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Updating Study on the Impact of Trade Liberalization in APEC

CGE Modeling Unit, ERI/EPA

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The views expressed here are the author’s and do not represent those of the Economic Planning Agency.
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Abstract

This paper presents a preliminary simulation for the economic impact of trade liberalization in APEC in line with the report on “Assessing APEC Trade Liberalization and Facilitation - 1999 Update” adopted by the APEC in September 1999.

Impact of Trade Liberalization in APEC, a research project that used a CGE model to assess the impacts of “Manila Action Plan (MAPA),” was submitted to the Ministerial Meeting in November 1997. Facing several new demands to update the existing CGE component of the study, the Economic Research Institute of the Economic Planning Agency proposed to launch an update in 1999. It was desirable to revise the existing CGE estimate on the impact of APEC Individual Action Plans (IAPs) on each individual member economy, including the new members, once they submit their IAPs. The database of the CGE Model used in the last study was updated in December 1998.

Our goals in this paper are the threefold. The first goal is to calculate tariff data of APEC members, matching to the latest Individual Action Plans. The calculation is based on the Global Trade Analysis Project (GTAP) model’s methodology. The second is to compare the economic effects of MAPA estimated by means of the Version 4 database to that by the Version 3 database. We try to examine whether the models used in the previous study are still appropriate to the new database. The last goal is to estimate the economic effects of the updated IAPs in various models.
Chapter 1   Introduction

This paper presents a preliminary simulation for the economic impact of trade liberalization in APEC in line with the report on “Assessing APEC Trade Liberalization and Facilitation - 1999 Update” adopted by APEC in September 1999.

The “Manila Action Plan (MAPA),” which includes members’ specified trade liberalization measures, was finalized at the APEC Ministerial Meeting in November 1996. Those specific liberalization measures of individual economies were quantified to changes in the exogenous variables in the Computable General Equilibrium (CGE) model. The EC undertook a series of studies on the impact of liberalization of trade and investment in APEC in 1997, and reports were submitted to the Ministerial Meeting in November 1997. Impact of Trade Liberalization in APEC was a research project that used a CGE model to assess the impacts of MAPA.

Facing several new demands to update the existing CGE component of the study, the Economic Research Institute of the Economic Planning Agency proposed to launch an update in 1999. It was desirable to revise the existing CGE estimate on the impact of APEC Individual Action Plans (IAPs) on each individual member economy, including the new members, once they submit their IAPs.

The database of the CGE Model used in the last study was updated in December 1998. The new database reflects more recent trade and industrial structures in the world. In the context of APEC, updating the database would provide us with background that reflects the rapid growth in the early 1990s.

The proposed study – “Updating the Estimates of the Impact of Trade Liberalization in APEC” -- includes:

- An update of CGE estimates by using new inputs reflecting IAPs improvements, and new IAPs of new members.
- A revision of the CGE model to enable the specific estimate of the impact
to selected new members. In the present version of the CGE database, the estimates to Russia (but including the former USSR only) and Vietnam are feasible, but that of Peru is not.

- An update of the CGE database. Most of the input-output tables and trade data have been significantly updated. The older version of the database was used for some data in 1980 or before, but the new version in principle uses data from 1990 and thereafter.

Our goals in this paper are threefold. The first goal is to calculate tariff data of APEC members, matching to the latest Individual Action Plans. The calculation is based on the Global Trade Analysis Project (GTAP) model's methodology. The second is to compare the economic effects of MAPA estimated by means of the Version 4 database to that by the Version 3 database. We try to examine whether the models used in the previous study are still appropriate to the new database. The last goal is to estimate the economic effects of the updated IAPs in various models.

This paper comprises four chapters. Chapter 1 is an introduction, and Chapter 2 reports on the practical operations of tariff data calculations, according to the Global Trade Analysis Project (GTAP) model's methodology. Chapter 3 reports on the building of the GTAP model, including key assumptions for running simulations, and Chapter 4 shows the outcome of model simulations, a comparison between database Version 3 and Version 4, and the effects of trade liberalization in APEC.
Chapter 2 Tariff Data Calculation

This chapter reports on the practical operations of tariff data calculations, according to the GTAP methodology. In the GTAP database Version 4, tariff data are aggregated from detailed tariff line information using bilateral trade weight, denoted on an ad valorem basis.

The trade liberalization measures in the IAPs include two groups: those measures committed in the Uruguay Round (UR) negotiations, and those that go beyond the UR commitments. The latter measures include those committed in the Information Technology Agreement (ITA) as well as the unilateral liberalization in APEC. Twelve economies out of 21 APEC members joined the ITA. According to this classification, we calculate two cases. One is the baseline case, which presents the former, i.e., the tariff data only with measures committed in the UR negotiations, and the other is the controlled case, which includes unilateral measures beyond the UR commitments. Table 2-1 shows the highlights of the latest IAPs.

In this chapter, apart from the above classification, we take two time points: the base year point, and the future point. Here the base year point should be understood as the time point of the first IAP’s submission date. The future point is the year 2010. We calculate four total datasets: 1) the base year case; 2) the baseline case of year 2010, which includes only UR (UR); 3) the controlled case of year 2010, which includes UR and MAPA (UR+MAPA); and 4) the controlled case of year 2010, which includes UR and updated IAPs (UR+IAP98). Figure 2-2 shows the image of time points and datasets.

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1 The method of calculation on this paper is based on that of the EPA (1998).
2.1 Liberalization Measures

a. Measures Committed in the Uruguay Round Negotiations

In the Uruguay Round (UR) negotiations, many trade liberalizing measures were agreed upon. Each WTO member economy has submitted implementation measures toward the UR commitments. The main elements of the UR commitments are shown below.

One of the most significant rule changes in agricultural trade set by the UR is tariffication, i.e., conversion of non-tariff measures (NTMs) into bound tariffs. After tariffication, the new bound tariffs must be reduced by at least 15 percent on each item and by 36 percent on a simple average basis over six years (1995-2000) in developed economies. The new bound tariffs must be reduced by at least 10 percent on each item and by 24 percent on a simple average basis over ten years (1995-2005) in developing economies. Concerning export subsidies, WTO member economies must reduce them by 36 percent on a total value basis over six years (1995-2000).

Many significant measures were also agreed upon in the UR negotiations in trade of manufactured goods. This liberalization includes the binding of previously unbound tariffs in both developed and developing economies and tariff reductions, as well as the phasing out of the discriminatory quantitative restrictions applied under the Multi-fibre Arrangement (MFA). Tariffs must be reduced by at least 33 percent (almost 40 percent in developed economies) from base rates on a trade weighted average basis over five years. The coverage of tariff binding was significantly expanded, especially in developing economies. The MFA will be abolished in January 2004.

b. Information Technology Agreement (ITA)

In the APEC Ministerial Meeting in Manila in November 1996, Ministers endorsed WTO efforts to conclude an information technology agreement by the Singapore Ministerial Conference (SMC), and urged all
other members of the WTO to work toward that end.\textsuperscript{2} The liberalization of information technology products is being pursued because of the key role of trade in information technology products in the development of information industries and in the dynamic expansion of the world economy. 14 economies\textsuperscript{3} have agreed to the ITA in the SMC. Table 2-3 reports the tariff elimination schedule of the ITA.

c. Individual Action Plans (IAPs)

Regarding tariffs, a sizable number of APEC economies submitted unilateral liberalization measures included in IAPs beyond the UR commitments.

For the quantitative assessment of IAPs, we created a tariff database consisting of baseline and controlled cases. Because each of two cases will be fed into models independently as exogenous variables, we are able to interpret the difference of simulation results as a trade liberalization effect due to IAPs. Table 2-4 shows the extent of tariff curtailment in terms of percentage point change of the future time point data from the base year date.

c.i. General Principles

The general principles across economies for calculating baseline data are as follows.

1) Database time points are of the base and the future years, i.e., 1996\textsuperscript{4} and 2010. Data of the base year are calculated with trade and tariff information. The images of database time points and cases are shown in Figure 2-2.

2) Tariff rates are calculated according to the methodology of the GTAP.

\textsuperscript{2} APEC (1996 c).
\textsuperscript{3} They are Australia, Canada, Chinese Taipei, European Union, Hong Kong, Iceland, Indonesia, Japan, Korea, Norway, Singapore, Switzerland, Turkey, and the United States (underlined nine economies are APEC members). In addition, Malaysia, New Zealand, the Philippines, and Thailand are committed to the ITA. Among these four APEC member economies, New Zealand will be reducing tariffs on relevant commodities to zero by 2000, since it is an industrialized economy.
\textsuperscript{4} The base year 1996 should be understood as the time point of MAPA. Years of the trade and tariff information are reported in Table 2-6.
database. They are calculated directly from data sources such as UNCTAD/TRAINS and WTO/IDB.

3) Tariff rates will be reduced according to the Uruguay Round (UR) commitments for future time points.

4) Export subsidies on agricultural commodities will be reduced by 36 percent according to the UR commitments.

5) MFA duties will be reduced with linearity according to the UR commitments.

6) Voluntary export restraints (VER) will be abolished according to the UR commitments.

The general principle across economies for calculating controlled data is as follows.

7) Tariff rates of information technology products are reduced to zero in industrialized ITA-participating economies and with linearity by specific committed year in developing economies.

c.ii. Individual Economy’s Principle of Controlled Data

To calculate controlled data, we take into account the economy-specific unilateral measures shown below, apart from the tariff reduction attributed to the ITA.

Australia: tariff rates on passenger motor vehicles (PMV and components and PMV replacement parts) and textiles, clothing, and footwear are reduced according to the schedule reported in Table 2-5.

Canada: the rates of 714 tariff lines will be reduced by 1999 and those of 64 tariff lines by 2004.

Chile: tariff rates are reduced to zero for the year 2010.

China: rates of each tariff line for industrial products in years 2010 are regarded to be equal to current tariff rates simply multiplied by 10.8/17. Moreover, the other products are regarded to be equal to current tariff rates
simply multiplied by 15/17.

New Zealand: tariff rates are reduced to zero for year 2010.

The Philippines: tariff rates are reduced to 5 percent for year 2010 with the exception of sensitive agricultural commodities.

Singapore: tariff rates are reduced to zero for year 2010.

Chinese Taipei: rates of each tariff line in year 2010 are regarded to be equal to current tariff rates simply multiplied by 6.0/8.25.

2.2. Process of Calculations

a. Data Sources

We utilize three types of data sources: IAPs, UNCTAD/TRAINS, and WTO/IDB. Apart from these data sources, the tariff reduction schedule according to the ITA provides very useful information.

Two types of IAPs are available. One indicates specific tariff line information according to the 6-digit or more detailed level of the HS code classification. The other does not include it but summarizes the outline of the tariff reduction schedule. As to the latter, we interpret the information reported in the IAPs to applicable items according to the HS code.

b. GTAP Database

We prepared this paper to present tariff data calculations, evaluating IAPs in accordance with the GTAP database version 4. The GTAP tariff database has several characteristics: 1) tariff data are aggregated from detailed tariff line information using bilateral import weights; and 2) tariff data are denoted on an ad valorem basis.5

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5 Hertel eds. (1997). Another characteristic is that tariff data of agricultural commodities include tariff equivalents of non-tariff measures (NTMs).
In general, the tariff rates are generated according to the following formula.\(^6\)

In short, tariff rates of each commodity group are calculated as aggregations from detailed tariff line information, weighted by bilateral import data.

\[
t_{i,j}^{n} = \frac{\sum_{e \in \text{EXPG}_i} \sum_{m \in \text{IMPG}_n} \sum_{j \in \text{PROD}_j} T_{jk}^{m} w_{jk}^{m,e}}{\sum_{e \in \text{EXPG}_i} \sum_{m \in \text{IMPG}_n} \sum_{j \in \text{PROD}_j} w_{jk}^{m,e}}
\]

where

- \( t_{i,j}^{n} \): tariff rate of commodity \( i \) from economy \( j \) to economy \( n \)
- \( T_{jk}^{m} \): tariff rate of importer \( m \) in tariff line \( j_k \)
- \( w_{jk}^{m,e} \): value of trade between importer \( m \) and exporter \( e \)
- \( \text{IMPG}_n \): importer group \( n \)
- \( \text{EXPG}_i \): exporter group \( i \)
- \( \text{PROD}_j \): product group \( j \)

The protection database is composed of 10 goods and services and 21 regions, 18 of which are of APEC economies,\(^7\) evaluating IAPs, with a supplement by UNCTAD/TRAINS. Moreover, the most detailed tariff data, which consist of 50 goods and services, based on the GTAP database version 4, are available in Appendix 1 of this paper\(^8\). Table 2-6 reports the years of the trade and tariff information.

c. Process of Calculations

We calculate four datasets: 1) the base year case; 2) the baseline case of year 2010 (UR); 3) the controlled case of year 2010 (UR+MAPA); 4) the controlled case of year 2010 (UR+IAP98). According to the methodology of the GTAP database, two types of data are required for the protection

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\(^6\) Reincke (1996).
\(^7\) The data of Brunei Darssalam, Papua New Guinea, and Peru are not incorporated in the GTAP database Version 4.
\(^8\) The data of Viet Nam are from GTAP Version 4 because they are not available in UNCTAD/TRAINS.
We employ trade data from UNCTAD (1997), which reports bilateral trade data on imports classified by exporting economies at the HS 6-digit level. For all five datasets, the same trade data are used since future trade data are not available at present.

In comprehensive data sources of international organizations, tariff data are reported in both UNCTAD/TRAiNS and WTO/IDB. All these tariff data are regarded as measures on an MFN basis.

Tariff data are reported at the HS 6-digit level in WTO (1995), and at the HS 8-digit level in UNCTAD (1997). We include 6-digit level tariff data, simply averaged from more detailed data, including 8-digit ones, of the latter two data sources, when necessary.

Tariff data must be donated on an ad valorem basis in the GTAP database. We unqualifiedly employ ad valorem duties when two types of duties, such as ad valorem duties and specific duties, are listed in the same tariff line in UNCTAD/TRAiNS and/or WTO/IDB. In some cases, ad valorem duties are not available. We therefore convert specific duties into those on an ad valorem basis when both trade quantity data and total tariff value are reported. On the other hand, when this conversion is not applicable, we have to ignore the tariff data reported only in a specific duties form or regard them as “not available.”

Generally concerning the tariff data of current and baseline cases, the data reported in UNCTAD/TRAiNS are widely employed for updating the current tariff rates as the current dataset. Those reported in WTO/IDB are employed for future tariff rates as the four future datasets. They are partially utilized for filling up the missing current data from UNCTAD/TRAiNS, since WTO/IDB is not comprised of all HS code items.

Apart from these calculation principles, we also pay close attention to

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9 Some tariff data are reported at the HS 9-digit level in WTO (1995).
sub-regional preferential trade agreements, such as NAFTA and CER. According to NAFTA, bilateral tariff rates on manufactured goods among Canada, Mexico, and the United States are set to zero from 2000 onward. Concerning CER, bilateral tariff rates on all goods between Australia and New Zealand are set to zero at all time points of the protection database. These treatments of the sub-regional preferential trade agreements are subject to the GTAP database Version 4.
### Table 2-1: IAP98 Highlights -- Tariff Action Plans of APEC

<table>
<thead>
<tr>
<th>Economy</th>
<th>IAP Implementation and Improvements</th>
</tr>
</thead>
</table>
| Australia | • Reduced import tariffs on passenger motor vehicles (by 2.5%), as well as on textile, clothing and footwear (by between 1 and 3%)  
  • Bring forward the removal of tariffs on most Information Technology Agreement products by 18 months to 1 July 1998.  
  • Remove tariffs on a range of medical and scientific equipment.                                                                                                             |
| Brunei    | • All of the specific tariffs (87 tariff lines) will be converted to ad valorem and itemised all tariff lines at the 9-digit level.                                                                                      |
| Canada    | • Tariff simplification initiative implemented on January 1, 1998, introduced several measures, including acceleration of UR reductions, to bring the average tariff under 1.1% (1997 level).             |
| Chile     | • Will reduce general applied tariff rates by 45%, from 11% to 6% across-the-board, in a five-year period, at a rate of 1 percentage point per annum, starting on January 1st, 1999.                                 |
| China     | • Will reduce by 2005 the average tariff rate of 5,669 manufactured commodities to 10.8%, with the weighted average rate declining to 6.6%.  
  • Tariffs for 185 information technology products to be eliminated by 2005, except a few of them by 2007.                                                                 |
| Hong Kong | • Implement autonomously in 1999 the tariff elements of all sectoral proposals under EVSL, on the basis of product coverage and end rates endorsed by Trade Ministers in June 1998.                     |
| Indonesia | • Lowered a significant number of tariffs in 1998, including:  
  • -tariffs on all food items (reduced to a maximum of 5%)  
  • -tariffs on non-food agricultural products, chemical products and steel/metal products (reduced by 5 percentage points)  
  • -tariffs between 15-25% by five percentage points  
  • Will reduce tariffs on chemical, steel/metal, and fishery products to 5-10% by the year 2003.                                                                              |
| Japan     | • Undertook tariff reductions in accordance with commitments under UR and ITA.                                                                                                                                                 |
| Korea     | • In addition to its UR tariff concessions, unilaterally reduced its tariff on 182 tariff rates lines of raw materials and intermediate/semi-finished goods to 1-5% as of 1 January, 1998.                                      |
| Malaysia  | • Reduced tariffs on 65 tariff lines, including those committed under the WTO and ITA. Abolished duties on 12 lines.  
  • Will review 300 tariff lines with specific, mixed or alternative duties, for conversion into ad valorem tariffs.                                                          |
| Mexico    | • Implemented unilateral tariff reductions on, among others, certain chemicals, vehicle parts, tractors and other vehicles, and environmental machinery and equipment.  
  • Will review further tariff reductions, especially in the case of inputs and machinery produced in APEC economies.                                                                 |
<p>| New Zealand | • Removed tariffs on automobiles and light commercial vehicles from 15 May 1998.                                                                                                                                            |</p>
<table>
<thead>
<tr>
<th>Country</th>
<th>Actions</th>
</tr>
</thead>
<tbody>
<tr>
<td>PNG</td>
<td>• All imports will be duty free by 1 July 2006.</td>
</tr>
<tr>
<td></td>
<td>• To introduced comprehensive Tariff Reform (TRF) on 1.1.99</td>
</tr>
<tr>
<td></td>
<td>• Will lower all base tariff from 8% to 5%.</td>
</tr>
<tr>
<td>Philippines</td>
<td>• Reduced applied tariffs bringing the simple average tariff down from</td>
</tr>
<tr>
<td></td>
<td>12.11% in 1997 to 9.44% in 1998.</td>
</tr>
<tr>
<td>Russia</td>
<td>• To improve the customs tariff taking into account the process of</td>
</tr>
<tr>
<td></td>
<td>accession of the Russian Federation to the WTO.</td>
</tr>
<tr>
<td></td>
<td>• To scale down consistently the average weighted rate of import</td>
</tr>
<tr>
<td></td>
<td>customs tariff taking into account Russia’s commitments that should</td>
</tr>
<tr>
<td></td>
<td>be accepted in WTO.</td>
</tr>
<tr>
<td>Singapore</td>
<td>• Singapore has bound 85% of its tariff lines at 8.0% and below as per</td>
</tr>
<tr>
<td></td>
<td>the schedule in its IAP.</td>
</tr>
<tr>
<td>Chinese Taipei</td>
<td>• Has promulgated the 1996 Amendment of Customs Import Tariff Schedule</td>
</tr>
<tr>
<td></td>
<td>in June 17, 1998 which reduces the average nominal rate of tariff</td>
</tr>
<tr>
<td></td>
<td>from 8.64% to 8.25%.</td>
</tr>
<tr>
<td></td>
<td>• Have implemented temporary tariff reductions of 16 items in order to</td>
</tr>
<tr>
<td></td>
<td>fulfill the commitment of the WTO negotiations.</td>
</tr>
<tr>
<td>Thailand</td>
<td>• Review the possibility of revising its tariff concession schedule.</td>
</tr>
<tr>
<td></td>
<td>• Regularly review the level of import duties with a view to reducing</td>
</tr>
<tr>
<td></td>
<td>domestic protection and enhancing trade liberalization.</td>
</tr>
<tr>
<td>U.S.</td>
<td>• From January 1, 1998, the U.S. implemented the fourth phase of tariff</td>
</tr>
<tr>
<td></td>
<td>reductions under the Uruguay Round agreements.</td>
</tr>
<tr>
<td>Viet Nam</td>
<td>• Reduce the current number of tariff rates from 25 to less than 15.</td>
</tr>
<tr>
<td></td>
<td>• Prepare for the implementation of GATT Customs Valuation Agreement.</td>
</tr>
</tbody>
</table>

Source: SOM Chair’s Summary Report (APEC, 1998)
Figure 2-2  Images of Database Time Points and Cases

<table>
<thead>
<tr>
<th>Cases</th>
<th>Time Point</th>
</tr>
</thead>
<tbody>
<tr>
<td>A: Base year</td>
<td>1996</td>
</tr>
<tr>
<td>B: UR</td>
<td>2010</td>
</tr>
<tr>
<td>C: UR+MAPA</td>
<td>2010</td>
</tr>
<tr>
<td>D: UR+IAP98</td>
<td>2010</td>
</tr>
</tbody>
</table>

1 These figures describe the images of tariff reduction schedules and are not based on actual schedules.
Table 2-3 Tariff Elimination Schedule on the ITA

<table>
<thead>
<tr>
<th>Date for tariff elimination</th>
<th>2000</th>
<th>2002</th>
<th>2004</th>
<th>2005</th>
</tr>
</thead>
<tbody>
<tr>
<td>Economies which represent to join the ITA at SMC</td>
<td>Australia Canada Hong Kong Japan Singapore USA</td>
<td>Chinese Taipei</td>
<td>Korea</td>
<td>Indonesia</td>
</tr>
<tr>
<td>Economies which represent to join the ITA after January, 1997</td>
<td>New Zealand</td>
<td></td>
<td></td>
<td>Malaysia Philippines Thailand</td>
</tr>
</tbody>
</table>

Source: EPA (1998)