7</td>
<td></td>
<td>31</td>
</tr>
<tr>
<td>Total from</td>
<td>136</td>
<td>112</td>
<td>2938</td>
<td>0.06</td>
</tr>
</tbody>
</table>

(*) Figures in the parentheses indicate the percentage points from the base case.

In this case, compared with a base case, South Korean exports accelerate 2.11 percent, which push up the country’s GDP by 1.32 points, exceeding one point given to the system exogenously as the initial shock.

In Japan’s side, on the other hand, although exports increase by 0.13 points, imports increase by 0.67 points. The effect of the import increase described in Case 1 remains dominant. However, the effect on GDP now turns positive by a small margin, 0.06 percentage points.

Simulation 2-2: Tariff rate reduction between Japan and Korea.
Furthermore, the effect of the tariff rate reduction (abolition) between Japan and South Korea is measured. Tariff reduction is introduced into the model by subtracting the average rate of import duties from import prices.
Table 5. Tariff Rate Reduction between Japan and Korea (Case 2-2)

<table>
<thead>
<tr>
<th></th>
<th>Exports</th>
<th>Imports</th>
<th>GDP</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Total</td>
<td>Total</td>
<td>from</td>
</tr>
<tr>
<td>Japan</td>
<td>696 (0.16)</td>
<td>2976 (0.73)</td>
<td>2323 (15.06)</td>
</tr>
<tr>
<td>Korea</td>
<td>3121 (2.33)</td>
<td>1436 (0.95)</td>
<td>341 (1.09)</td>
</tr>
</tbody>
</table>

(*) Figures in the parentheses indicate the percentage points from the base case.

Again, Korea benefits more from the tariff rate reduction. Compared with the case 2-1, Japan’s exports expand by 0.03 percentage point to 0.16 percent. Korean exports, on the other hand, expand 0.22 more points by tariff rate reduction, and enjoy 2.33 percent increase from the base case. In line with this development, Korean GDP after tariff rate reduction measures 1.35 percentage point expansion as opposed to Japan see only 0.06 percentage point increase, just a same rate in case 2-1.

Simulation 3-1: Trade Creation (imports accelerate) in East and Southeast Asia.

In addition to the case 2-2, the case 3-1 expands the coverage of the FTA throughout East and Southeast Asia. That is, China and ASEAN are additionally taken into. Case 3-1 computes the effect of the trade expansion between East Asian country group (Japan, Korea and China) and Southeast Asian countries, i.e., ASEAN countries. Exogenous condition here is to accelerate imports of three East Asian countries from ASEAN sub-group by 6%. At the same time, ASEAN’s imports from these three economies are inflated by 6% of the base case.
Table 6. Imports Increase Effects in East and Southeast Asia (Case 3-1)

<table>
<thead>
<tr>
<th>Country</th>
<th>Exports from Japan</th>
<th>Imports from Japan</th>
<th>Exports from Korea</th>
<th>Imports from Korea</th>
<th>Exports from ASEAN 7</th>
<th>Imports from ASEAN 7</th>
<th>Exports from China</th>
<th>Imports from China</th>
<th>Exports from APEC</th>
<th>Imports from APEC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Japan</td>
<td>7033 (1.63)</td>
<td>6153 (1.51)</td>
<td>2330 (15.11)</td>
<td>2696 (5.86)</td>
<td>133 (0.30)</td>
<td>5966 (0.12)</td>
<td>Korea</td>
<td>4129 (3.09)</td>
<td>2208 (1.47)</td>
<td>359 (1.15)</td>
</tr>
<tr>
<td>Korea</td>
<td>192 (0.13)</td>
<td>632 (0.46)</td>
<td>25 (0.09)</td>
<td>45 (0.44)</td>
<td>509 (5.78)</td>
<td>-440 (-0.06)</td>
<td>ASEAN 7</td>
<td>2691 (0.85)</td>
<td>5496 (1.51)</td>
<td>4518 (5.76)</td>
</tr>
<tr>
<td>China</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>APEC</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>10220 (0.06)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

(*) Figures in the parentheses indicate the percentage points from the base case.

Consequently, Japan's total imports increase by 1.5% while total exports increase 1.6%. However, Korea will see a completely different sight, enjoying a 3.1% increase of the total exports while the total imports expand by 1.5%. This alteration brings about a viewable output to the two economies. While Japan will have just a small amount of GDP drift, 0.1%, Korea will enjoy a sizable 1.4% GDP growth acceleration. It turns out that the influence of the positive effect of the expansion in the free trade area given to South Korea is much larger than that given to Japan. Moreover, in China and ASEAN, although increase of the total export is seen, it remains within a small margin. Conversely, imports expand a larger margin, and as a result, GDP reduces by 0.06% and 0.47%, respectively. Finally as for the income in APEC whole region, a rise of 10.2 billion dollars is seen.
Simulation 3-2: Tariff rate reduction in East and Southeast Asia.
Furthermore, case 3-2 calculates the effect of mutual tariff rate reduction. Similar to the case 2-2, we subtract a part for a average rate of import duties from bilateral import prices.

Table 7. Tariff Rate Reduction Effects in East and Southeast Asia (Case 3-2)

<table>
<thead>
<tr>
<th></th>
<th>Japan</th>
<th>Korea</th>
<th>ASEAN 7</th>
<th>China</th>
<th>APEC</th>
<th>Total from Japan</th>
<th>Total from Korea</th>
<th>Total from ASEAN 7</th>
<th>Total from China</th>
<th>Total from APEC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Exports</td>
<td>10313 (2.39)</td>
<td>7573 (5.66)</td>
<td>2246 (0.71)</td>
<td>167 (0.11)</td>
<td>---</td>
<td>2362 (15.31)</td>
<td>1245 (13.02)</td>
<td>3167 (26.7)</td>
<td>844 (9.6)</td>
<td>11307 (0.07)</td>
</tr>
<tr>
<td>Imports</td>
<td>6381 (1.57)</td>
<td>3491 (2.32)</td>
<td>9727 (2.67)</td>
<td>1013 (0.73)</td>
<td>26 (0.09)</td>
<td>2802 (6.09)</td>
<td>146 (2.26)</td>
<td>307 (3.74)</td>
<td>-846 (-0.12)</td>
<td></td>
</tr>
<tr>
<td>GDP</td>
<td>2362 (15.31)</td>
<td>1245 (13.02)</td>
<td>-499 (-0.78)</td>
<td>59 (0.56)</td>
<td>844 (9.6)</td>
<td>2802 (6.09)</td>
<td>146 (2.26)</td>
<td>307 (3.74)</td>
<td>-846 (-0.12)</td>
<td></td>
</tr>
</tbody>
</table>

(*) Figures in the parentheses indicate the percentage points from the base case.

The positive effects in Japan and Korea expand further. Korean GDP, especially, expands by 1.85%. It mainly originates in the increase in Korean total exports, by 2.5%, compared with the case 3-1, without tariff rate reduction. Moreover, ASEAN’s imports from Japan and South Korea are measured to the further expand by 2.8 and 21.8 percentage points, to 8.6 and 26.7 percentage points, respectively. However, ASEAN’s imports from China are calculated to decline by 1.3
percentage points from the case 3-1, to 3.7 percentage points. This indicates that the import price reduction brought about a trade diversion (import substitution) to other sub-groups.

ASEAN's total exports decelerated by 0.1 point despite the total imports accelerate by 1.1 point compared with the case 3-1. ASEAN's GDP will see a 0.8 less point from the case without tariff reduction.

Whole APEC region will appreciate a more GDP expansion, 11.3 billion dollars, 0.01 percentage point higher income compared with the outcome in case 3-1.

6. Summary and Conclusion

Economic impact of the Japan-South Korea FTA and more larger market liberalization in East and Southeast Asian region is measured by simulating the APEC Trade Link Model, 21st century version. The link model originally was provided in Uemura (2000) to simulate a rough scenario analysis one year earlier. This version of the model collects a more broken down set of behavioral equations and data sets. The APEC link model includes models for NAFTA, Oceania (Australia and New Zealand), Latin America (Chile and Peru) as well as those for ASEAN and East Asian economies. The APEC Link Model measures the effects of the economic impacts through worldwide repercussions.

In the first simulation, case 1 in the paper, just calculates to evaluate the total model reaction. When we put a 2 $ billion initial shock on Japanese imports from South Korea, the shock amount is scattered to the world market through the import share matrix to provide a slightly larger outcome on the very variable.

Next two simulations compare results from direct exogenous condition (income expansion) and those from combined effect of income and price conditions. In this simulation, we assume a 1 percentage point GDP acceleration in the two countries for the first case (case 2-1) and import price decline for the second case (case 2-2). In both cases, South Korea collects a larger harvest from the exogenous condition we set.

The last two simulations also compare results from direct condition (import expansion) and outcomes from compounded effect of increase in import and decrease in import prices between the East and Southeast Asian economies reflecting the tariff rate reduction. We assume 6 percentage point import acceleration between East Asian economy group, Japan, Korea and China, and Southeast Asian economy group, ASEAN 7 for the first simulation (case 3-1) and additional import price decline for the
second case (case 3-2). Similar to the cases in the latter two simulations, South Korea is the most benefit-receiving economy in the members mentioned. In case 3-1, South Korean GDP in the simulation year accelerates by 1.4 percentage points while Japan gains only 0.12 points. China and ASEAN in case 3-1 lose their GDP by 0.06 points and 0.47 points, respectively. Even tariff reduction is imposed in the simulation (case 3-2), ASEAN cannot collect any positive pay-offs to the GDP (negative 1.25 points). China under this condition loses more, 0.12 point decline in GDP is measured. Japan sees a slightly better positive effect, 0.18 point GDP acceleration compared with 0.06 points in case 3-1. Only South Korea attains stronger GDP growth rate, 1.85 percentage point GDP spur.

To the whole APEC region, the last two simulations give positive conclusions. Case 3-1 shows 10.2 billion dollar (0.06 percentage points) GDP picking up and case 3-2, 11.3 billion (0.07 points). Comparing the results shown above, 65.7% and 78.5% of total APEC (net) GDP harvest in case 3-1 and case 3-2, respectively, are captured by Korea.

Since trade liberalization will constitute the mainstream of the future international economic environment, it will be more and more important to study the possible impacts of major shift or revolution ex ante, and to grasp those quantitative impacts of further liberalization.
Appendix A. Macro Performance of the Model

For each SG model and the total link model, macro-performance are measured by Root Mean Squared Percent Error (RMSPE). We adopt the years 1996 and 1997 for the simulation period since the import share matrix used in the trade block consists of 1996 figures. RMSPE measures the accuracy of the individual variables in a simulation context. A desirable model would lead us to expect the results of a historical simulation to match the behavior of the real world rather closely. RMSPE is a measure of how closely each endogenous variable tracks the historical data and is defined as

\[
RMSPE = \left\{ \frac{1}{T} \sum \left[ \frac{(Y^s_t - Y^a_t)^2}{Y^a_t} \right] \right\}^{1/2} \times 100 \% \quad (A1)
\]

where:
- \(Y^s_t\): Simulated value of \(Y_t\)
- \(Y^a_t\): Actual value
- \(T\): Number of periods in the simulation
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<th>Japan</th>
<th>Hong Kong</th>
<th>Korea</th>
<th>Taiwan</th>
<th>NAFTA</th>
<th>Oceania</th>
<th>Latin Am.</th>
<th>Russia</th>
<th>World</th>
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</table>
Appendix C. Variable List

All of the variable names included in the model are separated into two parts. The first part consists of a two character variable name describing the sub-groups while the remaining part consists of descriptive variables.

**Sub-Group Abbreviation (First two characters)**

<table>
<thead>
<tr>
<th>Code</th>
<th>Sub-Group Name</th>
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<tbody>
<tr>
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<td>ASEAN 7</td>
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<tr>
<td>KR</td>
<td>South Korea</td>
</tr>
<tr>
<td>HK</td>
<td>Hong Kong</td>
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<td>TW</td>
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<td>NF</td>
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<td>China</td>
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<td>RU</td>
<td>Russia</td>
</tr>
<tr>
<td>AP</td>
<td>APEC Total</td>
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<tr>
<td>RW</td>
<td>Rest of the World</td>
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<td>WL</td>
<td>World Total</td>
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Variable Description (From the third character to the tail)

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<th>Variable</th>
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<th>Unit</th>
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<td>MA7</td>
<td>Imports from ASEAN</td>
<td>US$ million</td>
</tr>
<tr>
<td>MKR</td>
<td>Imports from South Korea</td>
<td>US$ million</td>
</tr>
<tr>
<td>MHK</td>
<td>Imports from Hong Kong</td>
<td>US$ million</td>
</tr>
<tr>
<td>MTW</td>
<td>Imports from Taiwan</td>
<td>US$ million</td>
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<tr>
<td>MNF</td>
<td>Imports from NAFTA</td>
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<td>MOC</td>
<td>Imports from Oceania</td>
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<td>MLA</td>
<td>Imports from Latin America</td>
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<td>MJP</td>
<td>Imports from Japan</td>
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<td>MCN</td>
<td>Imports from China</td>
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<td>MRU</td>
<td>Imports from Russia</td>
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</tr>
<tr>
<td>MRW</td>
<td>Imports from Rest of the World</td>
<td>US$ million</td>
</tr>
<tr>
<td>MWL</td>
<td>Imports from World</td>
<td>US$ million</td>
</tr>
<tr>
<td>YD</td>
<td>Gross Domestic Product</td>
<td>US$ million</td>
</tr>
<tr>
<td>DDD</td>
<td>Domestic Demand</td>
<td>US$ million</td>
</tr>
<tr>
<td>XD</td>
<td>Exports</td>
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<tr>
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</tr>
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<td>Domestic Demand (Nominal)</td>
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<td>PM</td>
<td>Import Deflator index</td>
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</table>
Appendix D. APEC Link Model, 21st Century Version

D.1. ASEAN 7 (A7) SG Model

D.1.1. Import Functions

A7-1. &LOG A7MA7 [1989-1998]

\[
&\text{LOG A7MA7} = 3.0018 + 0.6131 \times (\&\text{LOG A7YD}) \\
(2.2025) \quad (5.9579) \\
-3.2084 \times (1 \times \&\text{LAG} \times \&\text{LOG} \times (A7PM \times A7PMP3) / A7PY) \\
(-25.7290)
\]

SE=.0335 DW=.9420 R-SQ(ADJ)=.9931 F-STAT=652.0333

A7-2. &LOG A7MCND [1990-1998]

\[
&\text{LOG A7MCND} = -34.8912 + 1.6405 \times (\&\text{LOG A7YD} \times CNYD) + 0.4336 \times (D98) \\
(-2.4065) \quad (3.0231) \quad (1.7252)
\]

SE=.2370 DW=1.7702 R-SQ(ADJ)=.5602 F-STAT=6.0953

A7-3. A7MCN [1989-1998]

\[A7MCN = A7MCND + DAMC\]

A7-4. &LOG A7MJPD [1989-1998]

\[
&\text{LOG A7MJPD} = -6.8950 + 0.6331 \times (\&\text{LOG A7YD} \times JPYD) \\
(-1.6373) \quad (4.3015) \\
-1.2326 \times (\&\text{LOG} (A7PM \times A7PMP3) / A7PY) \\
(-2.8218)
\]

SE=.0484 DW=1.8213 R-SQ(ADJ)=.9722 F-STAT=158.4180

A7-5. A7MJP [1989-1998]

\[A7MJP = A7MJPD + DAMJ\]
A7-6. &LOG A7MKRD [1989-1998]

\[ \begin{align*}
& \text{&LOG A7MKRD} = 39.5744 - 1.1376 \times (\text{&LOG A7YD} \times \text{KRYD}) \\
& \text{(3.8260)} \quad \text{(-2.8950)} \\
& - 7.4032 \times (\text{&LOG (A7PM\times A7PMP3)/A7PY}) \\
& \text{(-6.0851)} \\
\end{align*} \]

SE = .1623  DW = 2.2937  R-SQ(ADJ) = .8739  F-STAT = 32.1931


\[ \text{A7MKR} = \text{A7MKRD} + \text{DAMK} \]


\[ \begin{align*}
& \text{&LOG A7MHK} = -18.8037 + 1.1071 \times (\text{&LOG A7YD} \times \text{HKYD}) - 0.1561 \\
& \text{*(-D92+D93)} \\
& \text{(-19.8909)} \quad \text{(29.1790)} \quad \text{(-5.8840)} \\
\end{align*} \]

SE = .0335  DW = 2.0752  R-SQ(ADJ) = .9900  F-STAT = 448.4271


\[ \begin{align*}
& \text{&LOG A7MTW} = -7.3083 + .6578 \times (\text{&LOG A7YD} \times \text{TWYD}) - 1.1927 \times (\text{&LOG A7PM/A7PY}) \\
& \text{(-.8753)} \quad \text{(2.0276)} \quad \text{(-1.3433)} \\
& - 0.1174 \times (\text{D92+D93}) \\
& \text{(-1.7885)} \\
\end{align*} \]

SE = .0812  DW = 1.6383  R-SQ(ADJ) = .9214  F-STAT = 36.1749

A7-10. &LOG A7MNF [1990-1998]

\[ \begin{align*}
& \text{&LOG A7MNF} = -18.4389 + .8129 \times (\text{&LOG A7YD} \times \text{NYFCD}) \\
& \text{(-6.1838)} \quad \text{(7.1635)} \\
& + 0.5121 \times (1 \times \text{&LAG &LOG A7MNF}) + 0.0574 \times (\text{D95}) \\
& \text{(9.9322)} \quad \text{(1.4374)} \\
\end{align*} \]

SE = .0347  H-STAT = -.7998  R-SQ(ADJ) = .9828  F-STAT = 153.2184
A7-11. &LOG A7MOC [1990-1998]
&LOG A7MOC = -1.5279 + .3231 * (&LOG A7YD * OCYD )
\[ (-.4177) \] \[ (2.5239) \]
+ .2398 * (1 &LAG &LOG A7MOC ) - 1.3060 * (&LOG A7PM/A7PY )
\[ (4.2681) \] \[ (-4.0684) \]
SE = .0239 H-STAT = .5390 R-SQ (ADJ) = .9866 F-STAT = 196.6030

&LOG A7MLA = -37.6384 + 1.7821 * (&LOG A7YD * LAYD )
\[ (-2.6866) \] \[ (3.1774) \]
- 1.0558 * (&LOG A7PM/A7PY )
\[ (-.8322) \]
SE = .0880 DW = 1.0797 R-SQ (ADJ) = .9467 F-STAT = 54.2894

A7MWL = A7MA7 + A7MCN + A7MJP + A7MLA + A7MNF + A7MKR + A7MHK
+ A7MTW + A7MOC + A7MRU + A7MRW

A7MVWL = A7MWL * A7PM / 100

D.1.2. National Accounts
A7-15. &LOG A7MD [1989-1998]
&LOG A7MD = -.0755 + 1.0122 * (&LOG A7MWL ) - .0147 * (D98 )
\[ (-.6712) \] \[ (112.0505) \] \[ (-1.8825) \]
SE = .0074 DW = 1.9431 R-SQ (ADJ) = .9993 F-STAT = 6369.1138
A7-16. &LOG A7XD [1989-1998]

\[ &\text{LOG A7XD} = 1.8241 + .8619 \times (\text{LOG WLMA7}) - .3254 \times (D98) \]

\[ (3.4257) \quad (19.9697) \quad (-6.3989) \]

SE = .0437  DW = 2.0628  R-SQ(ADJ) = .9781  F-STAT = 201.9926

A7-17. A7DDD [1980-1998]

\[ A7DDD = A7DD + A7DDEX \]


\[ A7YD = A7DDD + A7XD - A7MD \]


\[ A7YDV = A7YD \times A7PY / 100 \]

D.1.3. Prices

A7-20. &LOG A7PX [1980-1998]

\[ &\text{LOG A7PX} = ((( .9379 \times 1 \times \text{LAG} \times &\text{LOG A7PX}) + .7183 - .6736) \]

\[ ( .8972) \]

\[ + (( .8311 \times &\text{LOG A7PY}) - ( .7795 \times 1 \times \text{LAG} \times &\text{LOG A7PY})) \]

\[ ( 4.4387) \]

\[ + (( .0499 \times D83 + D84) - ( .0468 \times 1 \times \text{LAG} \times D83 + D84)) \]

\[ ( 1.1732) \]

\[ + (( .1955 \times D98) - ( .1834 \times 1 \times \text{LAG} \times D98)) \]

\[ ( 3.2265) \]

RHO = .9379  T-VALUE(RHO) = 15.6055  DW = .4840

SE = .0433  R-SQ(ADJ) = .9993  F-STAT = 21695.9377
A7-21. &LOG A7PY  [1982-1998]

&LOG A7PY  =-.3976  +.2076*(&LOG A7PM )  +.8918*(1  &LAG &LOG A7PY )

(-4.5425)  (4.0897)  (22.1244)

-.0413*(D85 )  -.1902*(D98 )

(-2.4977)  (-10.7735)

SE=.0154  H-STAT=1.1084  R-SQ(ADJ)=.9976  F-STAT=1629.7886
D.2. China (CN) SG Model

D.2.1. Import Functions

CN-1. &LOG CNMA7D [1989-1998]

\[
&LOG \text{ CNMA7D} = -2.0516 + .4173 \times (&LOG \text{ CNYD} \times \text{ A7YD}) \\
\quad (-.3117) \quad (1.6963) \\
-1.5009\times (&LOG \ (\text{CNPM} \times \text{CNMP3}) / \text{CNPY}) \\
\quad (-16.6279)
\]

SE = .0769  DW = 2.4461  R-SQ(ADJ) = .9860  F-STAT = 318.0811

CN-2. CNMA7 [1989-1998]

CNMA7 = CNMA7D + DCMA


\[
&LOG \text{ CNMJP} = -36.3664 + 1.6145 \times (&LOG \text{ CNYD} \times \text{ JPYD}) \\
\quad (-10.4657) \quad (13.3768) \\
- .9589 \times (&LOG \text{ CNPM} / \text{CNPY}) + .3082 \times (\text{D94}) \\
\quad (-19.0865) \quad (6.8575)
\]

SE = .0421  DW = 1.5920  R-SQ(ADJ) = .9953  F-STAT = 642.1078


\[
&LOG \text{ CNMKR} = -4.6452 + .3284 \times (&LOG \text{ CNYD} \times \text{ KRYD}) \\
\quad (-1.3570) \quad (2.5356) \\
+ .5829 \times (1 \ &LAG \ &LOG \text{ CNMKR}) - .4339 \times (&LOG \text{ CNPM} / \text{CNPY}) \\
\quad (15.9450) \quad (-2.9853)
\]

SE = .0508  H-STAT = -1.3228  R-SQ(ADJ) = .9977  F-STAT = 998.1000
CN-5. &LOG CNMOC [1990-1998]

\[
&LOG \text{ CNMOC} = 1.1802 + .3882 \times (\&LOG \text{ CNYD} \times \text{ OCYD}) \\
\quad (.1520) \quad (1.2549) \\
\quad - .4286 \times (1 \times \text{LAG} \times \&LOG \text{ CNMOC}) - 1.4946 \times (\&LOG \text{ CNPM/CPY}) \\
\quad (-2.1968) \quad (-7.2996)
\]

SE=.0714  H-STAT=-.7300  R-SQ(ADJ)=.9746  F-STAT=103.5224


\[
&LOG \text{ CNMLA} = -17.7076 + .9671 \times (\&LOG \text{ CNYD} \times \text{ LAYD}) - .5323 \times (\&LOG \text{ CNPM/CPY}) \\
\quad (-.8199) \quad (1.1288) \quad (-1.3398)
\]

SE=.2319  DW=2.2309  R-SQ(ADJ)=.6104  F-STAT=5.6996

CN-7. CNMWL [1989-1998]

\[
\text{CNMWL} = \text{CNMA7} + \text{CNMJP} + \text{CNMLA} + \text{CNMNF} + \text{CNMKR} + \text{CNMHK} \\
\quad + \text{CNMTW} + \text{CNMOC} + \text{CNMRU} + \text{CNMRW}
\]

CN-8. CNMVWL [1989-1998]

\[
\text{CNMVWL} = \text{CNMWL} \times \text{CNPM}/100
\]

D.2.2. National Accounts


\[
&LOG \text{ CNMD} = -2.4655 + 1.0315 \times (\&LOG \text{ CNMWL}) \\
\quad (-13.2857) \quad (20.6011) \\
\quad + .1850 \times (1 \times \text{LAG} \times \&LOG \text{ CNMD}) \\
\quad (4.3061)
\]

SE=.0220  H-STAT=.4429  R-SQ(ADJ)=.9986  F-STAT=3320.7924
CN-10. \&LOG \text{CNXD} \ [1989-1998]
\[ \&LOG \text{CNXD} = -1.7233 + .4424 \times (\&LOG \text{WLMCN}) \]
\[ (-2.5519) \quad (2.8473) \]
\[ + .6985 \times (1 \times \&LAG \&LOG \text{CNXD}) \]
\[ (5.2140) \]
SE = .0754  H-STAT = -.6675  R-SQ(ADJ) = .9839  F-STAT = 276.0058

CN-11. \text{CNDDD} \ [1980-1998]
\[ \text{CNDDD} = \text{CNDD} + \text{CNDDEX} \]

CN-12. \text{CNYD} \ [1980-1998]
\[ \text{CNYD} = \text{CNDDD} + \text{CNXD} - \text{CNMD} \]

CN-13. \text{CNYDV} \ [1980-1998]
\[ \text{CNYDV} = \text{CNYD} \times \text{CNPY}/100 \]

D.2.3. Prices
CN-14. \&LOG \text{CNPX} \ [1981-1998]
\[ \&LOG \text{CNPX} = .1942 + .4735 \times (\&LOG \text{CNPM}) + .4811 \times (1 \times \&LAG \&LOG \text{CNPX}) \]
\[ (.6370) \quad (6.8972) \quad (5.5349) \]
SE = .0334  H-STAT = -.2682  R-SQ(ADJ) = .9252  F-STAT = 106.1381

CN-15. \&LOG \text{CNPY} \ [1981-1998]
\[ \&LOG \text{CNPY} = -1.0014 + .2440 \times (\&LOG \text{CNPM}) + .9945 \times (1 \times \&LAG \&LOG \text{CNPY}) \]
\[ (-3.5433) \quad (3.6878) \quad (40.4413) \]
SE = .0399  H-STAT = 1.6043  R-SQ(ADJ) = .9911  F-STAT = 947.7829
D.3. Japan (JP) SG Model

D.3.1. Import Functions

JP-1. \( \text{&LOG JPMA7D} \) [1990-1998]

\[
\begin{align*}
\text{&LOG JPMA7D} &= -7.4594 + 0.4603 \times (\text{&LOG JPYD} \times A7YD) \\
&\quad \text{(-3.2916) (6.3586)} \\
&\quad + 0.4693 \times (1 \times \text{&LAG &LOG JPMA7}) \\
&\quad \text{(8.8127)} \\
&\quad - 0.2548 \times (\text{&LOG (JPPM*JPPMP3)/JPPY}) \\
&\quad \text{(-1.3050)} \\
&\quad - 0.0720 \times (D92) \\
&\quad \text{(-2.2026)} \\
\end{align*}
\]

SE=.0297 DW=2.5760 R-SQ(ADJ)=.9888 F-STAT=177.2312


JPMA7 = JPMA7D + DJMA

JP-3. \( \text{&LOG JPMCN} \) [1989-1998]

\[
\begin{align*}
\text{&LOG JPMCN} &= -23.5043 + 1.1803 \times (\text{&LOG JPYD} \times CNYD) \\
&\quad \text{(-1.0399) (1.5073)} \\
&\quad - 2.9802 \times (\text{&LOG JPPM/JPPY}) - 0.4953 \times (D93) \\
&\quad \text{(-3.3585) (-2.1874)} \\
\end{align*}
\]

SE=.1945 DW=1.6268 R-SQ(ADJ)=.8932 F-STAT=26.0850

JP-4. \( \text{&LOG JPMKRD} \) [1989-1998]

\[
\begin{align*}
\text{&LOG JPMKRD} &= -1.8038 + 0.4008 \times (\text{&LOG JPYD} \times KRYD) \\
&\quad \text{(-0.3958) (2.4913)} \\
&\quad - 0.6571 \times (\text{&LOG (JPPM*JPPMP2)/JPPY}) \\
&\quad \text{(-1.9369)} \\
\end{align*}
\]

SE=.0983 DW=1.1599 R-SQ(ADJ)=.7877 F-STAT=17.6980


JPMKR = JPMKRD + DJMK
\[ \text{&LOG JPMTW} = -13.4682 + 0.7307 \times (\text{&LOG JPYD} \times \text{TWYD}) \]
\[ (-3.8008) \quad (4.7277) \]
\[ + 0.2720 \times (1 \times \text{LAG \&LOG JPMTW}) \]
\[ (1.7866) \]

SE=.0877  H-STAT=.6281  R-SQ(ADJ)=.8804  F-STAT=30.4391

\[ \text{&LOG JPMNF} = -16.8471 + 0.7337 \times (\text{&LOG JPYD} \times \text{NFYD}) \]
\[ (-6.5798) \quad (7.6257) \]
\[ + 0.4610 \times (1 \times \text{LAG \&LOG JPMNF}) \]
\[ (6.6996) \]

SE=.0374  H-STAT=.7481  R-SQ(ADJ)=.9738  F-STAT=149.9531

\[ \text{&LOG JPMOC} = -2.7352 + 0.4395 \times (\text{&LOG JPYD} \times \text{OCYD}) \]
\[ (-1.0597) \quad (4.8172) \]
\[ - 0.7053 \times (\text{&LOG JPM/JPY}) \]
\[ (-5.7382) \]

SE=.0287  DW=1.5139  R-SQ(ADJ)=.9733  F-STAT=164.8825

\[ \text{&LOG JPMLA} = -30.6889 + 1.4318 \times (\text{&LOG JPYD} \times \text{LAYD}) \]
\[ (-4.1428) \quad (5.2037) \]

SE=.1045  DW=.6719  R-SQ(ADJ)=.8130  F-STAT=27.0786

\[ \text{JPMWL} = \text{JPMA7} + \text{JPMCN} + \text{JPMLA} + \text{JPMNF} + \text{JPMKR} + \text{JPMHK} + \text{JPMTL} + \text{JPMOC} + \text{JPMRU} + \text{JPMRW} \]

\[ \text{JPMVWL} = \text{JPMWL} \times \text{JPM/JPY} / 100 \]
D.3.2. National Accounts


\[ \text{&LOG JPMD} = 0.7470 + 0.9569 \times (\text{&LOG JPMWL}) \]
\[ (5.0145) \quad (79.4518) \]

SE = 0.0092  DW = 2.1371  R-SQ(ADJ) = 0.9986  F-STAT = 6312.5829


\[ \text{&LOG JPXD} = -6.4837 + 1.4906 \times (\text{&LOG WLMJP}) \]
\[ (-3.6902) \quad (10.9698) \]

SE = 0.0627  DW = 1.0435  R-SQ(ADJ) = 0.9299  F-STAT = 120.3372


\[ \text{JPDDD} = \text{JPDD} + \text{JPDDEX} \]


\[ \text{JPYD} = \text{JPDDD} + \text{JPXD} - \text{JPMD} \]


\[ \text{JPYDV} = \text{JPYD} \times \frac{\text{JPPY}}{100} \]

D.3.3. Prices


\[ \text{&LOG JPPY} = -8.4454 + 0.4223 \times (\text{&LOG JPPM}) + 0.7265 \times (\text{&LOG JPDDD}) \]
\[ (-3.3564) \quad (2.8340) \quad (6.0178) \]

\[ -0.0866 \times (D94+D95) + 0.1029 \times (D97+D98) \]
\[ (-2.4881) \quad (3.4379) \]

SE = 0.0375  DW = 1.5167  R-SQ(ADJ) = 0.9438  F-STAT = 68.2200
D.4.  Hong Kong (HK) SG Model

D.4.1. Import Functions

HK-1. &LOG HKMA7  [1989-1998]
&LOG HKMA7  =-11.3194  +.8370  *(&LOG HKYD  * A7YD )
(-2.8390)  (5.2417)
-2.1479  *(&LOG HKPM/HKPY )
(-5.1737)

SE=.0700  DW=1.7734  R-SQ(ADJ)=.9786  F-STAT=206.3862

HK-2. &LOG HKMJP  [1989-1998]
&LOG HKMJP  =-9.7512    +.7343  *(&LOG HKYD  * JPYD )
(-2.6370)  (5.3608)
-.4281  *(&LOG HKPM/HKPY )
(-1.0947)

SE=.0676  DW=1.6363  R-SQ(ADJ)=.9445  F-STAT=77.5410

&LOG HKMKR  =-3.2297   +.4913  *(&LOG HKYD  * KRYD )
(-.8506)  (3.1949)
-2.2740*(&LOG HKPM/HKPY )
(-5.8894)

SE=.0874  DW=2.2667  R-SQ(ADJ)=.9476  F-STAT=82.4276

HK-4. &LOG HKMTW  [1989-1998]
&LOG HKMTW  =(( -.7565* 1 &LAG &LOG HKMTW )+ -23.2895- 17.6191)
(-30.9566)
+(( 1.3780*&LOG HKYD  * TWYD )
(44.1207)
-(  -1.0425* 1 &LAG &LOG HKYD  * TWYD ))

RHO = -.7565  T-VALUE(RHO) = -3.3781  DW = 1.9163
SE = .0191  R-SQ(ADJ) = 1.0000  F-STAT = 1869696.0388
HK-5. &LOG HKMOC [1989-1998]

\[ \text{&LOG HKMOC} = -15.5908 + 0.9361 \times (\text{&LOG HKYD} \times \text{OCYD}) \]

\[ (-2.9394) \quad (4.3616) \]

\[ -1.6790 \times (\text{&LOG HKPM/HKPY}) \]

\[ (-4.0232) \]

SE = 0.0550  DW = 2.5531  R-SQ(ADJ) = 0.9803  F-STAT = 225.2701

HK-6. HKMWL [1989-1998]

\[ \text{HKMWL} = \text{HKMA7} + \text{HKMCN} + \text{HKMJP} + \text{HKMLA} + \text{HKMNF} + \text{HKMKR} + \text{HKMHK} + \text{HKMTW} + \text{HKMOC} + \text{HKMRU} + \text{HKMRW} \]

HK-7. HKMVWL [1989-1998]

\[ \text{HKMVWL} = \text{HKMWL} \times \text{HKPM} / 100 \]

D.4.2. National Accounts


\[ \text{&LOG HKMD} = 0.3990 + 0.9761 \times (\text{&LOG HKMWL}) + 0.0108 \times (D98) \]

\[ (9.9307) \quad (288.1423) \quad (2.8371) \]

SE = 0.0034  DW = 2.0822  R-SQ(ADJ) = 0.9999  F-STAT = 46380.9973


\[ \text{&LOG HKXD} = -3.4030 + 0.4188 \times (\text{&LOG WLMHK}) \]

\[ (-1.6532) \quad (2.1094) \]

\[ + 0.9094 \times (1 \text{ &LAG &LOG HKXD}) - 0.1687 \times (D98) \]

\[ (25.2757) \quad (-3.8847) \]

SE = 0.0314  H-STAT = 1.4837  R-SQ(ADJ) = 0.9898  F-STAT = 292.4229

HK-10. HKDDD [1980-1998]

\[ \text{HKDDD} = \text{HKDD} + \text{HKDDEX} \]
   HKYD = HKDDD + HKXD - HKMD

HK-12. HKYDV [1980-1998]
   HKYDV = HKYD*HKPY/100

D.4.3. Prices

   &LOG HKPY = -.4937 + .3105*(&LOG HKPM )
            (-1.4289) (2.3785)
            + .8039*(1 &LAG &LOG HKPY )
            (12.5652)

   SE=.0325  H-STAT=.5204  R-SQ(ADJ)=.9884  F-STAT=725.8996
D.5. Korea (KR) SG Model

D.5.1. Import Functions

\[
&LOG \ KRMA7D = 7.7914 + .0536 \times (&LOG \ KRYD \times A7YD)
\]
\[
(1.4385) \quad (.2602)
\]
\[-2.0117 \times (&LOG \ (KRPM \times KRPMP3) / KRPY) - .1893 \times (D94)
\]
\[
(-4.2177) \quad (-1.9094)
\]
SE = .0902  DW = 1.1507  R-SQ (ADJ) = .8904  F-STAT = 25.3822


KRMA7 = KRMA7D + DKMA

\[
&LOG \ KRMCN = -28.7967 + 1.3053 \times (&LOG \ KRYD \times CNYD)
\]
\[
(-1.9149) \quad (2.2295)
\]
\[+.3375 \times (1 \ &LAG \ &LOG \ KRMCN)
\]
\[(1.2371)
\]
SE = .2242  H-STAT = -.1418  R-SQ (ADJ) = .5245  F-STAT = 4.3093

\[
&LOG \ KRMJP = -5.5449 + .5574 \times (&LOG \ KRYD \times JPYD)
\]
\[
(-1.0563) \quad (3.0087)
\]
\[-.0901 \times (&LOG \ (KRPM \times KRPMP2) / KRPY) -.1631 \times (D93)
\]
\[
(-.2314) \quad (-2.3679)
\]
\[-.4712 \times (D98)
\]
\[(-5.6500)
\]
SE = .0635  DW = 2.4382  R-SQ (ADJ) = .9495  F-STAT = 43.3031
&LOG KRMHK = -11.8509 + 1.4336 *(&LOG KRYD )
(-1.3774) (2.1682)
- .0045 *(&LOG KRPM/KRPY )
(-.0053)
SE = .2121 DW = 1.3152 R-SQ(ADJ) = .5107 F-STAT = 5.6970

&LOG KRMTW = -50.0767 + 2.3110 *(&LOG KRYD * TWYD )
(-2.3104) (2.5772)
- .1414 * (1 &LAG &LOG KRMTW ) + 2.5447 *(&LOG KRPM/KRPY )
(-.5679) (1.2995)
SE = .1467 H-STAT = .0901 R-SQ(ADJ) = .7902 F-STAT = 11.0452

&LOG KRMNF = -24.6336 + 1.2444 *(&LOG KRYD * NFYD )
(-8.4306) (12.6616)
- .2385 *(&LOG KRPM )
(-1.9302)
- .1450 *(D93 )
(-2.4352)
SE = .0557 DW = 2.0775 R-SQ(ADJ) = .9496 F-STAT = 57.4744

&LOG KRMOC = -4.2608 + .4964 *(&LOG KRYD * OCYD )
(-.6977) (2.1109)
- 1.1978*(&LOG KRPM/KRPY )
(-2.9361)
SE = .1083 DW = .4304 R-SQ(ADJ) = .8316 F-STAT = 23.2300

\[
KRMWL = KRMA7+KRMCN+KRMJP+KRMJL+KRMNF+KRMHK +KRMTW+KRMOC+KRMRU+KRMWR
\]


\[
KRMVWL = KRMWL*KRPM/100
\]

D.5.2. National Accounts


\[
\begin{align*}
&\text{&LOG KRMD = -.9749 +1.0947*(&LOG KRMWL) +.1160 *(D98) } \\
&(-2.4583) \quad (31.8719) \quad (3.8188)
\end{align*}
\]

\[
\text{SE=.0249 \ DW=1.9611 \ R-SQ(ADJ)=.9927 \ F-STAT=609.2633}
\]


\[
\begin{align*}
&\text{&LOG KRXD = .0296 +1.0163*(&LOG WLMKR) -.4338 *(D98) } \\
&(.0351) \quad (13.7277) \quad (-6.2589)
\end{align*}
\]

\[
\text{SE=.0564 \ DW=1.5824 \ R-SQ(ADJ)=.9542 \ F-STAT=94.6514}
\]


\[
KRDDD = KRDD + KRDEX
\]


\[
KRYD = KRDDD + KRXD - KRMD
\]


\[
KRYDV = KRYD*KRPY/100
\]
D.5.3. Prices

\[&LOG KRPX = (0.8476 \times \text{LAG} &LOG KRPX) + 2.3087 - 1.9569 \]
\((8.3928)\)
\[+ ((0.5049 \times &LOG KRPY) - (0.4280 \times \text{LAG} &LOG KRPY)) \]
\((7.6220)\)
\[+ ((0.2410 \times D98) - (0.2043 \times \text{LAG} D98)) \]
\((7.2389)\)

RHO = 0.8476  T-VALUE(RHO) = 7.7373  DW = 1.7542
SE = 0.0207  R-SQ(ADJ) = .9998  F-STAT = 138087.1759

\[&LOG KRPY = (0.9835 \times \text{LAG} &LOG KRPY) + -0.2954 - -0.2905 \]
\((-0.2412)\)
\[+ ((0.9885 \times &LOG KRPM) - (0.9722 \times \text{LAG} &LOG KRPM)) \]
\((3.7059)\)
\[+ ((-0.0422 \times D85) - (-0.0415 \times \text{LAG} D85)) \]
\((-0.9391)\)
\[+ ((-0.1912 \times D98) - (-0.1880 \times \text{LAG} D98)) \]
\((-2.0941)\)

RHO = 0.9835  T-VALUE(RHO) = 44.1233  DW = 0.5886
SE = 0.0625  R-SQ(ADJ) = .9985  F-STAT = 9809.5300
D.6. Taiwan (TW) SG Model

D.6.1. Import Functions

TW-1. &LOG TWMA7 [1990-1998]

\[
&\text{LOG TWMA7} = -3.1192 + 0.2449 \times (\text{LOG TWYD} \times \text{A7YD}) \\
(1.821) \quad (2.0752) \\
+ 0.6602 \times (1 \times \text{LAG } \text{LOG TWMA7}) - 0.4276 \times (\text{LOG TWPM/TWPY}) \\
(9.5407) \quad (-1.1308) \\
+ 0.1657 \times (D97) \\
(2.8523)
\]

SE = 0.0513  H-STAT = -1.6484  R-SQ(ADJ) = .9811  F-STAT = 104.8260

TW-2. &LOG TWMCN [1990-1998]

\[
&\text{LOG TWMCN} = -88.2340 + 3.6942 \times (\text{LOG TWYD} \times \text{CNYD}) \\
(-4.0205) \quad (4.3583)
\]

SE = 0.4818  DW = 1.7059  R-SQ(ADJ) = .6922  F-STAT = 18.9947

TW-3. &LOG TWMJP [1989-1998]

\[
&\text{LOG TWMJP} = -3.8438 + 0.5057 \times (\text{LOG TWYD} \times \text{JPYD}) \\
(-1.5691) \quad (5.6601) \\
- 1.0537 \times (\text{LOG TWPM/TWPY}) \\
(-2.7376)
\]

SE = 0.0627  DW = 2.1235  R-SQ(ADJ) = .9054  F-STAT = 44.0481

TW-4. &LOG TWMKR [1990-1998]

\[
&\text{LOG TWMKR} = -0.8382 + 0.0858 \times (\text{LOG TWYD} \times \text{KRYD}) \\
(-1.482) \quad (5.3521) \\
+ 0.8469 \times (1 \times \text{LAG } \text{LOG TWMKR}) \\
(5.9216) \\
- 0.7606 \times (\text{LOG TWPM/TWPY}) \\
(-2.7491)
\]

SE = 0.1391  H-STAT = -1.2589  R-SQ(ADJ) = .9055  F-STAT = 26.5485
TW-5. &LOG TWMOC [1989-1998]
&LOG TWMOC = -10.5709 + .7307 *(&LOG TWYD * OCYD )
(-2.2732) (3.9605)
-1.3090 *(&LOG TWPM/TWY )
(-2.7255)

SE=.0829 DW=1.7038 R-SQ(ADJ)=.8322 F-STAT=23.3170

TW-6. &LOG TWMLA [1989-1998]
&LOG TWMLA = -18.2112 + 2.0211 *(&LOG TWYD )
(-3.4898) (4.7728)
- .2437 *(&DIF &LOG TWPM ) -.3554 *(D98 )
(-.2127) (-1.9411)

SE=.1655 DW=2.4497 R-SQ(ADJ)=.7173 F-STAT=8.6109

TW-7. TWMWL [1989-1998]
TWMWL = TMA7+TMCN+TJP+TMLA+TWNF+TWKR+TWMK
+TWMOC+TMRU+TMRW

TW-8. TWMVWL [1989-1998]
TWMVWL = TWMWL*TWPM/100

D.6.2. National Accounts
&LOG TWMD = 1.6964 + .8656 *(&LOG TWMWL ) + .0746 *(D98 )
(2.1381) (12.3886) (1.3612)

SE=.0495 DW=1.9989 R-SQ(ADJ)=.9525 F-STAT=91.1851
TW-10. \&LOG TWXD [1989-1998]
\&LOG TWXD = 2.6589 + 0.7714 * (&LOG WLMTW )
(2.2951) (7.6920)
SE = 0.0635 DW = 1.4323 R-SQ(ADJ) = 0.8660 F-STAT = 59.1669

TW-11. TWDDD [1986-1998]
TWDDD = TWDD + TWD Dex

TW-12. TWYD [1986-1998]
TWYD = TWDDD + TWXD - TWMD

TWYDV = TWYD*TWPY/100

D.6.3. Prices
TW-14. \&LOG TWPX [1986-1998]
\&LOG TWPX = (( 0.7885 * 1 &LAG &LOG TWPX ) + 3.4987 - 2.7587)
( 2.5682) + (( 0.2457 * &LOG TWPY ) - ( 0.1937 * 1 &LAG &LOG TWPY ))
( 0.8163)
RHO = 0.7885 T-VALUE(RHO) = 4.7401 DW = 1.7244
SE = 0.0243 R-SQ(ADJ) = 0.9998 F-STAT = 224832.3974
D.7. NAFTA 3 (NF) SG Model
D.7.1. Import Functions

NF-1. \( \log \text{NFMA7} \) [1989-1998]
\[
\log \text{NFMA7} = -56.1452 + 2.2968 \times (\log \text{NFYD} \times A7YD ) \\
-4.4672 \times (\log \text{NFPM/NFPY}) + 0.4143 \times (D98) \\
\text{SE=}.0689 \quad \text{DW=1.9904} \quad \text{R-SQ(ADJ)=}.9688 \quad \text{F-STAT=94.1947}
\]

NF-2. \( \log \text{NFMCN} \) [1990-1998]
\[
\log \text{NFMCN} = -4.4176 + 0.1900 \times (\log \text{NFYD} \times CNYD ) \\
+0.9038 \times (\log &LAG \log \text{NFMCN}) - 0.4910 \times (\log \text{NFPM/NFPY}) \\
\text{SE=}.0464 \quad \text{H-STAT=}.4539 \quad \text{R-SQ(ADJ)=}.9915 \quad \text{F-STAT=311.0341}
\]

NF-3. \( \log \text{NFMJP} \) [1989-1998]
\[
\log \text{NFMJP} = -3.1449 + 0.4770 \times (\log \text{NFYD} \times JPYD ) \\
-1.7673 \times (\log \text{NFPM/NFPY}) \\
\text{SE=}.0193 \quad \text{DW=2.0853} \quad \text{R-SQ(ADJ)=}.9588 \quad \text{F-STAT=105.8172}
\]

NF-4. \( \log \text{NFMKR} \) [1989-1998]
\[
\log \text{NFMKR} = -8.4050 + 0.6368 \times (\log \text{NFYD} \times KRYD ) \\
-3.9751 \times (\log \text{NFPM/NFPY}) \\
\text{SE=}.0984 \quad \text{DW=1.6196} \quad \text{R-SQ(ADJ)=}.3676 \quad \text{F-STAT=3.6153}
\]
NF-5. &LOG NFMTW [1989-1998]
&LOG NFMTW = 4.1574 +.2158 *(&LOG NFYD * TWYD )
(1.8513) (2.7166)
-1.6897*(&LOG NFPM/NFPY )
(-3.5411)

SE=.0493 DW=1.8599 R-SQ(ADJ)=.6437 F-STAT=9.1313

NF-6. &LOG NFMNF [1990-1998]
&LOG NFMNF =-25.9347 +2.0424 *(&LOG NFYD )
(-3.0552) (3.0267)
+.4891 *(1 &LAG &LOG NFMNF )
(2.6062)

SE=.0292 H-STAT=-.5751 R-SQ(ADJ)=.9775 F-STAT=174.5262

NF-7. &LOG NFMOC [1989-1998]
&LOG NFMOC =-2.6786 +.3974 *(&LOG NFYD * OCYD )
(-.3903) (1.6722)
-3.0844*(&LOG NFPM/NFPY )
(-4.4850)

SE=.0648 DW=1.6735 R-SQ(ADJ)=.6687 F-STAT=10.0848

&LOG NFMLA =-37.9020 +1.6724 *(&LOG NFYD * LAYD )
(-13.3383) (16.2332)
-2.7741 *(&LOG NFPM/NFPY )
(-9.7982)

SE=.0278 DW=3.1908 R-SQ(ADJ)=.9846 F-STAT=192.6246


NFMWL = NFMA7+NFMCN+NFMJP+NFMLA+NFMNF+NFMKR+NFMHK
+NFMFW+NFMOC+NFMRU+NFMRW
NF-10. NFMVWL [1989-1998]

\[ NFMVWL = NFMWL \times NFPM/100 \]

D.7.2. National Accounts


\[ \begin{align*}
& &LOG\ NFMD = &(( .5107 \times 1 \times \text{LAG} \ \&LOG\ NFMD ) + 1.3350 - .6817) \\
& & & (3.7105) \\
& & & +(( .9161 \times \&LOG\ NFMWL ) - ( .4679 \times 1 \times \text{LAG} \ \&LOG\ NFMWL )) \\
& & & (35.0474)
\end{align*} \]

\[ \begin{align*}
\text{RHO} = &.5107 \quad \text{T-VALUE(RHO)} = 1.8054 \quad \text{DW} = 1.4556 \\
\text{SE} = &.0040 \quad \text{R-SQ(ADJ)} = 1.0000 \quad \text{F-STAT} = 73170170.0693
\end{align*} \]


\[ \begin{align*}
& &LOG\ NFXD = &5.4053 + .6206 \times (\&LOG\ WLMNF ) \\
& & & (15.4052) \quad (24.1003)
\end{align*} \]

\[ \begin{align*}
\text{SE} = &.0196 \quad \text{DW} = 1.9087 \quad \text{R-SQ(ADJ)} = .9847 \quad \text{F-STAT} = 580.8249
\end{align*} \]


\[ \text{NFDDD} = \text{NFDD} + \text{NFDDEX} \]


\[ \text{NFYD} = \text{NFDDD} + \text{NFXD} - \text{NFMD} \]


\[ \text{NFYDV} = \text{NFYD} \times \text{NFPY}/100 \]
D.7.3. Prices

NF-16. \texttt{\&LOG NFPX [1988-1998]}

\texttt{\&LOG NFPX =((-0.0382* 1 \&LAG \&LOG NFPX) + -1.3012 - 0.0497)}
\begin{align*}
( & -2.9351) \\
& +((- 1.2755* \&LOG NFPY) - ( -0.0487* 1 \&LAG \&LOG NFPY))
\end{align*}
\begin{align*}
& ( 13.0961) \\
& +((- -0.0970*D98) - ( -0.0037* 1 \&LAG D98))
\end{align*}
\begin{align*}
& ( -3.3930)
\end{align*}

\text{RHO} = -0.0382 \quad \text{T-VALUE(RHO)} = -0.1102 \quad \text{DW} = 1.9546

\text{SE} = 0.0096 \quad \text{R-SQ(ADJ)} = 1.0000 \quad \text{F-STAT} = 690669.7421

NF-17. \texttt{\&LOG NFPY [1988-1998]}

\texttt{\&LOG NFPY = 0.9179 + 0.8053*(\&LOG NFPM ) + 0.0993*(D98 )}
\begin{align*}
& (3.0021) \quad (11.8844) \quad (5.0093)
\end{align*}

\text{SE}=0.0181 \quad \text{DW}=2.0109 \quad \text{R-SQ(ADJ)}=0.9560 \quad \text{F-STAT}=109.5976
D.8. Oceania (OC) SG Model

D.8.1. Import Functions

OC-1. &LOG OCMA7 [1990-1998]

\[ \begin{align*}
\&\text{LOG} \text{OCMA7} &= -6.6580 + 0.3511 \times (\&\text{LOG} \text{OCYD} \times A7YD) \\
&\quad (1.0208) (1.6367) \\
&\quad + 0.7144 \times (1 \&\text{LAG} \&\text{LOG} \text{OCMA7}) - 1.0989 \times (\&\text{LOG} \text{OCPM/OCPY}) \\
&\quad (2.8718) (-1.0098)
\end{align*} \]

\[ \text{SE} = 0.0994 \quad \text{H-STAT} = -4.206 \quad \text{R-SQ(ADJ)} = 0.9084 \quad \text{F-STAT} = 27.4522 \]

OC-2. &LOG OCMJP [1990-1998]

\[ \begin{align*}
\&\text{LOG} \text{OCMJP} &= 1.5655 + 0.1857 \times (\&\text{LOG} \text{OCYD} \times JPYD) \\
&\quad (0.4885) (1.9230) \\
&\quad + 0.2632 \times (1 \&\text{LAG} \&\text{LOG} \text{OCMJP}) \\
&\quad (1.6170) \\
&\quad - 0.6089 \times (\&\text{DIF} \&\text{LOG} \text{OCPM/OCPY}) \\
&\quad (-1.4862)
\end{align*} \]

\[ \text{SE} = 0.0364 \quad \text{H-STAT} = -0.8277 \quad \text{R-SQ(ADJ)} = 0.6808 \quad \text{F-STAT} = 6.6863 \]


\[ \begin{align*}
\&\text{LOG} \text{OCMHK} &= 6.8910 + 0.3049 \times (\&\text{LOG} \text{OCYD} \times HKYD) \\
&\quad (2.0239) (1.4928) \\
&\quad - 1.6832 \times (\&\text{LOG} \text{OCPM}) \\
&\quad (-2.2875)
\end{align*} \]

\[ \text{SE} = 0.0907 \quad \text{DW} = 1.6013 \quad \text{R-SQ(ADJ)} = 0.2697 \quad \text{F-STAT} = 2.6618 \]

OC-4. &LOG OCMTW [1990-1998]

\[ \begin{align*}
\&\text{LOG} \text{OCMTW} &= -1.154 + 0.3058 \times (\&\text{LOG} \text{OCYD} \times TWYD) \\
&\quad (-0.883) (5.9167) \\
&\quad - 1.0424 \times (\&\text{LOG} \text{OCPM/OCPY}) - 0.1543 \times (D98) \\
&\quad (-8.7968) (-7.7752)
\end{align*} \]

\[ \text{SE} = 0.0149 \quad \text{DW} = 2.7360 \quad \text{R-SQ(ADJ)} = 0.9824 \quad \text{F-STAT} = 150.1419 \]
OC-5. \&LOG OCMNF [1990-1998]
\&LOG OCMNF = \(-29.3741 + 1.2030 * (\&LOG OCYD * NFYD) \)
\((-3.5377) (3.8236)\)
\(+ .4480 * (1 \&LAG \&LOG OCMNF) \)
\( (2.6313) \)

SE = .0673 H-STAT = -.2908 R-SQ(ADJ) = .8459 F-STAT = 22.9633

\&LOG OCMLA = \(-48.1228 + 2.1381 * (\&LOG OCYD * LAYD) \)
\((-8.1613) (8.9308)\)
\(- .1573 * (\&DIF \&LOG OCPM) \)
\((- .2043) \)

SE = .0623 DW = 2.1473 R-SQ(ADJ) = .9633 F-STAT = 79.7216

OCMWL = OCMA7 + OCMCN + OCMJP + OCMLA + OCMNF + OCMKR + OCMHK
+ OCMTW + OCMOC + OCMRU + OCMRW

OCMVWL = OCMWL * OCPM / 100

D.8.2. National Accounts

\&LOG OCMD = .9401 + .9391 * (\&LOG OCMWL) \)
\((3.7723) (41.7494) \)

SE = .0112 DW = 2.0647 R-SQ(ADJ) = .9949 F-STAT = 1743.0109
OC-10. \&LOG OCXD [1990-1998]

\&LOG OCXD = -2.243 \[+1.2196*(\&LOG WLMOC) \] - .1824 *(D98)
\[(-2.0597) \[12.4596\] (-3.9146)\]

SE=.0396 DW=2.2904 R-SQ(ADJ)=.9512 F-STAT=78.9830


OCDDD = OCDD + OCDDEX

OC-12. OCYD [1981-1998]

OCYD = OCDDD + OCXD - OCMD


OCYDV = OCYD*OCPY/100

D.8.3. Prices

OC-14. \&LOG OCPX [1982-1998]

\&LOG OCPX = .6760 \[+1.506*(\&LOG OCPY) \] + .7034*(1 \&LAG \&LOG OCPX)
\[2.5285 \[1.2883\] 5.6635\]
\[+ .0784* (D88) \]
\[1.9752\]

SE=.0383 H-STAT=-1.6094 R-SQ(ADJ)=.9264 F-STAT=68.1034

OC-15. \&LOG OCPY [1982-1998]

\&LOG OCPY = -.2241 \[+.0677*(\&LOG OCPM) \]
\[(-3.2214) \[2.0396\]\]
\[+.9897*(1 \&LAG \&LOG OCPY) \]
\[29.2567\]
\[+.0380*(D84+D85) \] - .0306*(D91)
\[4.8713 \[-3.2045\]\]

SE=.0092 H-STAT=-.9509 R-SQ(ADJ)=.9971 F-STAT=1386.3817
D.9. Latin America (LA) SG Model  
D.9.1. Import Functions  
LA-1. &LOG LAMA7 [1992-1998]  
\[ &\text{LOG LAMA7} = -12.9603 + 0.7494 \times ( &\text{LOG LAYD} \times A7YD ) \]  
\[ \begin{align*}  
&(-3.0182) \quad (4.3486) \\
&-1.4173 \times ( &\text{LOG LAPM} / LAPY ) + 0.4527 \times (D98) \\
&(-3.7424) \quad (5.6721) 
\end{align*} \]  
\[ SE = 0.0487 \quad DW = 3.7280 \quad R-SQ(ADJ) = 0.8307 \quad F-STAT = 10.8105 \]  

\[ &\text{LOG LAMHK} = -42.6672 + 2.0242 \times ( &\text{LOG LAYD} \times HKYD ) \]  
\[ \begin{align*}  
&(-1.1154) \quad (1.2427) \\
&-1.4835 \times ( &\text{LOG LAPM} / LAPY ) \\
&(-0.3565) 
\end{align*} \]  
\[ SE = 0.5079 \quad DW = 2.7702 \quad R-SQ(ADJ) = 0.0166 \quad F-STAT = 1.0505 \]  

\[ &\text{LOG LAMNF} = -35.7423 + 1.6133 \times ( &\text{LOG LAYD} \times NFYD ) \]  
\[ \begin{align*}  
&(-4.8270) \quad (6.0097) \\
&+ 1.0080 \times ( &\text{LOG LAPM} / LAPY ) \\
&(2.4038) 
\end{align*} \]  
\[ SE = 0.0587 \quad DW = 1.9254 \quad R-SQ(ADJ) = 0.9364 \quad F-STAT = 45.1360 \]  

\[ &\text{LOG LAMTW} = -2.0358 + 0.3258 \times ( &\text{LOG LAYD} \times TWYD ) \]  
\[ \begin{align*}  
&(-.2794) \quad (1.0762) \\
&- .8798 \times ( &\text{LOG LAPM} / LAPY ) \\
&(-1.5204) 
\end{align*} \]  
\[ SE = 0.0802 \quad DW = 2.9050 \quad R-SQ(ADJ) = 0.0557 \quad F-STAT = 1.1768 \]
LA-5. LAMWL [1992-1998]
LAMWL = LAMA7+LAMCN+LAMJP+LAMLA+LAMNF+LAMKR+LAMHK
+LAMTW+LAMOC+LAMRU+LAMRW

LAMVWL = LAMWL*LAPM/100

D.9.2. National Accounts
&LOG LAMD  =  .3052   +.9910*(&LOG LAMWL ) +.0156*(D98 )
( .6891)  (22.2660)    (1.1807)
SE=.0122  DW=2.9965  R-SQ(ADJ)=.9882  F-STAT=251.5665

&LOG LAXD  =  5.8190   +.4311 *(&LOG WLMLA )
(7.0499)  (5.1838)
SE=.0423  DW=2.3050  R-SQ(ADJ)=.8117  F-STAT=26.8722

LADDD = LADD + LADDEX

LAYD  =  LADDD + LAXD - LAMD

LA-10. LAYDV [1992-1998]
LAYDV  =  LAYD*LAPY/100
D.10. Russia (RU) SG Model

D.10.1. Import Functions

RU-1. RUMWL [1992-1998]

\[ RUMWL = RUAM7 + RUMCN + RUMJP + RUMLA + RUMNF + RUMKR + RUMHK + RUMTW + RUMOC + RUMRW \]

RU-2. RUMVWL [1993-1998]

\[ RUMVWL = RUMWL \times RUPM / 100 \]

D.10.2. National Accounts

RU-3. RUYDV [1993-1998]

\[ RUYDV = RUYD \times RUPY / 100 \]
D.11. APEC Region

AP-1. APMWL [1992-1998]

$$APMWL = CNMWL + JPMWL + HKMWL + KRMWL + TWMWL + A7MWL + NFMWL + OCMWL + LAMWL + RUMWL$$

AP-2. APYD [1993-1998]

$$APYD = CNYD + JPYD + HKYD + KRYD + TWYD + A7YD + NFYD + OCYD + LAYD + RUYD$$

AP-3. APMVWL [1989-1998]

$$APMVML = CNMVWL + JPMVWL + HKMVWL + KRMVWL + TWMVWL + A7MVWL + NFMVWL + OCMVWL + LAMVWL + RUMVWL$$

AP-4. APYDV [1993-1998]

$$APYDV = CNYDV + JPYDV + HKYDV + KRYDV + TWYDV + A7YDV + NFYDV + OCYDV + LAYDV + RUYDV$$

AP-5. APPM [1992-1998]

$$APPM = APMVWL/APMWL/100$$

AP-6. APPY [1993-1998]

$$APPY = APYDV/APYD/100$$
D.12. World Total
WL-1. WLMVWL [1989–1998]

\[
\text{WLMVWL} = \text{A7MVWL} + \text{CNMVWL} + \text{JPMVWL} + \text{HKMVWL} + \text{KRMVWL} + \text{TWMVWL} + \text{NFMVWL} + \text{OCMVWL} + \text{LAMVWL} + \text{RUMVWL} + \text{RWMVWL}
\]
D.13. Trade Model

D.13.1. World Import Definitions (Link Block)

TR-1. WLMA7 [1993-1998]

\[ WLMA7 = A7MA7 + CNMA7 + JPMA7 + HKMA7 + KRMA7 + TWMA7 + NFMA7 + OCMA7 + LAMA7 + RUMA7 + RWMA7 \]

TR-2. WLMCN [1993-1998]

\[ WLMCN = A7MCN + CNMCN + JPMCN + HKMCN + KRMCN + TWMCN + NFMCN + OCMCN + LAMCN + RUMCN + RWMCN \]

TR-3. WLMJP [1993-1998]

\[ WLMJP = A7MJP + CNMJP + JPMJP + HKMJP + KRMPJ + TWMJP + NFMPJ + OCMJP + LAMJP + RUMJP + RWMJP \]

TR-4. WLMHK [1993-1998]

\[ WLMHK = A7MHK + CNMHC + JPMHK + HKMHC + KRMPHK + TWMHK + NFMHK + OCMHK + LAMHK + RUMHK + RWMHK \]

TR-5. WLMTW [1993-1998]

\[ WLMTW = A7MTW + CNMTW + JPMTW + HKMTW + KRMTW + TWTMW + NFMTW + OCMTW + LAMTW + RUMTW + RWTMW \]

TR-6. WLMNF [1993-1998]

\[ WLMNF = A7MNF + CNMNF + JPMNF + HKMNF + KRMINF + TWMNF + NFMINF + OCMNF + LAMNF + RUMNF + RWMNF \]

TR-7. WLMOC [1993-1998]

\[ WLMOC = A7MOC + CNMOC + JPMOC + HKMOC + KRMOOC + TWMOC + NFMOOC + OCMOC + LAMOC + RUMOC + RWMOC \]
TR-8. WLMLA [1993-1998]
WLMLA = A7MLA + CNMLA + JPMLA + HKMLA + KRMLA + TWMLA + NFMLA
+ OCMLA + LAMLA + RUMLA + RWMLA

WLMRU = A7MRU + CNMRU + JPMRU + HKMRU + KRMRU + TWMRU + NFMRU
+ OCMRU + LAMRU + RUMRU + RWMRU

D.13.2. Import Price Definitions

TR-10. A7AP95 [1993-1998]
A7AP95= ( (A7PX*0.1823)+(CNPX*0.0295)+(JPPX*0.2429)
+ (HKPX*0.0249)+(KRPX*0.0461)+(TWPX*0.0449)
+ (NFPX*0.1492)+(OCPX*0.0269)+(LAPX*0.0031)
+ (RUPX*0.0018 ))

TR-11. CNAP95 [1993-1998]
CNAP95 = ( (A7PX*0.0737)+(JPPX*0.2195)+(HKPX*0.0651)
+ (KRPX*0.0778)+(TWPX*0.0030)+(NFPX*0.1438)
+ (OCPX*0.0228)+(LAPX*0.0052)+(RUPX*0.0287))

TR-12. JPAP95 [1993-1998]
JPAP95= ( (A7PX*0.1437)+(CNPX*0.1069)+(HKPX*0.0081)
+ (KRPX*0.0516)+(TWPX*0.0419)+(NFPX*0.2627)
+ (OCPX*0.0529)+(LAPX*0.0112)+(RUPX*0.0141))

HKAP95= ( (A7PX*0.0996)+(CNPX*0.3618)+(JPPX*0.1484)
+ (KRPX*0.0491)+(TWPX*0.1449)+(NFPX*0.0846)
+ (OCPX*0.0118)+(LAPX*0.0007)+(RUPX*0.0025))

TR-14. KRAP95 [1993-1998]
KRAP95= ( (A7PX*0.0706)+(CNPX*0.0547)+(JPPX*0.2412)
+ (HKPX*0.0061)+(TWPX*0.0204)+(NFPX*0.2464)
+ (OCPX*0.0439)+(LAPX*0.0076)+(RUPX*0.0141))
TR-15. TWAP95 [1993-1998]

\[ TWAP95 = (A7PX \times 0.1013) + (CNPX \times 0.0299) + (JPPX \times 0.2923) + (HKPX \times 0.0178) + (KRPX \times 0.0418) + (NFPX \times 0.2185) + (OCPX \times 0.0293) + (LAPX \times 0.0118) + (RUPX \times 0.0157) \]

TR-16. NFAP95 [1993-1998]

\[ NFAP95 = (A7PX \times 0.0686) + (CNPX \times 0.0520) + (JPPX \times 0.1387) + (HKPX \times 0.0118) + (KRPX \times 0.0280) + (TWPX \times 0.0300) + (NFPX \times 0.3767) + (OCPX \times 0.0065) + (LAPX \times 0.0041) + (RUPX \times 0.0046) \]

TR-17. OCAP95 [1993-1998]

\[ OCAP95 = (A7PX \times 0.0836) + (CNPX \times 0.0464) + (JPPX \times 0.1504) + (HKPX \times 0.0128) + (KRPX \times 0.0263) + (TWPX \times 0.0297) + (NFPX \times 0.2303) + (OCPX \times 0.1005) + (LAPX \times 0.0016) + (RUPX \times 0.0004) \]

TR-18. LAAP95 [1993-1998]

\[ LAAP95 = (A7PX \times 0.0152) + (CNPX \times 0.0241) + (JPPX \times 0.0608) + (HKPX \times 0.0069) + (KRPX \times 0.0307) + (TWPX \times 0.0158) + (NFPX \times 0.3077) + (OCPX \times 0.0100) + (LAPX \times 0.0312) + (RUPX \times 0.0013) \]


\[ RUAP95 = (A7PX \times 0.0101) + (CNPX \times 0.0186) + (JPPX \times 0.0164) + (HKPX \times 0.0020) + (KRPX \times 0.0108) + (TWPX \times 0.0040) + (NFPX \times 0.0625) + (OCPX \times 0.0053) + (LAPX \times 0.0020) + (RUPX \times 0.0000) \]


\[ A7PM = A7AP95 \times A7RW95 \]


\[ CNPM = CNAP95 \times CNRW95 \]
TR-22. JPPM [1993-1998]
   JPPM = JPAP95 * JPRW95

TR-23. HKPM [1993-1998]
   HKPM = HKAP95 * HKRW95

   KRPM = KRAP95 * KRRW95

TR-25. TWPM [1993-1998]
   TWPM = TWAP95 * TWRW95

   NFPM = NFAP95 * NFRW95

TR-27. OCPM [1993-1998]
   OCPM = OCAP95 * OCRW95

   LAPM = LAAP95 * LARW95

TR-29. RUPM [1993-1998]
   RUPM = RUAP95 * RURW95
References


