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**THE BENEFIT OF ESVL TO APEC ECONOMIES: A  
GENERAL EQUILIBRIUM ANALYSIS**

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**A joint research project on**

**Linkages Between Indonesia's Agricultural Production, Trade and the Environment  
funded by the Australian Centre for International Agricultural Research,**

**between**

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**CASER/CSIS/CIES/ANU  
joint research project on**



## **Policy analysis of linkages between Indonesia's agricultural production, trade and environment**

Rapid economic growth in Indonesia has been accompanied by significant structural changes, including for its agricultural sector and its unique natural environment. Recently questions have been raised about the impact of Indonesia's agricultural, industrial, trade and environmental policies on sustainable rural development. The nature of interactions between the economic activities of different sectors and the environment are such that an intersectoral, system-wide perspective is essential for assessing them. An international perspective also is needed to assess the impact on Indonesia of major shocks abroad, such as the implementation of the Uruguay Round agreements, APEC initiatives, or reforms in former centrally planned economies. There is increasing pressure on supporters of liberal trade to demonstrate that trade reforms at home or abroad affecting countries such as Indonesia will not add to global environmental problems (e.g., deforestation, reduced biodiversity). Again, this requires system-wide quantitative models of the economy and ecology, because typically there are both positive and negative effects at work, so the sign of the net effects ultimately has to be determined empirically.

To begin to address these issues, the Australian Centre for International Agricultural Research (ACIAR) has generously provided funds for a collaborative 3-year project (to mid-1999) involving the University of Adelaide's Centre for International Economic Studies (CIES) as the lead institution, Bogor's Centre for Agro-Socioeconomic Research (CASER) which is affiliated with the Ministry of Agriculture, Jakarta's independent Centre for Strategic and International Studies (CSIS), and the Economics Division of the Research School of Pacific and Asian Studies (RSPAS) at the Australian National University in Canberra. Being based on Indonesia with its rich diversity of environmental resources (and on which there are relatively good data) and its rapid economic growth, the project could also serve as a prototype for similar studies of other developing countries in Southeast Asia and elsewhere.

The key objective of the project is to assess the production, consumption, trade, income distributional, regional, environmental, and welfare effects of structural and policy changes at home and abroad particularly as they will or could affect Indonesia's agricultural sector over the next 5-10 years. Among other things, the analysis will focus both on the effects of economic changes on the environment, and on the impacts on Indonesia's agricultural production and trade of resource and environmental policy changes. The implications of regional and multilateral trade liberalization initiatives and Indonesia's ongoing unilateral trade reforms will be analysed, along with other potential domestic policy changes and significant external shocks such as the entry of China and Taiwan into the World Trade Organization. The analysis will draw on and adapt computable general equilibrium (CGE) models such as the national INDOGEM Model (built as part of an earlier ACIAR project) and the global GTAP Model.

The project is being undertaken in close collaboration with the Indonesian Ministry of Agriculture and ministries involved in trade, planning, and the environment. A Research Advisory Committee has been established to encourage close collaboration of representatives from those and other ministries.

**ACIAR INDONESIA RESEARCH PROJECT**

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## SUMMARY

This study measures the potential gain from the implementation of the Early Voluntary Sector Liberalization (EVSL) in Asia Pacific Economic Cooperation (APEC). The objective of the study is to empirically estimate the potential welfare gain or loss as a result of the EVSL and to predict the changing patterns of trade and resource allocation as a result of the liberalization. Several trade liberalization schemes are simulated in this study so that the potential gain from those schemes can be identified and compared. Precise measure of the potential gain from trade liberalization would be crucial for APEC member economies to prepare for the liberalization and to develop the effective policy strategy to get the most benefit from the liberalization.

The paper suggests that APEC should broaden the sectoral coverage of EVSL to get the most benefit from trade liberalization. There are two reasons for this recommendation. First, the larger sectoral coverage would increase the welfare gain for most economies. The potential welfare gain from liberalizing all sectors is much larger than that of liberalizing some sectors through the EVSL. Second, the broader sectoral coverage would ensure that the changing trade patterns would be consistent to the principal of comparative advantages and therefore increase efficiency.

## **THE BENEFIT OF THE EVSL TO APEC ECONOMIES: A GENERAL EQUILIBRIUM ANALYSIS**

Tubagus Feridhanusetyawan

This study measures the potential gain from the implementation of the Early Voluntary Sector Liberalization (EVSL) in Asia Pacific Economic Cooperation (APEC). The objective of the study is to empirically estimate the potential welfare gain or loss as a result of the EVSL and to predict the changing patterns of trade and resource allocation as a result of the liberalization. Several trade liberalization schemes are simulated in this study so that the potential gain from those schemes can be identified and compared. Precise measure of the potential gain from trade liberalization would be crucial for APEC member economies to prepare for the liberalization and to develop the effective policy strategy to get the most benefit from the liberalization.

The impact of EVSL on the economy of the Asia Pacific region is modeled using a Computable General Equilibrium (CGE) approach. The CGE model is an analytical approach, which looks at the economy as a complete system of interdependent components where prices and quantities for goods and factors adjust to equate supply and demand based on Walrasian general equilibrium theory. Different from regular CGE, which focuses on domestic economy and analyzes the relation between sectors within one economy or one country, and assumes foreign variables as exogenous components, this study uses a Global CGE, or a multi regional CGE, which captures the world economy on regional and sectoral classification. The relations between regions or economies are well represented by the flow of international trade and the relation between sectors are captured by the production process well presented in the input-output table.

The use of a multi-region CGE and the general equilibrium framework is important to be able to observe and understand the linkage between policy changes at a global scale to individual economies at a local scale. It is also possible to analyze how local policy

changes could lead to significant impact in global scale. A multi-region CGE models can show the interconnectedness of economies and how policy changes in one economy will benefit (or cost) other economies as well as the global economy. In a Global CGE framework, the world economy is classified into several regions and sectors, where quantity and prices adjust to the changing supply and demand that form the equilibrium conditions in every market. Policy changes, such as reduction in import tariffs, would lead to changing equilibrium market conditions in every sector and region involved in the model. The CGE model could measure precisely the impact of the policy changes on the changing prices and quantities, structural resource reallocation, as well as the potential welfare gain or loss.

The first section of this paper presents the methodology to model the EVSL in a Global CGE framework by discussing the model and the data used in this study. The second section presents the relation and concordance between the EVSL and the GTAP sectors, including the strategy to model the tariff reduction and simulation scenarios. The third section presents the result of the simulation by focusing on the impact of EVSL on welfare and trade patterns. Finally the summary and policy recommendation is presented in the final section

## **THE MODEL**

This study utilizes the well-known Global Trade Analysis Project (GTAP), to measure the impact of EVSL. Previous study on the benefit of trade liberalization conducted by the Economic Committee of APEC has also used the similar GTAP model<sup>1</sup>. Different from the previous study, this study uses a newer version of the GTAP database, different regional and sectoral classifications, and more specific liberalization scenarios.

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<sup>1</sup> Economic Committee of APEC (1997). The Impact of Trade Liberalization in APEC. Apec Secretariat. November 1997.

The GTAP is a CGE model founded upon the Australian Industrial Commission's SALTER project, and was further developed and improved at its home in the Center for Global Trade Analysis, Department of Agricultural Economics, Purdue University, Indiana.<sup>2</sup> Unlike most standard CGE models which are designed as a single country model, GTAP is a multi-country model. Hence, it simulates the effects brought about by the changes of policies in some countries or sectors to the other countries or sectors.

There are three major components of the GTAP. The first is the model itself, which is made up of regional sub-models that describe the economic activities and behaviors of firms, households, and governments. The central feature of the model is the input-output structure that links industries together in a value added chain starting from primary goods and moving up to intermediate processing and to the final consumer goods for households and governments. Prices and quantities supplied are then determined simultaneously in all primary factor markets and in domestic and international commodity markets.

The second major component of the GTAP is its database. The centerpiece of the database consists of bilateral trade, transport, and protection matrices that link individual countries' economic databases.<sup>3</sup> This database is derived from the individual countries' input-output tables. The third component of the GTAP is its behavioral parameters, consisting of four types: elasticities of substitution (in both consumption and production), transformation elasticities that determine the degree of mobility of the primary factors across sectors, the flexibility of regional investment allocation, and consumer demand elasticities.<sup>4</sup>

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<sup>2</sup> Hertel, Thomas (1997). *Global Trade Analysis, Modeling and Applications*, Cambridge University Press.

<sup>3</sup> Gelhar, Mark et. al., *Overview of the GTAP data base*, in Hertel (1997)

<sup>4</sup> Huff, Hanslow, Hertel, and Tsigas, *GTAP Behavioral Parameters*, in Hertel (1997)

## The Structure of GTAP<sup>5</sup>

The production structure is governed by a separable, constant return to scale technologies. The output is derived from primary and intermediary inputs. Previous versions of the GTAP database classify the primary inputs into three categories: capital, labor and land. Version 4, the most current version, adds another category, namely specific natural resources and splits labor into skilled labor and unskilled labor. The intermediary inputs can be produced domestically or imported from abroad. In determining the amount of intermediate inputs that are imported, GTAP uses an Armington structure for imports.

Meanwhile, the behavior of the regional household is determined by an aggregate utility function specified over composite government purchase, private consumption, and savings. In a standard closure, constant budget shares of these forms of final demands are allocated to each category using the regional household's Cobb-Douglas utility function – although, if required, real government purchases and savings can also be dictated exogenously (i.e., fixed or shocked), in which case the private expenditure will adjust to satisfy the regional household's budget constraint. Once the government spending is determined, the allocation of this spending across composite goods is determined once again using the Cobb-Douglas assumption of constant budget shares.

However, the non-homothetic nature of private household demands require a different treatment. A homothetic utility function, such as the CES function, implies that average household budget shares spent on various commodities are independent of total expenditure.<sup>6</sup> Given the empirical evidence showing that private household demands cannot be explained with a homothetic utility function – as exemplified in the falling budget shares on food as income increases – , the Cobb-Douglas or the CES function is

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<sup>5</sup> Most of the information in this section is derived from Hertel and Tsigas, *Structure of GTAP*, in Hertel (1997).

<sup>6</sup> Huff, Hanslow, Hertel and Tsigas, *GTAP Behavioral Parameters*, in Hertel (1997).

insufficient to capture the household preference over private commodities. Hence, in GTAP, household preference is represented by a Constant Difference of Elasticities (CDE) functional forms which lies midway between the CES and more flexible functional form such as translog.<sup>7</sup>

Given the static nature of the model, where simulation is modeled as a comparative static analysis, a proper treatment of savings-investment link is required to complete the global system. The GTAP specifies an equality of global savings and global investment in both the initial and new equilibrium. The allocation on investment across region can be modeled by assuming a fixed and equal return to investment across region.

### **The GTAP Database<sup>8</sup>**

The second major component of the GTAP is its database. The database consists of detailed bilateral trade, transport and protection data that characterizes economic linkages among regions, as well as individual country IO databases which accounts for intersectoral linkages within regions. Until now, the GTAP has released four versions of its database. The GTAP data is updated on an 18-month cycle.

For the bilateral trade data, GTAP relies on the publicly available data. Currently, its primary source of bilateral trade data is the COMTRADE database that is maintained by the United Nations Statistical Office. The construction of the tariff database benefited a great deal from the culmination of the UR in which individual countries submitted tariff schedules to the WTO. Version 2 of the database were built on this data. In version 3, the protection database incorporates a work done for the World Bank which compiles the pre- and post-UR protection based on the WTO's database as well as other sources. Since the

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<sup>7</sup> The name Constant Difference in Elasticities arise due to the fact that the  $N \times N$  matrix of elasticities of substitution dependent only on  $N$  parameters, so that the difference between the elasticities of substitution  $\sigma_{ij}$  and  $\sigma_{ih}$  is invariant to index  $i$  (Hertel, 1997).

<sup>8</sup> Hertel in McDougall, R.A., A. Elbehri, and T.P. Truong (1998). Global Trade Assistance and Protection: The GTAP 4 Data Base, Center for Global Trade Analysis, Purdue University

effort by the World Bank was not continued, the version 4 of the database utilized a different source of tariff information, to wit the UNCTAD Trains database provided by the United Nations.

As for the IO data for the regions, since GTAP builds very heavily on the Australian Industry Commission's SALTER project, the IO data in the first versions of the database has relied on the data provided by the Australian Industry Commission. Version 1 of the database used the original SALTER fifteen source-IO tables, while version 2 and 3 added new regions and updated the original SALTER IO tables. In version 4, however, almost all of the original SALTER database has been replaced and many more regions have been added. Members of the GTAP network have provided the data for this latest version of the database.

This paper uses the version 4 of the GTAP database. The latest version of the database is used to find a more accurate description of the current conditions since this latest version has been much improved from version 3, particularly in relation to the agriculture sector. There are other several new features of the database. First, the base year for its data is 1995, while the previous version uses 1992. In this new version, the data for trade protection have even been updated up to 1996 for some countries. The IO tables have also been added to include more regions and sectors. The number of regions has increased from 30 regions in version 3 to 45 regions in version four. The sectors have also been further disaggregated from the original 37 sectors to the level of 50 sectors – much of which is provided for agriculture and food.

Another new feature of the latest version is its protection database. The version 4 database has three main components. First, is the tariff information, sourced from the UNCTAD Trains Database. The second component is the database related to agriculture. Here, market price support and subsidy information is integrated into the database, based on the OECD's Producer Subsidy Equivalent (PSEs) database. The third component relates to the non-tariff barriers for non-agricultural sectors.

Finally, version 4 also makes significant changes in the types of primary factors. It breaks the category of natural resources into specific natural resources and calibrates the cost share of these specific natural resources to replicate the target elasticity of supply for each resource-constrained sector. In other words, it means that the supply response of a specific natural resource will depend on the supply elasticity of the sector that utilizes that specific resource (e.g., coal for manufacturing, land for agriculture).<sup>9</sup> Meanwhile, the second significant change is the split of primary labor payments into the skilled and unskilled components for each sectors and regions.

## **THE SECTORAL CONCORDANCE**

To be able to model the EVSL schedule in the GTAP, one must know the magnitude of the tariff reductions resulting from the EVSL, for each region and each sector based on the GTAP aggregation. However, as illustrated in Table 1, none of the EVSL sectors have a one-to-one correspondence with GTAP's aggregated sectors. For instance, EVSL's Chemical sector corresponds to a mere portion of GTAP's Chemical, Rubber and Plastic (CRP) aggregation. At the same time, EVSL's Medical sector also corresponds to another portion of GTAP's CRP. Using this as an example, the shock for CRP will vary for different regions since the impact of eliminating tariff for a portion of GTAP's aggregated sector will translate into different tariff reductions for different regions. This is so because not all countries have the same number of tariff lines.

### *Table 1. Summary of Concordance between EVSL and GTAP: Selected Sectors*

We get around this problem by working backwards. That is, we first calculate the post-EVSL rate for each of GTAP's sectoral aggregation, and from there we figure out the

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<sup>9</sup> For a detailed treatment on the specific natural resources, see Hertel and Tsigas, *Primary Factor Shares and Supply Response in the Natural Resource-based Industries*, in McDougall, R.A., A. Elbehri, and T.P. Truong (1998).

necessary tariff reductions for each region and each sector. Based on these calculated reductions, we calculate the necessary shocks to reduce the tariffs for each of the sectoral aggregation.

Since the EVSL schedule is described in four- and six-digit HS tariff lines, we need an HS-to-GTAP concordance to do aggregation. However, the GTAP homepage<sup>10</sup> only provides a six-digit HS concordance to the GTAP version 3 while we are using GTAP version 4 to model EVSL. To solve this problem, the sectoral aggregation for the model is based on the GTAP version 3. This will not create a conflict with the version 4 database, since version 4 is simply a disaggregation of the GTAP version 3 database.<sup>11</sup> The final aggregation adds up to 13 sectors by 19 regions. (Table 2).

### **Aggregation**

In deciding on the regional aggregation, it is clear that APEC countries must be prioritized. Hence, each individual APEC country – except for Vietnam, PNG and Brunei – is aggregated separately in order to be able to observe the impact of the EVSL schedule to individual countries.

*Table 2. Sectoral and Regional Aggregation*

*Table 3. Tariff Reduction in EVSL scheme for GTAP Simulation*

Meanwhile, there are two considerations in deciding upon the sectoral aggregation. First, we use the common classifications of Agriculture, Forestry, Fishery, Manufacturing, Services etc. Then, for certain sectors, we disaggregate further to separate out sub-sectors that are fully (or almost fully) liberalized in contrast to those that are not. For example, we

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<sup>10</sup> The site address for the concordance is <http://www.agecon.purdue.edu/gtap/info/concord.htm>. For the general information on the GTAP, see <http://www.agecon.purdue.edu/gtap>.

<sup>11</sup> Ver. 4-to-Ver. 3 concordance is also available in <http://www.agecon.purdue.edu/gtap/info/concord.htm>

distinguish between grain and non-grain crops. This distinction is based on the fact that most of tariff lines in the non-grain crops sector are liberalized in the EVSL schedule while none in the grain crops sector are. By separating the two, one can observe in more detail the impact of the liberalization of the non-grain crops. A similar reasoning is used to separate Electricity, Gas and Water (EGW) from other services.

### **Tariff reduction calculation**

As discussed briefly above, the simulation input is calculated by working backwards, to wit, by first calculating the tariff reductions for each region and each of GTAP's sectoral aggregation. We first calculate the pre- and post-EVSL average tariff for each sector in each region. The pre-EVSL tariff is simply the simple average tariff based on the data provided by the UNCTAD Trains Database. Meanwhile, the post-EVSL tariff is calculated by averaging the tariff for each sector in each region after the tariffs at the eight-, nine- or ten-digit HS lines are reduced according to the EVSL schedule.

Then, after aggregating it into GTAP's sectoral aggregation, we compare the pre-EVSL and post-EVSL average tariff for each sector, and calculate the percentage reduction required to achieve the EVSL goal (Table 3). Further calculations are then conducted to find the appropriate shocks to reduce the power of intervention to the desired level. The tariff reduction is not homogeneous for a particular sector in all regions because the number of tariff lines in a single sector affected by the EVSL differs from one region to the other.

### **Simulation Scenarios**

This study compares the impact of trade liberalization on APEC member economies by specifying various liberalization scenarios. The first scenario is **the EVSL scenario**, where APEC member economies follow tariff reduction scheme specified in Table 3.

Those tariff reductions are consistent with the EVSL scheme and all APEC member economies consistently follow the tariff reductions.

The second scenario is called **the EVSL-WTO scenario**, where the EVSL tariff reduction scheme is submitted to the WTO, the WTO takes the scheme, and all countries in the world follow the same tariff reduction scheme. Under this scenario, therefore, both APEC and Non-APEC economies consistently reduce their import tariff based on EVSL scheme. This study assumes that the tariff reductions of non-APEC member economies are equal to the average tariff reduction of APEC economies, calculated for each commodity or sector.

The third scenario is called **the APEC-2010**, which assumes that all tariffs in APEC economies are cut up to zero percent for the developed and 5 percent for the developing members of APEC. In other words, it is assumed that by 2010, the average tariff level in the developed and developing economies are zero and 5 percent respectively. Tariff reductions are applied to all sectors, except for other services (OSR) because the form of trade liberalization in services in APEC is less clear to that in other sectors. Because the electricity, gas, and water sectors (EGW) are already included in the EVSL scheme, these particular service sectors are separated from the other services and are included in the liberalization scheme. This scenario simulates the nearly full APEC liberalization based on the Bogor goal.

The fourth liberalization scenario is called **the UR Zero-for-Zero** tariff reduction following the zero-for-zero tariff reduction scheme proposed in the WTO/Uruguay Round. Under this zero-for-zero tariff reduction, import tariffs in some sectors, such as agricultural equipment, beer, chemical, construction equipment, distilled spirits, furniture, medical equipment, paper, pharmaceuticals, steel, and toys are cut to zero for all economies. Table 4 presents the tariff reductions of the UR zero-for-zero tariff reduction scheme, calculated for the GTAP aggregated sector used in this study. It is clear from the table that the UR zero-for-zero scheme only covers one forestry sector and three

manufacturing sectors, namely the petro-chemical and mineral products, the metal products and transport equipment, and the electronic and other machinery equipment.

*Table 4. The UR zero-for-zero tariff reduction scheme*

Those four liberalization scenarios above only consider the reduction in tariff barriers, but do not apply any treatment for the non-tariff barriers (NTBs) and other possible distortions. Therefore, in the next four scenarios, those above four scenarios are repeatedly simulated by incorporating reduction in several forms of non-tariff barriers. To be more specific, in addition to the reduction in import tariff barriers, it is also assumed that both APEC and Non-APEC members are following the WTO commitment in reducing the domestic distortion and export tariff in agriculture, and also in abolishing the MFA (Multi-fiber Agreement) quota on textile products. There is information on the tariff-equivalence of the MFA quotas in the GTAP database and the abolishment of these tariffs would allow the liberalization scenario to incorporate the impact of the reduction in some on the non-tariff barriers. It is realized that because of the data limitation, the coverage of NTBs in this study is only partial compared with the complexity of various versions and forms of the NTBs actually applied in the real world.

To more realistically represent the improvement in technology for the next ten to twenty years, this study also assumes *Hick's Neutral* technological progress in all sectors. The study assumes that throughout the liberalization processes, there will be an increase in total factor productivity, represented by an increase in the shifting technological parameter of the production function in all sectors. The increase in the shifting parameter is assumed to be 1 percent for developing countries and 0.5 percent for developed countries. The shift in technological parameter is applied in all eight liberalization scenarios simulated in this study.

## **THE RESULTS**

## Welfare

The impact of EVSL and other liberalization scenarios on welfare of APEC member economies, measured as the change in equivalent variation<sup>12</sup>, is presented in Table 5. This welfare gain from trade liberalization should be interpreted to mean that the welfare would be higher than otherwise would have been if the trade liberalization measures had not been implemented. By assuming 0.5 percent technological progress for the developed and 1 percent for the developing economies, the implementation of EVSL in APEC will increase the welfare of APEC member economies by around US\$ 188.1 billion. This gain is mainly as a result of better resource allocation and the improvement of terms of trade. The positive welfare gain also suggests that the positive impact of trade creation would dominate the potential negative impact of trade diversion. Both APEC and non-APEC member economies would benefit from the implementation of EVSL. The total world welfare gain is estimated at around US\$ 380.4 billion, and the gain for non-APEC member economies is around US\$ 192.3 billion.

*Table 5: The Impact of EVSL and Other Trade Liberalization Schemes on Welfare*

The welfare gain for APEC will be much larger if the EVSL scheme is submitted to the WTO/UR and all member economies of the WTO, both APEC and non-APEC, commit to follow the EVSL tariff reduction schedule. The total world welfare gain would be around US\$ 391.9 billion, and US\$ 196.7 billion would go to APEC member economies. When non-APEC member economies implement the EVSL tariff reduction scheme, their welfare will increase up to US\$ 195.2 billion. These results clearly justify the presumption that both the APEC and non-APEC member economies would benefit from the implementation

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<sup>12</sup> Equivalent Variation is one measure of the changes in welfare as a result of the changing equilibrium condition in the economy. The equivalent variation measures the changes in utility of the society in each economy by using the current prices level as the base for calculation.

of EVSL, and that larger participation of international trade liberalization would lead to greater world welfare.

But the results from the simulation also show that the welfare gain from EVSL would be smaller compared to the potential gain for APEC when all sectors are liberalized. The result of APEC-2010 simulation scenario, which simulates 0 percent import tariff for developed and 5 percent for developing member of APEC, shows that the potential gain for APEC is around US\$ 239.1 billion, or US\$ 51 billion additional gain to that of the EVSL. The total world welfare is expected to increase by US\$ 443.7 billion, and the welfare gain for non-APEC member economies is expected to be around US\$ 204.6 billion.

Trade liberalization through the UR zero-for-zero tariff reduction would lead to larger welfare gain for APEC economies compared with the EVSL scheme. The potential welfare gain from the UR zero-for-zero tariff reduction for APEC economies is estimated to be around US\$ 195.6 billion. The welfare gain from the UR zero-for-zero liberalization for non-APEC economies, however, is smaller at around US \$ 190.4. Compared with the EVSL, the UR zero-for-zero tariff reduction scheme is more progressive in terms of tariff reduction in manufacturing sectors. And this result suggests that more progressive tariff reductions in the manufacturing sectors would lead to larger welfare gain for APEC economies. Therefore, there is large potential welfare gain for APEC economies by broadening the coverage of EVSL especially in the manufacturing sectors.

By incorporating the reduction in several non-tariff barriers, especially abolishing the domestic distortion and export subsidy in agriculture, as well as banning the MFA quota on textile export, the welfare gain from trade liberalization is generally larger. By reducing these several non-tariff barriers, the welfare gain from EVSL increases by more than US\$ 6 billion from US\$ 188.1 billion to US\$ 194.1 billion. When the EVSL plus the reduction in NTBs are submitted to the WTO and all economies follow the liberalization scheme, the welfare gain for APEC economies increases by around US\$ 37.7 billion. The

additional benefit due to reduction in NTBs to the APEC 2010 and to UR-Zero-to-zero scenarios are estimated at around US\$ 4.9 billion and US\$ 11.6 billion respectively.

*Table 6. The Impact of EVSL on Welfare and Real GDP*

*Figure 1. The Impact of EVSL on Welfare and Real GDP*

Table 6 presents the welfare impact of the pure EVSL (Scenario 1) on each APEC member economies in terms of changes in equivalent variation and real GDP. Figure 1 also illustrates that all APEC economies would benefit from EVSL. In terms of equivalent variation, the potential welfare gain from EVSL ranges from US\$ 1.1 billion in New Zealand to US\$ 67.9 billion in the United States. When this equivalent variation is expressed as the real GDP value in 1995, it ranges from 0.9 percent in Canada to around 3 percent in Malaysia. Large benefits are expected, for example, in Malaysia at US\$ 2.6 billion (3 percent of real GDP 1995) and China at US\$ 19.8 billion (3 percent on GDP 1995).

Table 6 also presents the impact of various liberalization scenarios on real GDP for each APEC economies. All APEC member economies would benefit from the EVSL and the benefit ranges from 1 percent in the United States to 3.4 percent in Malaysia. The study predicts that the EVSL would increase the real GDP by more than 3 percent in Malaysia, Philippines, and China. The increases in real GDP in Indonesia, Thailand, Mexico and Chile are expected to be more than 2 percent.

### **Trade Patterns**

The implementation of EVSL will also increase the volume and value of trade in some sectors, especially the ones that are included in the EVSL. The changes in total world export of some sectors as a result of trade liberalization through the EVSL, EVSL-WTO, APEC-2010, and UR-ZERO scenarios, with and without reduction in NTBs, are

presented in Table 7. The first column of table 7 show that the EVSL will increase the total world export of non-grain crop products by 3.2 percent, forestry products by 3.2 percent, fisheries products by 6.2 percent, and processed food by 5.8 percent.

*Table 7. The Change in World Export by Commodity*

When the EVSL is submitted to the WTO, and all economies adopt the EVSL scheme of tariff reduction, the volume of world trade in increases significantly. For example, the exports of non-grain crops would increase by 6.7 percent, forestry products by 6.1 percent, fisheries by 9.1 percent, and processed food by 11 percent.

The impact of EVSL on the trade of manufacturing sectors, other than processed food, is smaller (at around 1.4 to 1.9 percent increase), partly because the tariff reduction for these sectors (aggregated based on the GTAP classification) is less progressive. As discussed in the previous section, the sectoral concordance between EVSL and GTAP for most of the manufacturing sectors are complicated because of the partiality of the liberalization within the sector. In most manufacturing sectors, only part of the GTAP sectors are liberalized by the EVSL scheme. The implementation of the EVSL will increase the trade of textile products by 1.6 percent, the petroleum-chemical-metal products by 1.4 to 1.6 percent, and other manufacturing by 1.9 percent. The submission of EVSL to the WTO would increase the value of trade in manufacturing products, but the increases are still in the range of 1.6 to 2.6 percent.

The value of trade in electricity, gas, and water sectors, which are supposed to be liberalized progressively under the EVSL, would increase by 1.3 percent. This small additional increase is due to the fact that there is in fact not much tariff reduction in some economies because the sector is already liberalized. The minimal impact of EVSL is also because the outputs of the services sectors covered in this study are mostly non-traded.

These increases in world export as a result of the EVSL or EVSL-WTO liberalization scenarios would be smaller compared with the increase in exports due to the implementation of APEC 2010. When trade liberalization is applied to all sectors, the value of trade in all sectors increases significantly. The world export of grain crops that would increase by only around 1 percent due to the EVSL, for example, would increase by 72 percent as a result of the APEC-2010 trade liberalization. Similar trends apply to the exports of other sectors that are untouched by the EVSL, such as livestock products (4.4 percent increase), textile and garment (17 percent increase), and other manufacturing sectors. The results clearly show that the additional gain from the implementation of APEC would be larger for the sensitive sectors, especially in agriculture and manufacturing, which are currently not included in the EVSL. It is important therefore for APEC to widen the coverage of EVSL to get the most benefit from trade liberalization.

The implementation of the UR zero-for-zero tariff reduction would increase the value of trade in those sectors that are liberalized more progressively, namely the forestry and manufacturing sectors. Trade in forestry related products would increase by 4.8 percent, petro-chemical and mineral products by 2.5 percent, metal and transport equipment by 4.9 percent, and other manufacturing such as electronic and machinery equipment by 2.4 percent. Because the UR zero-for-zero tariff reduction is more progressive in manufacturing, it is not surprising that the impact of the liberalization on manufacturing sectors is more significant compared with that of the EVSL.

The additional impact of the reduction in NTBs to the EVSL is clearly seen by the additional increase in exports of agricultural (grain crops, non-grain crops, and livestock) and agricultural related products (processed food). By incorporating the reduction in domestic distortion and export subsidy/tax in agriculture, but still maintaining the tariff barriers in agriculture, the exports of agricultural products increase very significantly. The export of grain crops, for example, would increase by 13.7 percent, while those of non-grain and livestock products increase by 5.1 and 7.2 percent respectively. The ban of

MFA quota also increases the world exports of textile products from 1.6 percent due to the pure EVSL to 3 percent due to the EVSL plus the reduction in NTBs.

Similar trend applies to other scenarios, where the additional reduction in domestic distortion and the ban of MFA quota would significantly increase exports of agriculture and textile products. The lesson from this simulation is that the benefit from removing the domestic distortion and non tariff barriers would be positively significant, even though the tariff barriers are still in place.

*Table 8. The Impact of EVSL on Export Value*

*Table 9. The Impact of EVSL on Import Value*

Table 8 and 9 present the changing trade patterns by sectors and economies as a result of the EVSL. The impact of EVSL on exports varies between one economy and another, but in general it is clear that the exports of products that are included in the EVSL would increase significantly. The changing trade patterns in each economy depends on the source of comparative advantages of each economy, and whether the comparatively advantaged sectors are liberalized under the EVSL.

It is interesting to note that the partiality of the sectoral coverage of the EVSL might alter the source of comparative advantages in certain economies. For example, the export of grain crops and livestock products, the traditional source of comparative advantages for the Australian and New Zealand economy, will decrease as a result of the EVSL because those sectors have not been progressively liberalized and not been included in the EVSL scheme. However, the export of products covered in the EVSL such as the non-grain crops and processed food in Australia are expected to increase by 38.5 percent and 34 percent respectively. Similar case is expected to happen in New Zealand, where the export of processed food products is expected to increase by 21.8 percent.

The exports and imports of all commodities from member economies of APEC will generally increase as a result of EVSL. Even the exports of forest related products, including pulp, paper, and publishing from Japan and Korea, the two economies with limited forest resource, are expected to increase by more than 20 percent as a result of cheaper imported raw materials.

The export of manufacturing commodities from APEC member economies will increase moderately in most economies and most sectors. The moderate increase in exports is because the partial coverage of the EVSL in manufacturing sectors. The exception is the processed food products. The export and import of processed food products increases significantly because this sector has large coverage of tariff reductions in the EVSL scheme. When all sectors are liberalized, the impact of trade liberalization on the value of trade in manufacturing sectors is significant. The results from fully implemented the APEC-2010 liberalization shows that the value of trade in manufacturing sector increases significantly, especially textile and garment. Unfortunately, textile and garment are not included in the EVSL.

In summary, the coverage of the EVSL sector matters in affecting the trade patterns in the Asia Pacific region. The greater coverage of tariff reduction in one sector would generally lead to larger volume and value of trade of this sector in most economies. But the partial nature of EVSL, where some sectors are selected to be liberalized sooner than others, could alter the patterns of comparative advantages in determining the patterns of trade. One economy that naturally has a comparative advantage in producing one commodity, for example, could be a large importer of that commodity after EVSL is implemented mainly because the particular sector is not liberalized under EVSL scheme. Therefore, broadening the coverage of EVSL is important to get the most benefit from trade liberalization.

## **SUMMARY AND POLICY RECOMMENDATION**

By assuming 0.5 to 1 percent technological progress in all sectors in the economy throughout the liberalization process, the implementation of the EVSL will increase the welfare of APEC member economies by US\$ 188.1 billion. The benefit from EVSL to non-APEC member economies is estimated at around US\$ 194.3 billion. When the EVSL is submitted to the WTO, and all economies follow the EVSL tariff reduction scheme, the gain for APEC will increase by US\$ 8.6 billion or up to US\$ 196.7 billion. The welfare gain for non-APEC economies also increases to US\$ 234.4 billion.

Compared with the potential benefit from the complete APEC liberalization where all sectors are liberalized, the welfare gain from EVSL for APEC economies is smaller. With the implementation of Bogor goal on tariff reduction or the APEC-2010, the welfare gain for APEC economies increases by US\$ 51 billion or up to US\$ 239.1 billion. The gain from the EVSL for APEC economies is also smaller compared with the gain from the UR zero-for-zero tariff reduction that has larger tariff reduction in the manufacturing sectors. These results show that there is still large potential welfare gain from broadening the coverage of EVSL.

The positive impact from reducing the distortions other than tariff barriers, such as domestic distortions and various non-tariff barriers, is significant. The study shows that the potential welfare gain from incorporating the non-tariff barriers in trade liberalization scheme is large. Therefore, APEC should continue to broaden the scope of trade liberalization by incorporating more sectors and more variety of trade barriers in the scheme.

The impact of the EVSL is significant in a sector that is included in the EVSL, and less significant in other sectors. The impact of EVSL on the value of trade in manufacturing commodities is moderate partly because of the minimal coverage of the EVSL in the manufacturing sectors.

APEC should broaden the sectoral coverage of EVSL to get the most benefit from trade liberalization. There are two reasons for this recommendation. First, the larger sectoral coverage would increase the welfare gain for most economies. The potential welfare gain from liberalizing all sectors is much larger than that of liberalizing some sectors through the EVSL. Second, the broader sectoral coverage would ensure that the changing trade patterns would be consistent to the principal of comparative advantages and therefore increase efficiency.

APEC should increase the coverage of the EVSL especially in the manufacturing sectors in the short run because the potential gain from liberalizing the manufacturing sector for APEC is large. The coverage of EVSL in the manufacturing sector is currently minimal, and the result of this study shows that more progressive liberalization of the manufacturing sectors through the UR zero-for-zero tariff reduction would lead to larger benefit for APEC economies. In the long run, the coverage of EVSL should be broadened to cover the more sensitive sector such as agriculture, fisheries, and forestry.

APEC should encourage the WTO to adopt the EVSL scheme for all the WTO member economies because the potential welfare gain for both APEC and non-APEC member economies would be much greater when EVSL is implemented world wide.

**Table 1. Summary of the Concordance between EVSL and GTAP: Selected Sectors**

EVSL SECTORS	PRODUCT COVERAGE	END RATE	END DATE	GTAP EQUIVALENT SECTOR/S*)
Gems and Jewelry	HS 7101 – 7118	0-5%	2005	Chemical, Rubber, Plastic (CRP); Non-ferrous Metals (NFM); Other minerals (OMN); Fabricated metal products (FMP); Other manuf. (OMF)
Toys	HS 9501 – 9505	0	2000 - 2005	Other manuf. (OMF)
Chemicals	Ch. 28 – 39	CTHA	CTHA	Chemical, Rubber, Plastic (CRP); Non-ferrous Metals (NFM); Other machinery and equipment (OME); Petroleum, coal products (P_C); Other minerals (OMN); Non-metallic minerals (NMM); Wearing Apparel (WAP).
Medical Equipment & Instruments	2844.40, 3822, 8419.20, ex8419.90, 8713, 8714.20, 9018-9019, 9021-9028, 9030-9032, 9402.10, 9402.90	0%	2001	Chemical, Rubber, Plastic (CRP); Wearing Apparel (WAP); Transport industries (TRN); Other machinery and equipment (OME); Other manuf. (OMF)
Fish and Fish Products	0301-0307, ex0511, ex1603, 1604, 1605, ex2301, ex2309 (108 tariff lines)	0%	2005	Other livestock products (OLP); Fisheries (FSH); Meat products (MET); Other food products (OFP);
Forest Products	Chapter 38, 44, 46 - 49, and 94.	0%	For Ch. 46-49, year 2000, others 2002.	Chemical, Rubber, Plastic (CRP); Non-metallic minerals (NMM); Forestry (FOR); Textiles (TEX); Lumber (LUM); Pulp, paper & printing (PPP); Petroleum and Coal (P_C); Non-ferrous Metals (NFM); Fabricated metal products (FMP); Other machinery and equipment (OME);
Energy	<b>(list of tariff lines is too long to be included. See original EVSL document)</b>	0%	2004	Coal (COL); Gas (GAS); Non-metallic minerals (NMM); Primary ferrous metals (I_S), Fabricated metal products (FMP); Transport equipment (TRN); Other machinery and equipment (OME); Electricity and Utility (EGW).
Natural and Synthetic Rubber	4001, 4002	0%	2005	Non-grain crops (NGC); Chemical, Rubber, Plastic (CRP); Wearing Apparel (WAP).
Fertilizers	HS 2503.00, 2809.20, 2814.10, Chapter 31	0%	2002	Chemical, Rubber, Plastic (CRP); Other minerals (OMN);

**Table 1. Summary of the Concordance between EVSL and GTAP: Selected Sectors (Continued)**

EVSL SECTORS	PRODUCT COVERAGE	END RATE	END DATE	GTAP EQUIVALENT SECTOR/S *)
Food	0701-0714, 0801-0814, 1602, 1704, 1806, 1901, 1902, 1905, 2001-2008 (excluding nuts), 2103, 2104, 2105, 2309, 0901-0903, 1107, 2101, 2201-2205, 2208	0-5%	2004	Non-grain crops (NGC); Meat products (MET); Milk products (MIL); Other food products (OFP); Beverages and tobaccos (B_T);
Environmental Goods and Services	<b>(list of tariff lines is too long to be included. See original EVSL document)</b>	0%	2003	Chemical, Rubber, Plastic (CRP); Textiles (TEX); Non-metallic minerals (NMM); Other machinery and equipment (OME).
Oilseeds and Oilseed Products	1201, 1203-1208, 1507, 1511-1515, 1516.20, 1517, 1518, 2106.10, 2103.30, 2302.50, 2304, 2306, 2923.20, 3504	0%	2002	Chemical, Rubber, Plastic (CRP); Other food products (OFP); Non-grain crops (NGC)

\*) This concordance is based on the HS classification in the GTAP database version 3. In some sectors, the whole GTAP aggregated sector is part of the EVSL sector, but in some others, only some portion of the GTAP sector is included in the EVSL.

**Table 2. Sectoral and Regional Aggregation**

<b>Name</b>	<b>Description</b>	<b>In GTAP Database</b>
<b><u>SECTORAL AGGREGATION</u></b>		
GRN	Grain	Paddy rice; Wheat; Cereal grains nec.
NGR	Non Grain Crops	Vegetables, fruit, nut; Oilseeds; Sugar cane, sugar beet; Plant-based fibers; Crops nec.
LVS	Livestock and Products	Bovine cattle, sheep & goats, horses; Animal products nec; Raw milk, Wool silk-worm cocoons;
FOR	Forestry & Forest Products	Forestry; Wood Products; Paper prod., publishing.
FIS	Fisheries	Fishing
MNG	Mining	Coal; Oil; Gas; Minerals;
PFD	Manuf – Processed Food & Beverages	Bovine cattle, sheep and goat, horse meat prod.; Meat prod. nec; Vegetable oils & fats; Dairy prod.; Processed rice; Sugar; Food prod. nec; Beverages & tobacco prod.
TXL	Manuf – Textile and Apparel	Textiles; Wearing apparel; Leather products
PCM	Manuf – Petroleum, Chemical, Mineral Products	Petroleum, coal products; Chemical, rubber, plastic products; Mineral products nec.
MTL	Manuf – Metal Products	Ferrous metals; Metals nec; Metal products; Motor vehicles and parts; Transport equipment nec.
OMF	Manuf – Other Manufacturing	Electronic equipment; Machinery and equipment nec; Manufactures nec.
EGW	Electricity, Gas and Water	Electricity; Gas manufacture, distribution; Water
OSR	Other Services	Construction; Trade, transport; Financial, business, recreational services; Public administration and defense, education and health; Dwellings.
<b><u>REGIONAL AGGREGATION</u></b>		
AUS	Australia	Australia
NZL	New Zealand	New Zealand
JPN	Japan	Japan
KOR	Korea	Korea
IDN	Indonesia	Indonesia
MYS	Malaysia	Malaysia
PHL	Philippines	Philippines
SGP	Singapore	Singapore
THA	Thailand	Thailand
CHN	China	China
HKG	Hong Kong	Hong Kong
CHT	China Taipei	China Taipei
USA	United States of America	United States of America
CAN	Canada	Canada
MEX	Mexico	Mexico
CHL	Chile	Chile
LAM	Rest of Latin America	Central America and Caribbean; Venezuela; Columbia; Rest of Andean Pact; Argentina; Brazil; Uruguay; Rest of South America.
WEU	Western Europe	United Kingdom; Germany; Denmark; Sweden; Finland; Rest of European Union; European Free Trade Area.
ROW	Rest of the World	Vietnam; India; Sri Lanka; Rest of South Asia; Central European Associates; Former Soviet Union; Turkey; Rest of Middle East; Morocco; Rest of North Africa; South African Customs Union; Rest of Southern Africa; Rest of Sub Saharan Africa; Rest of the World.

**Table 3. Tariff Reduction in EVSL scheme for GTAP Simulation (percent)**

SECTOR	Description	AUS	NZL	JPN	KOR	IDN	MYS	PHL	SGP	THA	CHN
GRN	Grain	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NGR	Non-grain Crops	35.71	16.30	52.58	79.39	56.45	71.06	58.34	0.00	62.29	61.87
LVS	Livestock and Products	0.00	0.00	0.93	1.23	1.10	0.00	1.25	0.00	4.42	0.60
FOR	Forestry and Products	97.40	98.93	100.00	95.70	97.69	99.03	97.25	0.00	97.93	97.78
FIS	Fisheries	0.00	100.00	98.15	97.72	99.27	100.00	100.00	0.00	96.97	96.05
MNG	Mining	0.00	13.92	75.81	20.31	26.65	9.92	28.75	0.00	9.93	36.23
PFD	Food Products	44.17	45.67	45.81	26.93	64.06	45.22	54.74	0.00	57.11	50.90
TXL	Textile, Apparel and Leather	0.36	0.57	0.08	0.55	0.46	0.51	0.50	0.00	0.48	0.43
PCM	Petro-chemical and Mineral	11.31	22.73	9.12	33.79	37.22	35.83	41.83	0.00	44.86	39.55
MTL	Metal Products and Transport Equipment	6.38	9.37	11.49	7.02	7.17	10.02	9.71	0.00	8.48	5.74
OMF	Electronic and Machinery	27.03	32.40	22.67	25.17	28.24	28.14	23.84	0.00	23.94	25.53
EGW	Electricity, Gas and Water	0.00	0.00	0.00	100.00	0.00	0.00	100.00	0.00	0.00	100.00
OSR	Other Services	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

**Table 3. Tariff Reduction in EVSL scheme for GTAP Simulation (percent), continued**

SECTOR	Description	HKG	CHT	USA	CAN	MEX	CHL	LAM	WEU	ROW
GRN	Grain	0.00	0.00	0.00	0.00	0.00	45.45	0.00	0.00	0.00
NGR	Non-grain Crops	0.00	67.58	46.82	44.12	54.75	45.45	0.00	0.00	0.00
LVS	Livestock and Products	0.00	0.38	1.79	0.00	0.99	45.45	0.00	0.00	0.00
FOR	Forestry and Products	0.00	95.42	97.82	98.90	95.60	45.45	0.00	0.00	0.00
FIS	Fisheries	0.00	97.49	81.05	100.00	95.88	45.45	0.00	0.00	0.00
MNG	Mining	0.00	21.68	17.95	28.31	12.43	45.45	0.00	0.00	0.00
PFD	Food Products	0.00	55.33	35.11	33.25	49.48	45.45	0.00	0.00	0.00
TXL	Textile, Apparel and Leather	0.00	0.07	0.08	0.14	0.43	45.45	0.00	0.00	0.00
PCM	Petro-chemical and Mineral	0.00	23.19	22.45	26.39	41.38	45.45	0.00	0.00	0.00
MTL	Metal Products and Transport Equipment	0.00	6.80	15.90	5.55	8.14	45.45	0.00	0.00	0.00
OMF	Electronic and Machinery	0.00	19.72	16.67	27.69	27.31	45.45	0.00	0.00	0.00
EGW	Electricity, Gas and Water	0.00	0.00	0.00	0.00	100.00	45.45	0.00	0.00	0.00
OSR	Other Services	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Notes: Actual shocks to import tariffs in GTAP simulations must be calculated further based on these tariff reductions.

**Table 4. The UR zero-for-zero tariff reduction scheme (percent)**

Sector	Description	AUS	NZL	JPN	KOR	IDN	MYS	PHL	SGP	THA	CHN
GRN	Grain	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NGR	Non-grain Crops	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
LVS	Livestock and Products	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
FOR	Forestry and Products	69.90	78.70	60.31	69.13	66.01	64.43	61.75	0.00	71.16	74.20
FSH	Fisheries	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MNG	Mining	0.00	0.00	0.00	0.39	0.00	0.00	0.00	0.00	0.37	0.08
PFD	Food Products	1.54	1.03	1.14	0.59	7.19	7.21	1.60	0.00	1.37	1.86
TXL	Textile, Apparel and Leather	0.05	0.19	0.00	0.16	0.20	0.18	0.15	0.00	0.08	0.11
PCM	Petro-chemical and Mineral	9.02	20.33	5.46	27.76	34.97	35.28	39.19	0.00	42.02	36.16
MTL	Metal Products and Transport Eq.	29.84	22.61	80.01	27.84	19.02	27.51	28.81	0.00	28.57	21.72
OMF	Electronic and Machinery	31.11	30.38	0.00	25.23	25.77	30.91	23.89	0.00	23.56	24.02
EGW	Electricity, Gas and Water	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
OSR	Other Services	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

**Table 4. The UR zero-for-zero tariff reduction scheme (percent), continued**

Sector	Description	HKG	CHT	USA	CAN	MEX	CHL	LAM	WEU	ROW
GRN	Grain	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NGR	Non-grain Crops	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
LVS	Livestock and Products	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
FOR	Forestry and Products	0.00	78.75	61.24	67.04	57.39	69.47	67.82	67.82	67.82
FSH	Fisheries	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MNG	Mining	0.00	0.00	0.00	0.00	0.32	0.61	0.13	0.13	0.13
PFD	Food Products	0.00	1.81	0.62	0.11	0.89	1.01	2.00	2.00	2.00
TXL	Textile, Apparel and Leather	0.00	0.01	0.01	0.08	0.12	0.18	0.11	0.11	0.11
PCM	Petro-chemical and Mineral	0.00	18.78	18.58	24.64	37.74	38.06	27.71	27.71	27.71
MTL	Metal Products and Transport Eq.	0.00	34.21	79.63	34.81	23.65	26.61	34.63	34.63	34.63
OMF	Electronic and Machinery	0.00	24.83	0.00	23.51	27.92	25.44	22.61	22.61	22.61
EGW	Electricity, Gas and Water	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
OSR	Other Services	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Notes: Actual shocks to import tariffs in GTAP simulations must be calculated further based on these tariff reductions.

**Table 5. The Impact of EVSL and Other Liberalization Scheme on Welfare  
(Change in Equivalent Variation, US\$ Billion)**

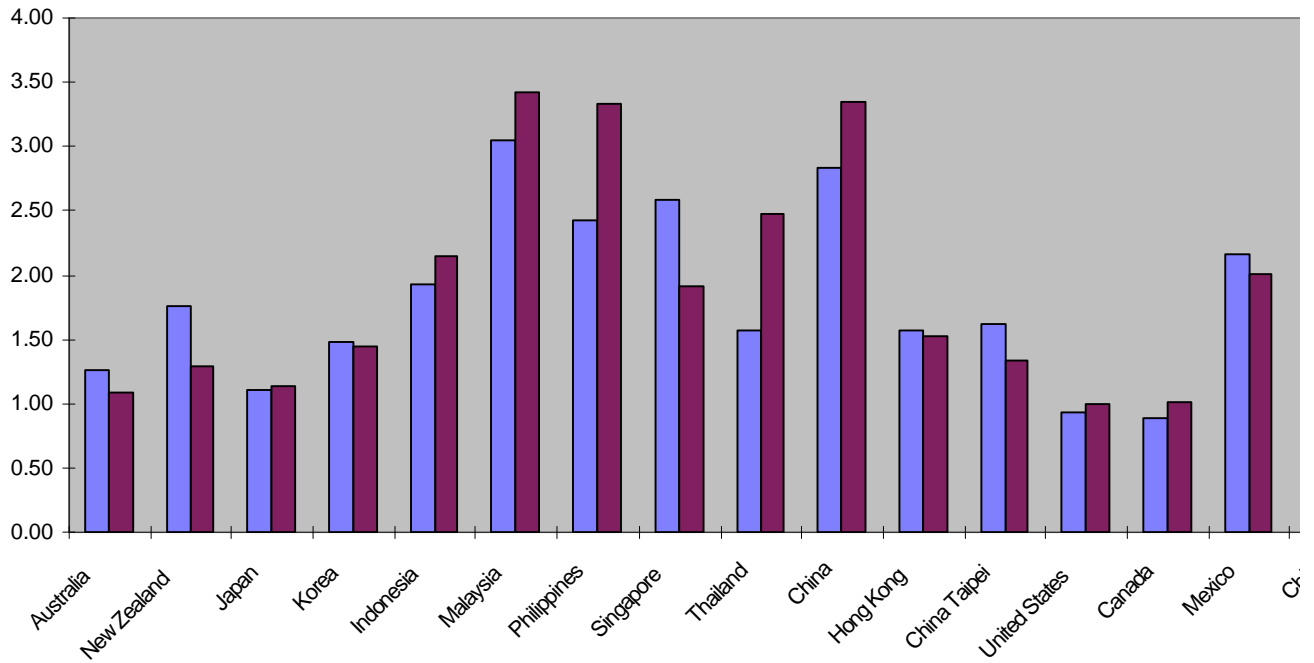
Scenario	APEC Region	Non Apec Region	World Total
<b>Pure Import Tariff Reduction (Without Reduction in NTB*)</b>			
EVSL Scenario	188.08	192.31	380.39
EVSL-WTO Scenario	196.70	195.24	391.94
APEC-2010 Scenario	239.09	204.64	443.73
UR-ZERO Scenario	195.59	190.35	385.94
<b>With Reduction on NTB*</b>			
EVSL Scenario	194.30	196.63	390.94
EVSL-WTO Scenario	234.41	199.28	433.68
APEC-2010 Scenario	243.96	209.48	453.44
UR-ZERO Scenario	207.20	194.52	401.73

\*NTBs are referred to distortions other than import tariffs, and by following the commitment to the WTO, in this study they are referred to domestic production and export subsidy of agricultural products, as well as MFA quota in textile products.

**Table 6. The Impact of EVSL on Welfare and Real GDP**

Region	Description	Welfare		Real GDP	
		US \$ billion*	In terms of 1995 real GDP (%)	% Change*	In terms of 1995 US \$ billion
AUS	Australia	4.86	1.26	1.09	4.19
NZL	New Zealand	1.05	1.75	1.29	0.77
JPN	Japan	56.63	1.11	1.14	58.26
KOR	Korea	6.75	1.48	1.45	6.60
IDN	Indonesia	3.87	1.92	2.15	4.33
MYS	Malaysia	2.60	3.04	3.42	2.92
PHL	Philippines	1.80	2.42	3.33	2.47
SGP	Singapore	2.16	2.58	1.92	1.61
THA	Thailand	2.62	1.57	2.47	4.13
CHN	China	19.79	2.84	3.34	23.30
HKG	Hong Kong	2.26	1.57	1.52	2.18
CHT	China Taipei	4.22	1.62	1.34	3.49
USA	United States	67.85	0.94	0.99	71.81
CAN	Canada	5.01	0.89	1.01	5.71
MEX	Mexico	5.52	2.17	2.01	5.12
CHL	Chile	1.12	1.66	2.33	1.57
<b>Total APEC</b>		<b>188.08</b>	<b>1.19</b>	<b>1.25</b>	<b>198.46</b>

**The Impact of EVSL on Welfare and Real GDP (percent)**



**Figure 1. The Impact of EVSL on Welfare and Real GDP**

**Table 7. The Change in World Export by Commodity  
(% Change in Export Value)**

Commodity	Without NTB* Reduction				With NTB* Reduction			
	EVSL	EVSL-WTO	APEC-2010	UR-ZERO	EVSL	EVSL-WTO	APEC-2010	
GRN	0.98	0.79	71.88	1.50	13.69	12.57	92.63	
NGR	3.20	6.70	6.25	1.18	5.09	7.92	8.18	
LVS	0.73	0.04	4.44	1.05	7.19	5.77	10.21	
FOR	3.19	6.07	3.24	4.81	3.18	6.09	3.21	
FIS	6.17	9.12	10.60	0.89	4.62	8.46	9.30	
MNG	-0.29	0.10	-0.08	-0.65	-0.49	-0.04	-0.29	
PFD	5.78	10.98	12.35	1.43	8.00	12.92	14.32	
TXL	1.63	1.57	17.14	1.50	2.98	2.94	18.94	
PCM	1.61	2.63	3.80	2.53	1.44	2.46	3.61	
MTL	1.35	1.96	6.96	4.92	1.39	2.01	6.99	
OMF	1.89	2.61	4.17	2.44	1.85	2.58	4.10	
EGW	1.27	1.15	2.53	1.02	1.48	1.34	2.81	
OSR	1.87	2.11	3.49	1.94	1.87	2.08	3.49	

\* NTBs are referred to distortions other than import tariffs, and by following the commitment to the WTO, in this study they are referred to domestic production and export subsidy of agricultural products, as well as MFA quota in textile products.

**Table 8. The Impact of EVSL on Export Value (% change)**

Region	Grain	Non Grain	Livestock	Forestry	Fishery	Mining	Processed Food	Textile	Petroleum, Chemical and Mineral	Meta Prod
AUS	-8.68	38.50	-9.73	0.00	-0.32	-1.68	33.95	-6.95	-0.19	
NZL	-4.47	-1.44	-2.57	-7.37	-10.46	-0.66	21.79	-5.65	-1.29	
JPN	5.22	11.44	10.33	23.02	10.27	-0.08	20.31	3.95	4.38	
KOR	3.67	2.25	12.02	24.87	19.49	-1.58	1.24	4.11	5.67	
IDN	5.11	2.18	7.80	9.34	2.32	0.34	-3.05	4.59	4.38	
MYS	5.80	4.69	7.70	0.34	0.17	-0.64	9.83	1.22	4.32	
PHL	8.09	22.34	14.35	8.40	0.04	-0.81	4.54	1.99	8.96	
SGP	1.80	2.40	3.38	12.50	2.55	1.77	4.95	-1.87	-0.03	
THA	4.08	8.71	6.31	6.74	37.08	0.24	8.93	9.85	3.42	
CHN	-2.08	2.38	-1.89	9.25	2.80	6.22	5.67	5.70	6.27	
HKG	3.56	-7.05	-0.11	32.21	1.63	0.16	52.72	-3.12	12.83	
CHT	3.57	9.25	4.04	26.70	10.02	1.97	35.33	-0.09	9.76	
USA	1.95	3.59	6.13	2.70	14.35	-0.80	8.91	3.07	1.64	
CAN	2.32	-2.98	1.99	0.77	3.53	-0.17	2.16	2.85	0.77	
MEX	3.77	-0.56	-0.20	-1.13	5.00	0.13	0.59	0.68	2.03	
CHL	1.98	3.80	8.25	1.60	16.45	0.01	-5.79	11.00	5.30	
LAM	-0.68	1.96	0.05	0.19	4.94	-0.49	3.05	-2.76	-0.14	
WEU	0.97	1.58	2.52	2.35	4.72	-0.45	3.84	0.48	0.80	
ROW	-0.46	2.38	1.49	-0.39	6.68	-0.37	0.75	-0.67	0.80	

**Table 9. The Impact of EVSL on Import Value (% change)**

Region	Grain	Non Grain	Livestock	Forestry	Fishery	Mining	Processed Food	Textile	Petroleum, Chemical and Mineral	Meta Prod
AUS	10.95	18.76	12.14	13.38	3.28	-1.49	10.69	3.74	2.53	
NZL	9.88	7.62	6.98	13.30	26.57	-1.10	9.08	3.40	2.27	
JPN	-1.70	4.41	-1.98	1.12	4.03	0.07	20.18	0.96	0.40	
KOR	-0.42	7.12	2.51	7.08	28.34	0.47	9.15	1.36	3.57	
IDN	-3.36	6.26	-4.48	13.91	37.44	1.48	7.87	2.12	3.65	
MYS	-0.44	11.02	-6.20	17.56	11.69	1.69	21.74	1.82	3.54	
PHL	-7.63	4.62	-11.86	32.73	61.04	-0.57	41.42	1.65	7.08	
SGP	2.12	1.67	4.07	3.37	1.94	-0.63	1.96	2.70	1.15	
THA	-0.80	15.43	1.31	17.02	88.84	0.60	46.98	-0.28	8.36	
CHN	3.18	20.67	3.21	41.31	91.14	-0.87	19.08	0.75	9.47	
HKG	1.93	1.03	2.02	3.69	1.12	0.40	3.04	2.95	1.99	
CHT	1.48	9.42	-0.17	9.86	37.27	1.48	29.07	1.15	3.62	
USA	-0.22	3.90	-1.40	1.21	1.64	-0.52	6.78	0.62	1.47	
CAN	-0.25	0.48	-0.15	1.16	-0.04	2.18	3.52	0.74	0.50	
MEX	0.31	-0.55	0.20	2.24	29.13	-0.08	-1.63	2.20	0.75	
CHL	-13.48	3.37	8.08	7.12	6.47	3.28	5.20	8.05	2.91	
LAM	2.00	2.22	2.07	2.89	4.37	-0.83	1.95	2.78	1.39	
WEU	1.32	1.47	0.67	1.30	1.57	-0.31	1.33	1.74	0.88	
ROW	2.46	2.54	1.65	2.48	4.51	-0.51	2.48	2.79	1.25	

