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Pimentel-Prenio, Ann; Ravago, Majah-Leah V. and Medalla,
Erlinda

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**The AFTA-CEPT and the ASEAN-China Early Harvest Program:
An Assessment of Potential Short-run Impact¹**

Ann Pimentel-Prenio, Majah-Leah Ravago and Erlinda M. Medalla

Abstract

Theoretical and empirical support for a more liberal trading environment has grown increasingly over the years. In the last decade, many countries have aggressively pursued unilateral trade liberalization. Based on decadal growth rates, globalizing developing countries has outpaced growth of non-globalizing developing economies in the 1980's and 1990's. Aside from participation in regular WTO Ministerial to discuss multilateral trade issues, many countries have also entered into bilateral and regional trade agreements (RTA's). Since 1995, the WTO has received 130 notifications regarding the creation of RTA's which is slightly higher than the notifications received by GATT over its almost fifty years of existence.

In this paper, we aim to sift thru the effects of trade policy on agriculture, focusing in particular on the possible short-run impact of the Common External Preferential Tariffs under the ASEAN Free Trade Agreement (AFTA-CEPT) and the ASEAN-China Early Harvest Program (EHP). While few would argue about the long-run benefits from a liberal trade regime, fewer still would deny the possible short-run adjustment costs that could accompany trade reforms. As such, it would help policy makers to be cognizant of the possible ramifications of pursuing a particular trade strategy. We provide an overview of the Philippine trade policy leading to the AFTA-CEPT and the EHP and isolate their impact. The immediate impact of trade policy is on the effective rate of protection it provides to various sectors. How uniform it is or how diverse reflects the relative protection, how much one sector is favored over another. Ultimately, the resulting trade protection structure would impact on output, income and employment. We measure how the EHP and AFTA impact on these variables. We employ a simulation model following an earlier study under the Joint Tariff Commission-PIDS (TC-PIDS) Study. The simulation analysis is done for three scenarios: (1) the Early Harvest Program, (2) the AFTA-CEPT, and (3) a hypothetical Base scenario reverting tariffs to 1994 levels which allows for comparative analysis that can be useful for policy formulation.

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The AFTA-CEPT and the ASEAN-China Early Harvest Program: An Assessment of Potential Short-run Impacts^{*}

Ann Pimentel-Prenio,[†] Majah-Leah Ravago,[‡] and Erlinda M. Medalla[§]

I. Introduction

Theoretical and empirical support for a more liberal trading environment has grown increasingly over the years. In the last decade, many countries have aggressively pursued unilateral trade liberalization. Based on decadal growth rates, globalizing developing countries has outpaced growth of non-globalizing developing economies in the 1980's and 1990's (Dollar and Kraay, 2001). Aside from participation in regular WTO Ministerials to discuss multilateral trade issues, many countries have also entered into bilateral and regional trade agreements (RTA's). Since 1995, the WTO has received 130 notifications regarding the creation of RTA's which is slightly higher than the notifications received by GATT over its almost fifty years of existence.

Although a liberal trade regime can benefit an economy in the long-run by promoting efficient use of resources, changes in trade policy, like any other policy reform, will affect different sectors differently, creating opportunities for some and difficult challenges for others. Some sectors would have to undergo more costly restructuring than others. Across countries, the impact of trade reforms would vary as well, depending on many factors such as the existing technological structure, the resilience of markets and maturity of institutions, among others.

In addition, while the direct impact on the good's price and availability is clear, the ultimate and indirect impact of trade policy is often less apparent, as it cuts across various sectors and down the consumption line. The many intervening layers and factors make it difficult to trace and isolate the real impact of trade policy, so much so that it becomes convenient to lay the blame on trade liberalization when things go wrong. The case is no different for agriculture, where the debate becomes even more emotional (and political). Claims have been made that trade liberalization has threatened food security and the very livelihood of farmers.

This paper aims to sift thru the effects of trade policy on agriculture, focusing in particular on the possible short-run impact of the Common External Preferential Tariffs under the ASEAN Free Trade Agreement (AFTA-CEPT) and the ASEAN-China Early Harvest Program (EHP). While few would argue about the long-run benefits from a

^{*} The authors are grateful for the patient and able assistance of Ms. Melalyn Cruzado.

[†] Research Associate, Philippine Department of Agriculture

[‡] Project Development Specialist, SEARCA

[§] Senior Research Fellow, Philippine Institute for Development Studies. Email: emedalla@mail.pids.gov.ph

liberal trade regime, fewer still would deny the possible short-run adjustment costs that could accompany trade reforms. As such, it would help policy makers to be cognizant of the possible ramifications of pursuing a particular trade strategy. The following section will first provide an overview of the Philippine trade policy leading to the AFTA-CEPT and the EHP. Then, the paper attempts in Sections 3 and 4 to gauge and isolate their impact. The immediate impact of trade policy is on the effective rate of protection it provides to various sectors. How uniform it is or how diverse reflects the relative protection, how much one sector is favored over another. Ultimately, the resulting trade protection structure would impact on output, income and employment. This paper attempts to measure how the EHP and AFTA impact on these variables. This is done using a simulation model patterned after an earlier study under The Joint Tariff Commission-PIDS (TC-PIDS) Study. The model is discussed briefly in Section 3 and presented more fully in Annex A. The simulation analysis is done for three scenarios: (1) the Early Harvest Program, (2) the AFTA-CEPT, and (3) a hypothetical Base scenario reverting tariffs to 1994 levels. This allows for some comparative analysis which is done in Section 4. Finally, section 5 presents the highlights and summary of findings and conclusions.

II. Brief Overview of the Philippine Trade Reforms

Like many developing countries, protectionist policies were once an integral part of the development strategy pursued by the Philippines. However, the emergence of theoretical and empirical arguments that discredits the wisdom of protectionism led to the abandonment of this strategy by many countries. Locally, the emergence of a more liberal trading environment only started in the past two decades. Nevertheless, protectionist tendencies continue to persist and the path towards freer trade was plagued with several policy reversals.

The first major tariff reform, also referred to as TRP-1, was undertaken in the 1980s within the context of a broader industrial restructuring program. TRP-1 entails the reduction of maximum tariff rates from 100 to 50 percent, and the increase of minimum tariff rates from 0 to 10 percent. The average tariff rate was reduced from 42 to 35 percent and, the average EPR and variance also declined. Based on estimates by Manasan and Pineda (1999), this reduced the bias against primary agriculture and exportables.

The next round of tariff reform (TRP-2) was launched in 1991 with the issuance of EO 470. The goal is to cluster tariff rates in the 10-30 percent range over a 5-year implementation period. EO 8, issued the following year, provided for the tariffication of 153 commodities and the realignment of another 48 commodities. The corresponding tariff rates were actually 100% higher than pre-EO 8 levels but there was a built-in provision for its gradual reduction over the next five years. Around this time, quantitative restrictions (QRs) for 286 commodities were also lifted but unfortunately, this was reversed not soon after and QRs were restored for 257 items. Nevertheless, this round of tariff reforms resulted to a further reduction of average tariffs from 28 percent in 1985 to 16 percent in 1995.

TRP-3 was implemented even before the conclusion of TRP2 in 1994. It involves the reduction of tariff rates of products in specific sectors such as capital equipment and machinery, chemical inputs and cement as directed by several EO's. The issued EO's were meant to collapse tariff rates to a four-tier schedule: 3 percent for raw materials and capital equipment that are not available locally; 10 percent for raw materials and capital equipment; 20 percent for intermediate goods and 30 percent for final goods.

In 1996, commitments made by the Philippines under the newly formed WTO were provided legal teeth through the issuance of RA 8187 and EO 313. It lifted import restrictions on sensitive agricultural products except rice, and specified in-quota and out-quota rates. Some out-quota rates were as high as 100 percent but it was subject to a built-in phased reduction in accordance with WTO commitments.

Since then, the country has been part of negotiations to expand or to establish various regional trade blocs, as well as being an active participant in the WTO. The Philippines is currently a member of the Asia-Pacific Economic Cooperation (APEC) and the ASEAN Free Trade Area (AFTA).

The ASEAN Free Trade Area (AFTA) was established at the Fourth ASEAN Summit in January 1992. The Common Effective Preferential Tariff (CEPT) Scheme is the main instrument for making ASEAN a free trade area in ten (10) years. This means that ASEAN Member States shall have a common effective tariff structure among themselves but the level of tariffs vis-à-vis non-ASEAN countries shall continue to be determined individually. The CEPT aims to reduce tariffs on all manufactured goods to 0-5% by the year 2003. All manufactured products, including capital goods and processed agricultural products, and those falling outside the definition of "unprocessed agricultural products" would be covered by the CEPT Scheme. This cooperative arrangement to reduce intra-regional tariffs and remove non-tariff barriers within ASEAN started in January 1, 1993.

Products may be excluded from the CEPT under three (3) situations. First, through General Exceptions that excludes a product in order to protect national security, public morals, human, animal or plant life and health, and articles of artistic, historic or archaeological value. Second, through Temporary Exclusions that excludes certain sensitive products in the CEPT Scheme on a temporary basis. Products on this list cannot enjoy the CEPT tariff from other ASEAN Member States. Lastly, Unprocessed Agricultural Products can also be exempted from the CEPT.

At the 17th Meeting of the AFTA Council in September 2003, Ministers were pleased to note that 99.6% of the ASEAN 6 inclusion lists were already within the 0-5% range and only 0.50% of products traded within the region remain outside the CEPT scheme. The Philippines, however, was unable to meet its commitment to eliminate tariffs on 60% of products in the inclusive list.

In line with the goals of the CEPT Scheme, EO's 163 and 165 were issued in January 2003 to further reduce tariff rates. The former accorded duty free entry of information and communications technology products while the latter, identified the products, including sensitive agricultural products that would be part of the CEPT inclusion list and its corresponding tariff rate. The list of sensitive agriculture products (Table 1) details the planned rate reduction from current levels to a uniform rate of 5% by 2010. The rates that were indicated by these two EOs for next year were the ones used for the simulation model. At the moment, there is still no significant difference from applied rates. Substantial declines in tariffs rates for the CEPT program will still be implemented, one tranche in 2006 and another in 2009.

The Early Harvest Program (EHP) is a component of the Framework Agreement formed in 2003 to establish economic cooperation between the Association of South East Asian Nations (ASEAN) and the People's Republic of China (PRC). It is meant to accelerate the implementation of the ASEAN-China Free Trade Area (FTA) for products under HS chapters one to eight, unless otherwise excluded by one party. The EHP entails lowering tariff rates to three tiers (zero, five and ten percent) by 1 January 2004, and eventually to zero tariffs by 1 January 2006. The final form of the EHP is negotiated bilaterally between China and each member of the ASEAN.

At the time the simulation exercise was done, the Philippines had yet to finalize its EHP with China so the simulation simply assumes that no exclusions will be made. This would tend to overestimate the impact on the negatively affected agricultural sectors. EO 485 has since been passed, dated December 29, 2005, which provides for the implementation of the Philippine commitment under the EHP. In compliance with the Memorandum of Understanding (MOU) between the Philippines and China, tariff duties on 214 tariff lines are scheduled to be reduced to zero. (Table 2)

III. Simulation Results: Short-Run Impact of ASEAN-AFTA, the ASEAN-China Early Harvest Program and the 1994 Base Scenario

The study makes use of a model patterned after the one used by the TC-PIDS study (Tan 1994). The exercise provides a quick estimate of the probable short-run impact of trade policy reform specifically, on the following:

- *Effective Protection Rates (EPRs)*. The immediate impact of trade reforms is to change the effective protection structure. A tariff on an industry's output provides nominal protection to the local production while a tariff on a product used as inputs penalizes whichever industry uses it. It is clear that what matters to industry more is the net effective protection rate (EPR) resulting from tariffs affecting both its output and inputs. This is elaborated on in Annex A. The resulting EPR structure already in itself provides insights on the biases of the trade policy regime, what sector is more favored, what is unprotected. The study

estimates EPRs before and after trade reforms which are then used to simulate the following.

- *Impact on output, income, employment, demand, and the trade balance.* Being a short-run model implies that the post-tariff reform production decision of the various sectors is based simply on changes in absolute prices and EPRs, (according to the price and income elasticities). It does not capture the impact on the real allocation of resources based on relative prices that occurs over the long run. So at the outset, higher tariffs will increase the price of a sector's output and EPR which necessarily leads to an increase production. The reverse can be expected from lower tariffs. The change in production serves as the basis for estimating changes in employment, income, demand and trade balance.

The model is partial equilibrium in nature in that it assumes zero cross-price elasticities and could not incorporate other factors such as investment behavior and monetary variables. These shortcomings limit the analysis to comparative statics. The advantage of the model, however, is its multi-sectoral, input-output framework, highlighting best the variation in EPRs and the varying effects of trade reforms across sectors and incorporating, to some extent, linkages among them. As such, it a good tool for analyzing intersectoral relationships at the macro-level and would be useful in policy and planning-related activities.

Basically, the model works as follows. Changes in nominal tariffs (or tariff equivalents in the case of QR removal) effected by trade reforms result in changes in EPRs across the various sectors of the economy. These changes in EPRs induce changes in sectoral supply/output (as dictated by the elasticity of supply). The resulting changes in sectoral output result in change in income which, in turn, leads to changes in the final demand (the magnitude depending on income demand elasticities). At the same time, the changes in nominal tariffs also affect the output prices which induce, in addition, changes in demand, according to its price demand elasticities. Hence, the initial changes in nominal tariffs ultimately affect both supply and demand for each sector. Under the fixed exchange rate assumption, the changes in supply and demand are translated into changes in the trade balance, i. e. exports and imports. Being a short-run simulation exercise, this would be the assumption used here, that there would be no change in the exchange rate. This is clearly an extreme assumption which would tend to overestimate the negative impacts on outputs as a result of lowering trade protection.²

The basic model was extended in two ways to provide an insight on the impact of productivity improvements. The first is by incorporating factor productivity growth in the model. This however, was limited only to agriculture since the influence of the Department of Agriculture in technology improvement is limited only to this sector. The simulation starts with the downward adjustment of input requirements of every sector in agriculture by a factor of 2% and 4%. This means that if sector-J usually requires P0.5 of

² Under the flexible exchange rate assumption, the exchange rate acts as the mechanism which is used to achieve trade balance.

raw materials to produce every Peso of output, it will require only P0.49 with two percent (2%) productivity improvement and P0.48 if factor productivity improves by four percent (4%). The gains from this are assumed to accrue to capital, although it could very well be shared with labor through an increase in wages.

The second way is by relaxing the basic assumption that only tariffs affect factor prices in the short-run. In this scenario, producer gains from improvements in agriculture productivity are partly shared with intermediate and final consumers as reflected in the decrease in the prices of agriculture goods. For purposes of the simulations, TFP gains are assumed to be equally divided between returns to capital and price reduction.

The model is discussed in full in Annex A.

Using the model, this study evaluates the effect of implementing tariff reforms in relation to the following: (i) the ASEAN Free-trade Area Common Effective Preferential Tariff (AFTA-CEPT) (ii), the Early Harvest Program (EHP), and (iii) a Base Scenario reverting tariffs to 1994 levels. The first two tariff regime scenarios are geared towards liberalizing trade policy in order to expand intra-regional trade. EHP entails lowering tariff rates of agriculture goods based on rules negotiated and established between each ASEAN member and China. CEPT entails lowering import-duties of manufacturing goods and is part of a continuing effort within the ASEAN to expand trade among members. On the other hand, the Base tariff regime scenario involves the institution of measures to protect the local agriculture sector through higher tariff barriers. Unlike the other two that are actually related to existing agreements, the Base scenario is a hypothetical situation where import duties for agricultural goods are reverted to its 1994 rates as suggested by some groups.

The estimated figures for each scenario is expected to help provide an initial assessment of the effect of tariff reforms that will allow policymakers to identify the sectors that will benefit and lose from the tariff rate changes in terms of the impact on output, employment, income and the trade balance. By providing some contrast, the third scenario would give a better picture of the impact of the two trade strategies.

A. The Early Harvest Program

Refer to Tables 3, 4 and 5 for simulation results of the EHP.

1. Basic Simulation

Effective Protection Rates. Of the eleven sectors in Agriculture and Food Manufacturing receiving double-digit EPR's in 2003, only three ended up with lower levels of protection upon implementation of the EHP. These are Vegetables (MM003), Hog (PM019) and Meat & Meat Products Processing (MM 039) and the fall in their EPRs is quite significant. The rest either retained its 2003 EPR or was slightly improved. For other sectors that have more modest levels of protection, only Citrus Fruits (MM008) and Fruits and Nuts (MM009) suffered a reduction in their EPR. Noticeably, many exporting sectors (those with codes starting with MX or PX) had slightly higher protection rates with the implementation of the EHP.

Output, Employment and Income. Simulations for the Early Harvest Program show that it is expected to have only a minimal impact on major macro-variables despite the assumption that no product under the first eight HS chapters will be excluded. Overall output will decrease by 0.18% and the bulk of this is accounted for by Food Manufacturing and then partly by Agriculture. The rest of the industries are not expected to alter their production as a result of the EHP. Even if only a few sectors had a significant decline in their EPRs, these are the ones that have a significant contribution to total domestic production. Based on output ranking of traded sectors, all three are within the top 50 contributors. The Hog sector, in fact, is ranked eighth largest producer and has a 2.8% share in total output.

The Wage-Bill, likewise, is not likely to be significantly affected by the tariff rate changes and closely follows changes in output. It should be noted though that for Agriculture, the percentage decline in the wage-bill is greater than that of output, whereas the fall in Food Manufacturing's wage bill is proportionally less than its output contraction. This may indicate that the sectors adversely affected by the EHP, in this case sectors in Agriculture, is relatively labor intensive so a fall in production leads to larger than proportional fall in its wage-bill.

Gross-value added or income, however, will fall by a fractionally larger amount (0.66%) since lower production is accompanied by a decline in domestic prices (as a result of lower tariff rates). Agriculture will take on a larger cut as its GVA declines by almost 2% compared to food manufacturing's 0.78%.

Demand. No radical change is expected in intermediate demand except for a relatively larger fall in Food Manufacturing because it has a relatively high level of intra-industry linkage. Many industries within Food Manufacturing is adversely affected by the EHP and its output is expected to decline, which in turn, lowers their demand for intermediate inputs. On the other hand, more changes are expected to occur in final

demand. It picks up slightly for Agriculture and Food Manufacturing because the lower import-duty also lowers domestic prices. The rest suffers a decline in demand even if its prices remain unchanged because of an overall decline in income or GVA.

Trade. The overall trade balance is expected to have a positive net change as a result of the EHP. Imports for agriculture goods is expected to increase sharply (31%) and exports to decline marginally (-0.07%) due to an increase in domestic consumption, largely in final demand, coupled with a decline in production. Food Manufacturing will have a positive change in both imports (5.84%) and exports (1.22%) although the net increment in the trade balance is negative. Since input cost is lower for Food Manufacturing, exporting firms have a greater incentive to sell their produce in the world market. However, producers catering to the domestic market will be unable to meet domestic demand since their output is expected to decline when tariff protection goes down. For the other sectors, the decline in domestic demand will lead to an overall net decline in imports (0.56%) and a slight increase in exports (0.3%).

Select Sectors in Agriculture and Food Manufacturing. Among agriculture goods, the Hog sector is the most adversely affected. Its output and GVA are expected to contract by 3.5% and 10% respectively since its tariff rate was reduced from 26.2% to 15% under the EHP. Similarly, the import competing component of the Meat and Meat Products Processing sector also suffers a considerable decline in their effective protection rate, which leads to a decline in its output and income. Its export competing component, on the other hand, actually has a slight increase in its output and income since its raw materials (hog, in particular) becomes cheaper.

2. With Total Factor Productivity Improvement in Agriculture

Effective Protection Rates. Improving the efficiency of factor use in Agriculture is going to improve EPRs of sectors within the industry. EPRs of other sectors outside Agriculture remains unaffected since none of the variables used for EPR computations (cost of inputs and output price) are affected by improving TFP in Agriculture. Compared to basic simulation figures, EPRs improves the most for exporting sectors.

Output, Employment and Income. Factor productivity improvement in Agriculture can be expected to soften the impact of the EHP on output and income, but is unfortunately limited only within the industry. Results show that output decline for Agriculture is reduced from -0.8% in the basic simulation to -0.72 and -0.64% for the 2% and 4% TFP scenarios respectively. Output of the rest remains unchanged from the basic simulation. Like output, the fall in the wage-bill (hence, employment) is softened by the introduction of TFP but only for the agriculture industry. Income is influenced more by factor productivity improvement but like output, it is limited only to Agriculture. A 2% TFP improvement reduces income by more than half, from 1.99% in the basic simulation to only 0.77%. This loss is reduced further to a 0.46% under the 4% TFP scenario.

Demand. Not surprisingly, intermediate demand is estimated to decline further because improving factor productivity in the agriculture industry lowers its input requirements and a large chunk of this also comes from within the sector. This is partly offset by a general improvement in final demand, boosted largely by the improvement in overall income.

Trade. The increase in agriculture production and the general decline in intermediate demand are expected to lower imports and provide an opportunity to increase exports. Overall trade balance is expected to improve by incorporating factor productivity.

Select Sectors in Agriculture and Food Manufacturing. The impact of incorporating TFP assumption is most evident on incomes of sectors in agriculture. Rice and Corn Milling in particular will move from zero per cent in the basic simulation to 2.16% and 4.33% under the 2% and 4% TFP assumptions. Moreover, income losses suffered by the Hog (PM) and Vegetable(MM) sectors are expected to be minimized by an average of twenty per cent. There is some movement in import activity but changes in exports are much more significant. The increase in coffee exports in the basic scenario more than doubles with a 2% TFP, and increasing by another 50% when the TFP assumption is raised to 4%.

3. With Total Factor Productivity Improvement in Agriculture and Decline in Prices

Effective Protection Rates. When prices of agricultural products are adjusted, EPRs are improved for non-agri production sectors because of the lower manufacturing cost. Sectors that gain the most from this are those that have high agriculture input requirements. Most sectors in Food Manufacturing gained from the price adjustment but only Manufacture of animal Feeds (MM059), Production of Crude Coconut Oil, etc. (PX047) and Manufacture of Desiccated Coconut (PX056) had two-digit percentage increase in EPR. Because of the price decline, EPRs of sectors in the agriculture industry also fall because of lower income margins compared to the TFP only case. Vegetables (MX003), Citrus Fruits (MX008), Fruits and Nuts (MX009), Abaca (MX013), Coconut (PX010) and Coffee (PX015) have at least 75% drop in its EPR relative to the TFP only scenario.

Output, Employment and Income. Relaxing the assumption that output prices are influenced only by tariff changes yields very interesting simulation results. By splitting the gains from increasing factor productivity with consumers through lower prices, output and incomes of other industries will also improve. Food Manufacturing is the major beneficiary of lower agricultural product prices especially with its income. Overall output, employment and income for the 2% TFP scenario is marginally lower compared to the TFP only simulation but is quite acceptable in exchange for a more equitable distribution of gains now that the benefit is more dispersed across all industries. However, this trade-off disappears with the higher 4% TFP assumption.

Demand. Lowering prices of agriculture product slightly softens the impact of higher factor productivity on domestic demand. It affects mainly final demand, which is stimulated by the higher overall income and the lower prices of goods. Intermediate demand is not significantly different from the TFP only simulation since the movement in overall output is quite minimal.

Trade. Agriculture imports is raised slightly by the higher domestic demand compared to the TFP only scenario. On the other hand, imports of other industries as a whole drops since domestic production does not fall as much with a reduction in agricultural prices. Agriculture export is significantly lower than the TFP only scenario since output is diverted to meet domestic requirements. On the other hand, there is a marginal improvement in the exports of other industries as a result of an expected increase in production.

Select Sectors in Agriculture and Food Manufacturing. There are output and income improvements for the selected sectors when prices are adjusted with TFP improvement. It is most significant for the income of Coffee Roasting and Processing, in both the import-competing and exportable component. Under a 2% TFP assumption, income posted roughly 40% increase over the TFP only scenario, which rises by another 30% with a TFP of 4%. Imports and exports among the select sectors do not significantly differ from the TFP only scenario.

B. AFTA-CEPT

Refer to Table 6, 7 and 8 for simulation results of the AFTA-CEPT.

1. Basic Simulation

Effective Protection Rates. Food Manufacturing sectors are the most adversely affected with the implementation of the AFTA-CEPT scheme. Canning and Preserving of Fruits and Vegetables (MM044), Manufacture of Bakery Products (MM052), Noodles (MM053), Cocoa and Chocolates (MM055), Animal Feeds (MM059) and Starch and starch products (MM060), in particular have the most significant fall in their EPRs (at least 50%) largely as a result of the tariff cuts under the CEPT scheme. EPRs in Agriculture are generally unaffected by the CEPT.

Output, Employment and Income. The AFTA-CEPT Scheme is expected to affect the output of the food manufacturing industry the most which registers a decline of a little over one percent. Agricultural output will remain largely unaffected while it declines by a tenth of a percent for other industries. As a result, the overall impact on output will be minimal (-0.22%). The impact on employment is closely follows the movement in output except Food Manufacturing which is fractionally higher which indicates that the affected sectors are relatively labor-intensive. The impact on income is slightly more pronounced, with Food Manufacturing income declining the most at 3.36%. The decline of income for all industries will, however, be limited to half a percent.

Demand. There is no large disruption expected in domestic demand. Intermediate demand contracts by only 0.19% for all industries with Food Manufacturing suffering the largest drop at 1.26%. In the same manner, final demand as a whole will decline by 0.19% despite the one percent increase in Food Manufacturing as a result of lower domestic prices.

Trade. Due to the decline in domestic demand and slightly higher output, imports of agriculture goods is likely to drop by three and a half percent, while its exports go up by 0.72%. Both imports and exports of the food manufacturing industry are also expected to increase. Imports surges by almost 13% which is significantly greater than the 1% expected increase in exports. The total incremental change in the net trade balance is slightly negative.

Select Sectors in Agriculture and Food Manufacturing. Output of the select sectors is mostly unaffected by the CEPT scheme, except the Meat and Meat Processing-MM sector which is expected to decrease production by a little over three per cent. Income of sectors in agriculture are again, generally unaffected. Unfortunately, incomes of some sectors in Food Manufacturing are bound to be hard-hit by the implementation of the CEPT scheme. In particular, the incomes of import-competing components of Meat

and Meat Product Processing, and Sugar Milling are expected to decline by 21% and 13% respectively.

2. With Total Factor Productivity Improvement in Agriculture

Effective Protection Rates. The sectors that gained most from improving Agriculture TFP, not surprisingly, are sectors in Agriculture. The major beneficiaries are Citrus Fruits (MX008), Fruits and Nuts (MX009), Abaca (MX013) and Other Agricultural Production (MX018) which gained at least 40% improvement in its EPR compared to the basic simulation. EPRs of the non-agriculture sectors, like in the EHP case, do not change since none of the relevant variables in determining it changed.

Output, Employment and Income. Improving agricultural productivity provides a significant boost in improving the industry's output and incomes. Under a 2% TFP assumption, agriculture output (and likewise, employment) is nine times and income forty times higher than the basic scenario. This figure is doubled with a TFP of 4%. Unfortunately and similar to the EHP results, other industries remains unchanged relative to the basic run since the gains from improved efficiency in production is reflected as an increase to the returns or reward of agriculture factors.

Demand. Intermediate demand for all industries declines more when factor productivity is incorporated since producing a unit of agriculture product now requires fewer inputs. The drop in total intermediate demand is now be more than twice under the 2% TFP case and thrice under a 4% TFP than the basic run. Final demand, on the other hand, generally improves with TFP. From a negative change in the basic run, final demand posts a 0.12% increment with 2% TFP and 0.44% with 4% TFP. The leap in final demand is driven chiefly by the improvement in income.

Trade. Incorporating TFP assumption softens the impact of implementing the CEPT on export and import activity. The improvement in production and the lower intermediate demand in for all industries decreases import demand and increase export activity under the 2% TFP assumption. Raising TFP to 4%, however, leads to a reversal of the change in the trade balance. Although imports fell and exports improved for the Agriculture and Food Manufacturing sectors, the opposite was happening to the rest. The jump in final demand for other industries under the 4% TFP assumption cannot be satisfied by domestic production alone leading to reversal of the decline in imports posted in the basic run, as well as a decline in its exports.

Select Sectors in Agriculture and Food Manufacturing. Agriculture output improves slightly with the incorporation of the TFP assumption. The impact on incomes however, is much more impressive. Rice and Corn Milling, and Hog sectors are the biggest gainers when TFP is improved. It barely gained from the basic CEPT simulation but including a 2% TFP improves the incomes of the two sectors by around two per cent. Trade activity of the select agriculture sectors is also significantly affected by improving TFP. Imports decline, except for Rice and Corn Milling because the rise in its domestic

demand due to the improvement in overall income is greater than the improvement in output. Exports also increase and Corn in particular, is fifteen-fold greater than the base scenario under the TFP 2% assumption. This figure is doubled when TFP is raised to 4%.

3. With Total Factor Productivity Improvement in Agriculture and Decline in Prices

Effective Protection Rates. The same sectors that has a significant improvement in its EPR when TFP is improved are also the same ones that declined the most when prices are adjusted since its profits also fall compared to the TFP only case. Most Food Manufacturing sectors nevertheless benefits but only Production of Crude Coconut Oil (PX047) and Manufacture of Desiccated Coconut (PX056) has a double-digit percentage increase in their EPR.

Output, Employment and Income. A price reduction in agriculture goods does not really help distribute the gains from factor productivity with the rest of the economy. Output for Agriculture is not be as high under the purely TFP scenario and remains mostly unchanged for other industries. One possible reason is that agriculture is not a significant input requirement to industries affected by the CEPT so the reduction in its prices barely makes an impact. Another possible factor is the rather small difference between the 2003 tariff rates and CEPT rates (Annex Table 2³). The same kind of results is also exhibited by industry incomes. Nonetheless, Food Manufacturing can be considered as the major beneficiary of lower agriculture goods prices since the loss it incurred by with the implementation of the CEPT scheme is now fractionally lower.

Demand. Overall intermediate demand does not differ from the results of the TFP only simulations. Unlike the EHP, the AFTA-CEPT scheme is geared more towards reducing tariffs in manufacturing goods. This appears to have reduced the efficacy of price reductions in agricultural goods in softening the impact of the tariff adjustments in intermediate demand. Final demand, nevertheless, is relatively more responsive. For Agriculture, the change in final demand jumps from insignificant in the TFP only scenario to around half a per cent for both TFP assumptions. Final demand for Food Manufacturing and other industries is just a bit lower than the TFP only scenario.

Trade. Following the pattern on the impact of price adjustments on macro-variables above, only the agriculture industry shows some changes in its trade activity. For the 2% TFP case, agriculture imports is expected to jump from a negative net change in imports (-7.64%) to a positive net change (2.37%) because domestic supply cannot match the jump in final demand. Increasing TFP to 4% however, will actually lead to a decline in imports because the impact of lower intermediate demand prevails over an increase in final demand. Imports of Food Manufacturing and other industries will be slightly lower than the TFP only scenario. These are driven largely by changes in its final demand since their intermediate demands are relatively unchanged. Exports for Agriculture will lie somewhere in between the TFP only and without TFP simulation results but unaffected as a whole for other industries. Food Manufacturing meanwhile,

³ Annex tables available upon request.

will have a slight improvement in its export activity since Final Demand has suffered a mild fall.

Select Sectors in Agriculture and Food Manufacturing. Moving prices only has a marginal impact on output and GVA of the sectors considered in this section. It does, nevertheless, have a significant impact on sector trading. As result of lower prices of agriculture goods, domestic demand rise resulting to generally higher level of imports, especially for Meat and Meat Products processing which is doubled compared to the TFP only figures. Exports were slightly lower as output is diverted to satisfy local demand.

C. 1994 Base Scenario

Unlike the other two scenarios, simulations for this section are not actually based on an existing agreement or commitment by the government. Following the collapse of the 5th WTO Ministerial in Cancun, Mexico last September 2003, pressure to raise tariff rates has been mounting. One of the proposals forwarded was to revert back to 1994 tariff rates. It would be interesting to see the impact of such a policy. The simulation for this section assumes that tariff rates for agricultural products are reverted to 1994 rates, except if 2003 rates are higher. Tariff rates for other industries are assumed to maintain its rates as of July 2003. The tariff hike is limited to the agriculture industry for the following reason: (i) to isolate the impact of this industry to the rest of the economy; (ii) it falls within the purview of the Department of Agriculture; and (iii) the impression that the pressure to raise tariffs comes mostly from this industry.

Refer to Tables 9, 10 and 11 for simulation results of the 1994 Base Scenario.

1. Basic Simulation

Effective Protection Rates. Reverting tariff duties to its 1994 level has the most radical impact on EPRs compared to the other two tariff regimes examined. In general, agriculture sectors experiences an improvement in its EPR, while this falls for food manufacturing sectors. Corn (MM002), for instance has a 30.29 EPR in 2003 and this leaps to 130.26 for the basic 1994 scenario. Other notable jumps in EPR are in the Vegetable (MM003), Citrus Fruits (MM008), Fruits and Nuts (MM009), Other Agriculture Production (MM018) and Cacao (PM016) sectors. The following sectors in Food Manufacturing have 1994 Base EPRs that are at least two-thirds of its 2003 value: Canning and Preserving of Fruits and Vegetables (MM and MX 044), Flour and Cassava Milling (MM and MX051), Other Crude Vegetable Oils (MM and MX048) and Manufacture of Starch and Starch Products (MM and MX060).

Output, Employment and Income. Reverting tariffs of agricultural goods to its 1994 rates is expected to lead to a 1.5% increase in Agriculture output while employment is expected to rise by a greater degree (2.63%). This gain comes at the expense of a contraction in Food Manufacturing output (3%) and employment (2.5%), which is going to be hard hit by the higher prices of its raw materials. As a result, output contracts in

general, albeit only minimally at 0.15%. Raising tariffs on agriculture goods is expected to have a more pronounced impact on Food Manufacturing income, which shrinks by a little over 10%. This is partly offset by a 1.22% increase in Agriculture, although overall income still declines by -0.15%.

Demand. Intermediate demand is expected to decline for all industries, especially Agriculture by two and half percent. Even if Agriculture output increased, its impact on intermediate is dominated by the decline in Food Manufacturing although the general effect is quite mild at -0.32%. Final demand likewise, drops for all industries as a result of falling incomes and, in the case of Agriculture, increasing prices. The aggregate decline however, is minor at almost one percent.

Trade. Not surprisingly, imports for agricultural goods are expected to decline and fall quite abruptly at 82%. Food manufacturing, as a result of the decline in its production, increases imports by around 16%. Agriculture exports increases given the higher domestic output while Food Manufacturing exports falls due to its lower production. The trade balance, taken as a whole, posts a positive net change largely driven by the positive net trade balance in Agriculture.

Select Sectors in Agriculture and Food Manufacturing. Among the select sectors examined, the import-competing component of the corn sector is expected to be the biggest beneficiary of reverting agriculture tariff rates to 1994 levels. Its production is expected to rise by as much as twenty-three per cent and income by thirty-eight per cent. Unfortunately, sectors like Rice and Corn Milling, and Meat and Meat Products Processing is going to be hard-hit by the tariff changes. Sectors given more protection experiences a sharp drop in imports since its output increase is faced by a fall in domestic demand. For sectors that are adversely affected by the increase in tariff rates, imports are going to increase as a result of the fall in production. The impact on exports among the select sectors is very minimal, except for coconut which rises by almost eight per cent since its output is not affected but domestic demand is expected to fall due to the decline in overall income.

2. With Total Factor Productivity Improvement in Agriculture

Effective Protection Rates. Like the other two tariff regime that were simulated, only sectors in Agriculture showed an improvement in its EPR when the TFP assumption was incorporated. The following sectors, in particular, has at least 50% increase in its EPR compared to the basic case: Citrus Fruits (MX008), Abaca (MX013), Other Agricultural Production (MX018), Coconut (PX010) and Coffee (PX015).

Output, Employment and Income. There is a slight improvement in Agriculture output and employment when TFP is incorporated. Compared to the basic simulation, output is six per cent higher under the 2% TFP assumption and 13% under a 4% TFP. Not surprisingly, GVA will grow more due to the combined effect of higher output and

bigger profit margins. Income increase for the basic simulation result is doubled under the 2% and tripled under the 4% TFP scenarios.

Demand. There is a slight deterioration in intermediate demand as a result of the lower resource requirement in agriculture production. Overall intermediate demand is expected to decline from -0.32% in the basic run to -0.58% and -0.71% for the TFP 2% and 4% scenarios respectively. On the other hand, final demand shows a more significant improvement. Food Manufacturing in particular, makes a turnaround from a negative figure to a slightly positive net change. The fall in the final demand for all industries in the base scenario is softened by the income improvement with the inclusion of TFP.

Trade. Imports fall further for Agriculture and Food Manufacturing under the two TFP assumptions. The fall in the imports of other industries on the other hand, is slightly reduced due to the improvement in final demand brought on by the slight improvement in aggregate income. Agriculture and Food Manufacturing exports increases but exports of other industries declines to meet domestic requirements. The trade balance improves marginally under a 2% TFP assumption. This is reversed under the 4% TFP scenario, which is a little lower than the base scenario, because the gains from Agriculture and Food Manufacturing is outweighed by the change in the export and imports of the rest of the industries.

Select Sectors in Agriculture and Food Manufacturing. Most of the select sectors' output is unaltered by the introduction of TFP. There is some improvement in income compared to the basic simulation, most notably a marked decline in the loss suffered by the Rice and Corn Milling sector from -10.02% to -7.69%. There are some changes in imports and exports compared to basic simulation results, mostly immaterial except for a considerable fall in Hog imports and increase in Corn exports. Hog imports fall because both intermediate and final demand. On the other hand, Corn exports are driven mainly by the large surge in its production.

3. With Total Factor Productivity Improvement in Agriculture and Decline in Prices

Effective Protection Rates. As expected, the same sectors that gained the most from improving agriculture productivity are also the same ones that decline the most when prices are adjusted. Most sectors in Food Manufacturing gain from the price adjustment but it is generally smaller compared to simulation results for the other two tariff regime scenarios. The biggest gainers on the other hand, are Production of Crude Coconut Oil (PX047) and Manufacture of Desiccated Coconut Oil (PX056).

Output, Employment and Income. The impact of allocating a portion of the gains from TFP improvement to lower agriculture output prices on output, employment and incomes is much more modest compared to simulation results of other two tariff regimes. It appears that the decline in prices attributed to TFP improvement is not enough to offset the impact of significantly higher tariffs on domestic agriculture prices. Output improves marginally in comparison to the TFP only case. In terms of income, Food Manufacturing

is the only gainer but only marginally so. Its short-term losses from the implementation of higher agriculture tariffs are expected to be reduced by an average of one per cent.

Demand. Intermediate and final demand for all three industry clusters barely changed under both TFP scenarios. The impact is relatively more conspicuous in Agriculture but the degree is quite negligible.

Trade. Given that output and domestic demand were barely affected by the inclusion of TFP with price adjustment assumptions, it comes as no surprise that there is very minimal on the trade balance.

Select Sectors in Agriculture and Food Manufacturing. Unlike the other two tariff reform scenarios, loosening the restriction on output prices will not have a significant impact on simulation results. Output, income, imports and exports do not differ materially to the TFP only scenario.

IV. Comparative Analysis of Simulation Results

Impact of tariff changes is evaluated by comparing tariff rates prevailing in January 2003 (the base year) to various tariff reform scenarios. Based on simple averages (Table 12), the EH and CEPT cases are generally inclined towards slightly lower tariff rates. The 1994 Base scenario, on the other hand, is a mixed package that includes a rather steep increase in agriculture tariffs and somewhat lower tariffs for Food Manufacturing. A comparison of simulation results (Table 13) for the three yields the following insights:

The three tariff packages are likely to result to a short-term decline in production, employment and incomes.

Despite having different policy directions, the three tariff regime scenarios all lead to an overall decline in output and income. Among the three, the CEPT has the largest decline in the value of overall production and 1994 Base the smallest. In terms of income, the ranking is reversed with the 1994 Base scenario showing the highest fall and CEPT being the most modest.

EHP and CEPT entail a moderate overall reduction in tariffs since most of the sectors involved have tariff rates that are close to the prescribed rate. Consequently, the general impact on income and production is also moderate. The 1994 Base scenario, on the other hand, entails a trade-off between Agriculture and Food Manufacturing. Agriculture production, obviously the biggest winner, grows by a modest one and a half per cent since its input cost (it has a significant agricultural input requirement) also increases and dampens the effect of the tariff increase on its EPRs. Food Manufacturing in contrast, suffers a contraction of almost three per cent. Food Manufacturing also suffer a relatively significant fall in its incomes since agriculture goods are important inputs to

production and it does not have a corresponding increase in its domestic prices to cover its higher cost of production. At the aggregate level, the effect is quite small because the increase in Agriculture output and income is canceled out by the decline in Food Manufacturing.

An improvement in TFP can improve production and income for agriculture sectors. Combining this with a reduction in agriculture prices will benefit sectors that have heavy input requirements from this sector.

When TFP is improved by 2%, EHP showed the largest improvement in overall production. This may be due to the fact that it has the most moderate deviation from the base rates in 2003 for all sectors. When TFP is raised to 4%, the lead is overtaken by 1994 base scenario possibly because the larger TFP gains now prevail over the impact of the significant swelling in domestic agriculture prices.

TFP improvement, with and without a corresponding price adjustment, has a more significant effect on simulation results for income. Among the three tariff packages, CEPT is the most responsive where losses, compared to the basic run, are reduced by as much as 70% under a TFP of 2% and eventually posting a positive income increase when TFP is combined with a reduction in prices. This may be due to the absence of tariff rate changes under this scenario combined with moderate tariff reductions in other industries. As a result, the gain from factor productivity improvement is not diluted by the impact of tariffs.

For the agriculture industry, improving factor productivity consistently has the largest impact on the CEPT scenario. Increasing TFP by 2% leads to a 40-fold increase in its incremental income. This figure is doubled when TFP is raised to 4%. When part of the TFP are reflected as a reduction in prices of agriculture goods, the figures for the TFP only case is reduced by around fifteen percent (15%). Again, this may be due to the fact that it does not change agriculture tariffs and has relative moderate decline in Food Manufacturing.

In general, the effect of the three tariff reform proposals is minimal but this hides trade-offs at the sector, which can be quite significant and result to a significant displacement of workers in that sector.

Simulation results show that as a whole, the impact of the three tariff reform packages is all negative. Albeit, the scale of its effect is quite immaterial but averages can misleadingly conceal large variations in sectoral effects. The degree of impact on a particular sector depends largely on the extent its tariff and the tariffs of its major raw materials move. For example, among the select sectors, simulations for the EHP show that the Hog (PM) and Meat & Meat Processing (MM) Sectors will be the most adversely affected sector, and for CEPT, it is Meat & Meat Processing (MM) Sectors. For 1994 base scenario, however, the impact is significant and varied even for sectors that only have a mild change in its tariffs. In terms of output and income, the big winners are Corn

(MM) and Vegetables (MM) while Rice & Corn Milling (PM), and Meat & Meat Processing (MM) gets the short end of the stick.

V. Conclusion and Recommendation

The simulation exercise in this study gives a quick and preliminary estimate of the short-term impact of three different tariff reform packages. Nevertheless, it was able to provide some illuminating insight on the possible ramifications of modifying import-duties.

Even if tariffs are applied to only one sector, it also affects other sectors because of inter-industry linkage. As the IO table clearly illustrates, each sectors requires inputs from other sectors to produce its output. For example, the agriculture sector plays an important role in the performance of the food manufacturing sector because it is a major source of its raw materials. When tariffs for raw materials of a sector rise and there is no corresponding increase in its output price then this implies that firm profits will fall. Since supply or production is linked with the viability of the business then the fall of profits will prompt less efficient firms to cease or decrease production leading to an overall decline in sector production. This result is evident in the simulation exercise for all of the three tariff regime scenarios. Over time, the affected sectors will eventually adjust prices (especially if it's output does not receive tariff protection) and try to pass on the higher production cost to consumers. The extent that the cost can be passed on to end-users depends on the prevailing market conditions. The more inelastic demand is (i.e. staples like rice), the greater the burden passed on to consumers. Moreover, the change in prices will trigger a new round of changes in production and income.

Improving factor productivity can help mitigate any adverse impact of changes in the tariff regime. Estimates that incorporate the impact of improving factor productivity show that it can be an important mitigating factor for any adverse effect of tariff changes. It does this by improving the income of producing sectors since it entails the reduction of raw materials needed to produce one unit of output. Improving income or GVA has a positive incentive effect on production and serves as a counter measure in the presence of any downward impact resulting from lower tariffs on output or higher tariff on inputs. More importantly, it reduces the dependence of firms or sectors on tariff protection and sustained improvements in factor productivity can even lead to the reduction of prices which will benefit its end-users.

Changes in the income of tradable sectors will affect the activity of the services sector. Non-production relationships between sectors are not explicitly captured by the simulation model but it can be expected that Services, which usually have minimal production ties with producing sectors will also be affected because they are dependent on the income generated by these sectors. For instance, the decline of Firm X because of higher input cost or lower domestic prices will also affect other businesses in the services sector such as eateries, barber shops and groceries in the community. The severity of its

impact depends on how dependent their businesses are on the presence of Firm X. The more prevalent this type of situation is across the country, the greater the additional contraction in income that can be expected from the production contraction of sectors negatively affected by a change in the tariff structure.

Protectionist policies create distortions in other markets. Although the model does not explicitly capture this, it does indicate the distortions that are created by changes in the tariff regime. The change in the prices of domestic goods entails an adjustment in the consumption of consumers as cheaper goods are substituted for expensive ones. This will trigger another round of adjustments in the goods, labor and capital markets. Sectors that are given exceptionally high protection (as measured by the EPR) are mostly likely to have above-normal profits. It disadvantages other sectors that do not receive the same level of protection because these privileged sectors compete with scarce capital resources. It can distort the labor market by attracting workers and other resources away from more efficient and competitive sectors.

Changes in prices, production and income will have an impact on social welfare. Social welfare is usually defined as the sum of consumer and producer surplus. This is not estimated in the study due to data constraints but the simulation exercise nevertheless, provides a clue on the possible impact of tariff changes on social welfare. An increase in the general price level and income implies a decline in the consumption basket of the average consumer, hence a lower consumer surplus. Movements in the price of food, which comprise the bulk of a consumer's expenditure, would have a greater impact on welfare. It is harder to establish the general movement in producer surplus since in all three tariff reform packages examined since there are sectors that gain and those that lose from the change in the structure of import duty. It is clear though, that the deviation of protected sectors from world prices also burdens other producing sectors with higher production cost and consumers with lower purchasing power.

In all three scenarios, there are always sectors that benefit and those that lose from the changes in import duties. Given the results of the simulation, following are some of the policy interventions that can help mitigate the adverse impact of changing the tariff structure:

- ❖ *Improve factor productivity.* Supporting policies that will improve TFP is an important move that will help soften the blow that comes with opening the market to international competition. Simulations show that even if TFP growth is limited only in agriculture, any negative impact of implementing the EHP is significantly reduced and can even be reversed. In the long run, TFP will allow for the more efficient use of resources, greater production, higher profit-margins, lower prices and possibly even, higher wages. Sustained TFP growth will ensure the competitiveness of the country in the world market and the acceleration of economic growth, rural development and poverty reduction.
- ❖ *Identify vulnerable social groups and, provide transition assistance effectively and wisely.* As shown by simulation, some sectors would have constricted. This means that

some businesses may have to close down or downsize their operations and a rise in unemployment will mostly like follow. A more disconcerting situation arises when a particular tariff reform package leads to the loss of jobs in one industry and the generation of employment in another, like the 1994 Base case, because it is possible that unemployment will continue to persist because it take time to undertake structural adjustments. In order to transfer to another industry, it may require a worker to acquire a new set of skills and possibly geographic relocation if the job is in another province or city. Not only will this take some time to accomplish but this also entails cost that may not be funded immediately in the absence of savings or access to the credit market. Assistance can come in the form of skills training and job placement services.

- ❖ *Remove biases and penalties against efficient sectors.* Competitive sectors should be supported to maximize the benefit of reforming the tariff structure. The model assumes that any excess output can be simply exported but in reality there are also information and trade barriers that prevent our goods from finding its way into the markets of other countries. Some ways to accomplish this is by providing access to new technology, capital and marketing assistance.

The simulation results should only be considered as a first step in identifying the sectors that will gain and lose from a particular set of tariff changes because of the model's many limitations. In any tariff reform effort, there will always be producing sectors or social groups that will be disadvantaged by the changes. Resistance to tariff reform is usually more severe when losses are concentrated among a small group or in a particular locality. Groups that gain much from tariff protection usually engage in socially wasteful rent-seeking (i.e. lobbying) behavior. Policy-makers should therefore, take into consideration its impact on social welfare, the long-term competitiveness and economic health of the country while ensuring that adequate social-safety nets and other efforts are in place to help mitigate the short-term costs involved in the transition process.

ANNEX A THE SIMULATION MODEL

A. The Chung Lee Model

The Chung Lee Model was developed for the Tariff Commission in the early 80's and is a partial-equilibrium type mathematical model based on the input-output (IO) table. Its information structure makes it an ideal tool for analyzing intersectoral relationships at the macro-level and is used most often in policy and planning-related activities. IO analysis is usually employed in estimating impact of changes in exogenous variables such as investment or government expenditure. The Chung Lee model,

Text Box 1: The Input-Output Table And Matrix of Technical Coefficients

The input-output (IO) table is a system of accounts that provides information on the resources (input) needed to produce the output of each sector in the economy within a particular time period. The columns of the IO table represent j producing sectors and the various components of final demand. Intermediate demand is the amount that goes into the production of other goods. Final demand is the output consumed by households and the government, net of the country's trading position. The sum of the j th column across i sectors correspond to the total intermediate input requirement of sector j . Adding this to total primary demand would give the value of the total production of sector j .

The rows, on the other hand, correspond to intermediate inputs from sector i and primary inputs. Intermediate inputs are created or produced by the various sectors in the economy. The ones that do not fall under this category, such as land and labor, are referred to as primary inputs. Adding the figures on the i th row across j sectors will yield the total intermediate demand for sector i . The sum of intermediate and final demand for a particular sector would be equal to the value of that sector's total production.

Aggregate data on the production and consumption pattern of the economy is then used to generate the matrix of technical coefficients, which we will denote as A . It is a $n \times n$ matrix of j columns (output) and i rows (inputs). Each coefficient a_{ij} indicates the input requirement from sector i to produce one output unit (usually in money terms such as Pesos) of sector j .

however, can be used to provide estimates of changes in macro-variables based on movement in output prices as a result of changes in the prevailing tariff rates.

Basic Assumptions

- The economy is small and open. This implies that the country's trading activity has no impact on world prices. As an open economy, it can freely import and export goods at the prevailing world prices, which it takes as given.
- Imported and local goods are perfect substitutes. Therefore, the consumer does not differentiate between goods made locally and ones made abroad so in the case of production surplus, the country can simply export at world prices and conversely, when there is a shortfall in output, the country simply imports.
- Factor prices are not affected by tariff rate changes in the short-run. There are many sources of output price fluctuations but the model limits this to tariff rates. This simplifying assumption can be considered acceptable since the model is focused on the very short-term and the impact of raising tariff rates is almost immediate. Other factors such as changes in preferences, changes in the mode of production and natural disasters are unpredictable or take time to change.
- Fixed-exchange rate system. Since this model analyzes short-term impact, it is reasonable to assume that the exchange rate is not expected to fluctuate excessively. Moreover, short-run changes in the exchange rate are usually a result of monetary policy and capital movement.

Classification of IO Sectors

The study uses the 1994 Input-Output Table⁴, which has two hundred twenty-nine (229) sectors. The sectors can be further grouped into eight industries (8), namely: agriculture, beverage, fishery, food manufacturing, forestry, mining and quarrying, tobacco, other manufacturing and services. This was collapsed further to three groups (Agriculture, Food Manufacturing and Other Sectors) for discussion purposes.

⁴ This is the most recent release of the National Statistical and Coordinating Board (NSCB).

Prior to the estimation process, each IO sector is first classified as tradable or non-tradable based on the level of exports and imports with respect to sector-output. Tradable goods are then categorized as pure exportables (PX), goods where imports are zero or minimal, and exports are significant); pure importables (PM), goods where exports are zero or minimal and imports are significant); and mixed (goods where both exports and imports are significant). Mixed sectors are further divided into its exportable (MX) and importable (MM) component. MX refers to the segment of a mixed sector which can compete in foreign markets and sells its product at the world price. MM, on the other hand, is the segment of a sector that produces for the domestic market and is more dependent on tariff protection.

Expansion of IO Matrix

The matrix of technical coefficients or IO matrix is then expanded to reflect the classification of the sectors. This involves the “horizontal split” of mixed sector technical coefficients. The horizontal split is needed to preserve the symmetry of the IO matrix. The factor used to do this is based on the ratio of ratio of exports and imports of each sector to total output (Annex Table 1). Vertically, the exportable and importable component of mixed sectors will be identical since both have the same technical input requirement. This results to the expansion of the IO based on the abovementioned classification from 229x229 to 345x345. Figures for output (Q), imports (M), intermediate demand (ID) and final demand (FD) was also expanded in the same manner.

The IO matrix was also rearranged in such a way that non-tradable goods and service sectors are located at the latter portion of the matrix. This allows for the creation of a 271 x 271 sub-matrix (A_{271}) composed of sectors that are tradable, which is needed for some equations in the simulation.

The technical coefficients and the rest of the macro-variables are then deflated to reflect its tariff-free equivalent or its “free trade” value. It is the modified IO matrix

(A₃₄₅) that is used, together with the various tariff reform scenarios (Annex Table 2), to estimate changes in domestic supply, income and demand. This in turn, provides the calculation of changes in the wage bill, employment and the trade balance. The basic equations used for the estimates are outlined in the next segment.

Simulation Equations

Note: The symbol “^” over a variable denotes percentage change and *d* before a variable refers to absolute change.

- (i.) Effective Protection Rate (EPR). This is a broad measure of economic incentives to producers and reflects how the value-added (the difference between product price and input cost) has changed when the economy deviates from a free-trade situation. *A higher EPR indicates greater economic incentive to local producers given the existing tariff structure.* Time periods in the equation below are denoted by *0* (pre-reform), *1* (post-reform) and *f* (free-trade situation). The pre-reform period is defined as tariff rates prevailing as of January 2003; the post-reform period are the various tariff reform scenarios; and the free-trade situation is defines as tariffs prevailing in 1994.

$$epr_0 = \frac{V_{j0} - V_{jf}}{V_{jf}} \qquad epr_1 = \frac{V_{j1} - V_{jf}}{V_{jf}}$$

$$\text{for } M\text{portables} \quad : V_j = (1 + t_j) - \sum a_{ij} * (1 + t_i)$$

$$\text{for } X\text{portables} \quad : V_j = 1 - \sum a_{ij}$$

Where,

a_{ij} – the technical coefficients of the IO table, indicating the input from sector *i* (horizontal axis) required to produce a unit of output *j* (vertical axis).

t_j – tariff on sector *j* output

t_i – tariff on inputs from sector *i*

- (ii.) Output. Domestic production or output (*Q*) is assumed to moves in the same direction as economic incentives (as indicated by changes in the EPR). This

means that if its prices go down (i.e. through lower tariffs) or its inputs become more expensive, producers will reduce its production. Similarly, if prices were raised or inputs become cheaper, output will be increased.

$$dQ_{bj} = c * Q_{bj} * \hat{V}$$

$$\hat{V} = \frac{epr_1 - epr_0}{1 + epr_0}$$

c - the constraints on supply that prevents production from responding to changes in the gross value-added/income such as incomplete information, pre-existing contracts, availability of input requirements and access to new markets.

- (iii.) Income/Gross Value-Added (GVA). Income (Y for aggregate and y for sector income) is the difference between revenue and input cost. It reflects the returns to labor and capital. An estimate of the change in income is represented by the following equations:

$$dy_{bj} = [I - A_{345}^T] dQ_{bj}$$

$$dY_{bj} = \sum dy_{bj}$$

- (iv.) Wage Bill and Employment. The Wage Bill refers to the labor expense of each sector. The change in labor expense (L) can now be projected using the labor coefficient (e) provided by the IO and change in output (dQ_{bj}).

$$dL_{bj} = e_j * dQ_{bj}$$

- (v.) Intermediate and Final Demand. Intermediate demand (ID), which reflects the demand of a particular good as a factor or input to production of the various sectors is derived by using the expected change in output and the IO matrix. Final demand (FD), which reflects the demand as an end-product by consumers like households and the government, is assumed to have a positive linear relationship with income and a negative relationship with price.

$$dID_{bj} = A_{346} * dQ_{bj}$$

$$dFD_{bj} = \left[(G_j * \hat{P}_j) + (K_j * \hat{Y}_{bj})_{bj} \right] * FD_{bj}$$

$$\hat{P}_j = \frac{t_1 - t_0}{1 + t_0}$$

Where,

\hat{P}_j – change in prices

\hat{Y}_b – change in Aggregate Income

G_j – Price elasticity of demand

K_j – Income elasticity of demand

- (vi.) Trade Balance. Trade activity depends on domestic production and the level of domestic demand. Goods are imported (M) when domestic production falls below domestic demand. In the same manner, goods are exported (X) when domestic production is higher than domestic demand. The level of import and exports now determines the overall trade balance (TB).

$$dM_{bj} = dD_{bj} - dQ_{bj}$$

$$dX_j = dQ_{bj} - dD_{bj}$$

$$dTB = dX_j - dM_j$$

B. Extension of the Chung Lee Model

The basic model was extended in two ways to provide an insight on the impact of productivity improvements. The first is by incorporating factor productivity growth in the model. This however, was limited only to agriculture since the influence of the Department of Agriculture in technology improvement is limited only to this sector. The simulation starts with the downward adjustment of input requirements of every sector in agriculture by a factor of 2% and 4%. This means that if sector-J usually requires P0.5 of raw materials to produce every Peso of output, it will require only P0.49 with two percent (2%) productivity improvement and P0.48 if factor productivity improves by four percent (4%). The gains from this are assumed to accrue to capital, although it could very well be shared with labor through an increase in wages.

The second way is by relaxing the basic assumption that only tariffs affect factor prices in the short-run. In this scenario, producer gains from improvements in agriculture productivity are partly shared with intermediate and final consumers as reflected in the decrease in the prices of agriculture goods. For purposes of the simulations, TFP gains are assumed to be equally divided between returns to capital and price reduction.

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**Table 1: Sensitive Agricultural Products Granted Concession
Under the Common Effective Preferential Tariff (CEPT)
for the ASEAN Free Trade Area (AFTA)**

| HDG NO. | HS CODE | DESCRIPTION | Applicable ASEAN-CEPT Rate (%) | | | | | | | | |
|---------|---------------|--|--------------------------------|------|------|------|------|------|------|------|------|
| | | | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 |
| (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) | (11) | (12) |
| 1.03 | | Live swine. | | | | | | | | | |
| | | - Other; | | | | | | | | | |
| | 0103.91 | -- Weighing less than 50kg; | | | | | | | | | |
| | 0103.91 10 | --- In-Quota | 30 | 30 | 30 | 30 | 30 | 20 | 20 | 20 | 5 |
| | 0103.91 20 | --- Out-Quota | 40 | 35 | 30 | 30 | 30 | 20 | 20 | 20 | 5 |
| | 0103.92 | -- Weighing 50kg or more; | | | | | | | | | |
| | 0103.92 10 | --- In-Quota | 30 | 30 | 30 | 20 | 20 | 20 | 10 | 10 | 5 |
| | 0103.92 20 | --- Out-Quota | 30 | 30 | 30 | 20 | 20 | 20 | 10 | 10 | 5 |
| 1.05 | | Live poultry, that is to say, fowls of the species Gallus domesticus, ducks, geese, turkeys and guinea fowls | | | | | | | | | |
| | | -Weighing not more than 185g; | | | | | | | | | |
| | 0105.11 | -- Fowls of the species Gallus: domesticus | | | | | | | | | |
| | 0105.11 90 | --- Other; | | | | | | | | | |
| | 0105.11 91 | ---- In-Quota | 35 | 30 | 30 | 30 | 20 | 20 | 20 | 10 | 5 |
| | 0105.11 92 | --- Out-Quota | 45 | 30 | 30 | 30 | 20 | 20 | 20 | 10 | 5 |
| | | - Other; | | | | | | | | | |
| | 0105.92 | -- Fowls of the species Gallus: domesticus, weighing not more than 2,000 g; | | | | | | | | | |
| | 0105.92 90 | --- Other; | | | | | | | | | |
| | 0105.92 91 | ---- In-Quota | 35 | 30 | 30 | 30 | 30 | 20 | 20 | 20 | 5 |
| | 0105.92 92 | --- Out-Quota | 45 | 40 | 30 | 30 | 30 | 20 | 20 | 20 | 5 |
| | 0105.93 | -- Fowls of the species Gallus: domesticus, weighing more than 2,000 g; | | | | | | | | | |

Table 2: Harmonised System Chapters with Corresponding Number of Tariff Lines under the Early Harvest Programme of the ASEAN-China Free Trade Area

| Chapter | Description | Number of Tariff Lines | Applicable ACFTA Rate of Duty* |
|----------------|--|-------------------------------|---------------------------------------|
| 01 | Live animals | 19 | 0 |
| 02 | Meat and edible meat offal | 29 | 0 |
| 03 | Fish and crustaceans, molluscs and other aquatic invertebrates | 73 | 0 |
| 04 | Dairy produce; birds' eggs; natural honey; edible products of animal origin, not elsewhere specified or included | 22 | 0 |
| 05 | Products of animal origin, not elsewhere specified or included | 15 | 0 |
| 06 | Live trees and other plants; bulbs, roots and the like; cut flowers and ornamental foliage | 8 | 0 |
| 07 | Edible vegetables and certain roots and tubers Potatoes, fresh or chilled. | 20 1 | 0 |
| 08 | Edible fruits and nuts; peel of citrus fruit or melons | 27 | 0 |
| | | 214 | |

* starting January 1, 2006

Source: Annex A, Executive Order 485 issued Dec. 29, 2005

Table 3: Aggregate Simulation Results for EHP
In Percentage

| OUTPUT | No TFP | With TFP 2% | With TFP 2% and price change | With TFP 4% | With TFP 4% and price change |
|----------------|--------|-------------|------------------------------|-------------|------------------------------|
| agriculture | -0.8 | -0.72 | -0.76 | -0.64 | -0.71 |
| food mfg | -0.18 | -0.18 | -0.16 | -0.18 | -0.13 |
| others | 0 | 0 | 0 | 0 | 0 |
| all industries | -0.18 | -0.16 | -0.17 | -0.15 | -0.15 |

| GVA | No TFP | With TFP 2% | With TFP 2% and price change | With TFP 4% | With TFP 4% and price change |
|----------------|--------|-------------|------------------------------|-------------|------------------------------|
| agriculture | -1.99 | -0.77 | -0.87 | 0.46 | 0.26 |
| food mfg | -0.78 | -0.78 | -0.68 | -0.78 | -0.59 |
| others | 0 | 0 | 0 | 0 | 0.01 |
| all industries | -0.66 | -0.31 | -0.32 | 0.05 | 0.02 |

| WAGE BILL | No TFP | With TFP 2% | With TFP 2% and price change | With TFP 4% | With TFP 4% and price change |
|-------------|--------|-------------|------------------------------|-------------|------------------------------|
| agriculture | -0.89 | -0.8 | -0.84 | -0.72 | -0.79 |
| food mfg | -0.14 | -0.14 | -0.12 | -0.14 | 0.09 |
| others | -0.01 | -0.01 | -0.01 | -0.01 | -0.01 |

| INTERMEDIATE DEMAND | No TFP | With TFP 2% | With TFP 2% and price change | With TFP 4% | With TFP 4% and price change |
|---------------------|--------|-------------|------------------------------|-------------|------------------------------|
| agriculture | -0.07 | -0.37 | -0.36 | -0.68 | -0.64 |
| food mfg | -0.63 | -1.14 | -1.15 | -1.64 | -1.65 |
| others | -0.02 | -0.25 | -0.25 | -0.31 | -0.31 |
| all industries | -0.07 | -0.33 | -0.33 | -0.46 | -0.46 |

| FINAL DEMAND | No TFP | With TFP 2% | With TFP 2% and price change | With TFP 4% | With TFP 4% and price change |
|----------------|--------|-------------|------------------------------|-------------|------------------------------|
| agriculture | 0.33 | 0.4 | 0.13 | 0.47 | 0.46 |
| food mfg | 0.74 | 0.91 | 0.09 | 1.09 | 1.08 |
| others | -0.83 | -0.38 | -0.31 | 0.07 | 0.03 |
| all industries | -0.33 | -0.01 | -0.03 | 0.31 | 0.28 |

| IMPORTS | No TFP | With TFP 2% | With TFP 2% and price change | With TFP 4% | With TFP 4% and price change |
|-------------|--------|-------------|------------------------------|-------------|------------------------------|
| agriculture | 30.99 | 26.89 | 27.88 | 22.8 | 24.79 |
| food mfg | 5.84 | 5.2 | 5.08 | 4.59 | 4.35 |
| others | -0.56 | -0.54 | -0.56 | -0.32 | -0.35 |

| EXPORTS | No TFP | With TFP 2% | With TFP 2% and price change | With TFP 4% | With TFP 4% and price change |
|-------------|--------|-------------|------------------------------|-------------|------------------------------|
| agriculture | -0.07 | 0.18 | 0.03 | 0.43 | 0.14 |
| food mfg | 1.22 | 1.27 | 1.34 | 1.31 | 1.46 |
| others | 0.3 | 0.2 | 0.2 | 0.07 | 0.08 |

| TRADE BALANCE | No TFP | With TFP 2% | With TFP 2% and price change | With TFP 4% | With TFP 4% and price change |
|----------------|---------------|---------------|------------------------------|---------------|------------------------------|
| agriculture | -2,449,677.75 | -2,086,941.63 | -2,187,829.50 | -1,725,692.75 | -1,927,971.00 |
| food mfg | -625,032.69 | -479,273.44 | -422,407.94 | -338,719.69 | -225,490.75 |
| others | 3,478,142.50 | 3,099,735.00 | 3,197,064.50 | 1,683,282.13 | 1,875,793.50 |
| all industries | 403,432.06 | 533,520.00 | 586,827.00 | -381,130.00 | -277,668.00 |

Table 4: EHP Results for Select Agriculture and Food Manufacturing Sectors

IMPACT ON MAJOR SECTORS - Percentage Change

| OUTPUT | No TFP | With TFP 2% | With TFP 2% and | With TFP 4% | With TFP 4% and |
|--------------------------------|--------|-------------|-----------------|-------------|-----------------|
| Agriculture | | | | | |
| Corn-MM | 0.00 | 0.10 | 0.06 | 0.21 | 0.12 |
| Corn-MX | 0.00 | 0.06 | 0.03 | 0.12 | 0.07 |
| Vegetable-MM | -1.68 | -1.61 | -1.64 | -1.55 | -1.61 |
| Vegetable-MX | 0.06 | 0.11 | 0.09 | 0.17 | 0.12 |
| Banana-PX | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Coconut-PX | 0.00 | 0.04 | 0.02 | 0.08 | 0.04 |
| Coffee-PX | 0.00 | 0.07 | 0.04 | 0.14 | 0.07 |
| Rice&Corn Milling-PM | 0.00 | 0.05 | 0.03 | 0.09 | 0.06 |
| Hog-PM | -3.54 | -3.32 | -3.42 | -3.09 | -3.29 |
| Food Manufacturing | | | | | |
| Meat&meat processing-MM | -9.68 | -9.68 | -9.67 | -9.68 | -9.66 |
| Meat&meat processing- MX | 0.27 | 0.27 | 0.28 | 0.27 | 0.29 |
| Sugar Milling-MM | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Sugar Milling- MX | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Coffee Roasting & Procesing-MM | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Coffee Roasting & Procesing-MX | 0.13 | 0.13 | 0.19 | 0.13 | 0.24 |
| GVA | No TFP | With TFP 2% | With TFP 2% and | With TFP 4% | With TFP 4% and |
| Agriculture | | | | | |
| Corn-MM | 0.00 | 0.83 | 0.75 | 1.67 | 1.51 |
| Corn-MX | 0.00 | 0.46 | 0.42 | 0.92 | 0.85 |
| Vegetable-MM | -2.44 | -2.00 | -2.04 | -1.56 | -1.65 |
| Vegetable-MX | 0.25 | 0.63 | 0.59 | 0.17 | 0.94 |
| Banana-PX | 0.01 | 0.97 | 0.89 | 1.93 | 1.78 |
| Coconut-PX | 0.00 | 0.32 | 0.30 | 0.65 | 0.60 |
| Coffee-PX | 0.00 | 0.50 | 0.45 | 1.00 | 0.91 |
| Rice&Corn Milling-PM | 0.00 | 2.16 | 2.10 | 4.33 | 4.20 |
| Hog-PM | -10.25 | -8.40 | -8.40 | -6.55 | -7.15 |
| Food Manufacturing | | | | | |
| Meat&meat processing-MM | -62.89 | -62.89 | -62.81 | -62.89 | -62.73 |
| Meat&meat processing- MX | 1.47 | 1.47 | 1.51 | 1.47 | 1.56 |
| Sugar Milling-MM | 0.02 | 0.02 | 0.02 | 0.02 | 0.03 |
| Sugar Milling- MX | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 |
| Coffee Roasting & Procesing-MM | 0.81 | 0.81 | 1.13 | 0.81 | 1.45 |
| Coffee Roasting & Procesing-MX | 0.47 | 0.47 | 0.65 | 0.47 | 0.84 |
| IMPORTS | No TFP | With TFP 2% | With TFP 2% and | With TFP 4% | With TFP 4% and |
| Agriculture | | | | | |
| Corn-MM | 0.28 | -14.90 | -14.53 | -30.08 | -29.33 |
| Vegetable-MM | 44.51 | 39.27 | 40.00 | 34.11 | 35.57 |
| Rice&Corn Milling-PM | -8.96 | -8.72 | -7.95 | -8.44 | -6.89 |
| Hog-PM | 75.46 | 71.76 | 73.35 | 68.10 | 71.27 |
| Food Manufacturing | | | | | |
| Meat&meat processing-MM | 64.08 | 64.60 | 64.55 | 65.12 | 65.02 |
| Sugar Milling-MM | -2.46 | -1.46 | -1.49 | -0.46 | -0.52 |
| Coffee Roasting & Procesing-MM | -0.79 | -0.36 | -0.38 | 0.06 | 0.02 |
| EXPORTS | No TFP | With TFP 2% | With TFP 2% and | With TFP 4% | With TFP 4% and |
| Agriculture | | | | | |
| Corn-MX | -0.02 | 2.73 | 2.67 | 5.52 | 5.39 |
| Vegetable-MX | 0.54 | 1.05 | 0.97 | 1.56 | 1.39 |
| Banana-PX | 0.05 | 0.11 | 0.10 | 0.16 | 0.15 |
| Coconut-PX | -0.34 | 0.22 | -0.29 | 0.78 | -0.25 |
| Coffee-PX | 2.69 | 6.26 | 5.14 | 9.84 | 7.58 |
| Food Manufacturing | | | | | |
| Meat&meat processing- MX | 1.31 | 1.02 | 1.06 | 0.74 | 0.82 |
| Sugar Milling- MX | 0.48 | 0.29 | 0.29 | 0.09 | 0.10 |
| Coffee Roasting & Procesing-MX | 1.00 | 0.68 | 0.85 | 0.35 | 0.71 |

Table 5: EPR Results for the EHP

| | Tariff Rates | | E P R | | | | | |
|---------------------------|--------------|--------|--------|--------|--------|--------|----------------------|----------------------|
| | 2003 | EHP | 2003 | EHP | TFP 2% | TFP 4% | TFP 2% w/ ? price | TFP 4% w/ ? price |
| | | | | | | | | |
| AGRICULTURE | | | | | | | | |
| MM002 | 27.00% | 27.00% | 30.29% | 30.29% | 30.74% | 31.19% | 30.55% | 30.81% |
| MM003 | 10.78% | 5.00% | 11.41% | 5.19% | 5.43% | 5.67% | 5.32% | 5.44% |
| MM008 | 7.00% | 5.00% | 7.89% | 5.40% | 5.90% | 6.40% | 5.66% | 5.92% |
| MM009 | 5.97% | 5.00% | 6.41% | 5.29% | 5.62% | 5.94% | 5.46% | 5.63% |
| MM013 | 3.00% | 3.00% | 3.02% | 3.02% | 3.58% | 4.13% | 3.31% | 3.59% |
| MM018 | 3.08% | 3.08% | 3.09% | 3.09% | 3.24% | 3.39% | 3.17% | 3.25% |
| MX002 | | | -0.97% | -0.97% | -0.77% | -0.57% | -0.86% | -0.74% |
| MX003 | | | -0.50% | -0.32% | -0.12% | 0.07% | -0.21% | -0.11% |
| MX008 | | | -0.52% | -0.52% | -0.20% | 0.13% | -0.35% | -0.19% |
| MX009 | | | -0.33% | -0.32% | -0.11% | 0.10% | -0.21% | -0.10% |
| MX013 | | | -0.63% | -0.63% | -0.19% | 0.26% | -0.40% | -0.17% |
| MX018 | | | -0.18% | -0.18% | -0.05% | 0.07% | -0.11% | -0.05% |
| PM016 | 3.00% | 3.00% | 3.00% | 3.00% | 3.33% | 3.65% | 3.17% | 3.34% |
| PM017 | 3.00% | 3.00% | 3.02% | 3.02% | 3.29% | 3.55% | 3.16% | 3.29% |
| PM019 | 26.20% | 15.00% | 34.48% | 18.62% | 19.62% | 20.62% | 19.17% | 19.73% |
| PX005 | | | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% |
| PX006 | | | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% |
| PX007 | | | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% |
| PX010 | | | -0.16% | -0.16% | -0.02% | 0.11% | -0.09% | -0.02% |
| PX015 | | | -0.22% | -0.22% | 0.00% | 0.23% | -0.10% | 0.02% |
| FOOD MANUFACTURING | | | | | | | | |
| MM039 | 37.64% | 15.00% | 45.36% | 17.20% | 17.20% | 17.20% | 17.23% | 17.26% |
| MM044 | 8.40% | 8.40% | 18.66% | 19.69% | 19.69% | 19.69% | 19.86% | 20.03% |
| MM048 | 5.08% | 5.08% | 3.83% | 6.92% | 6.92% | 6.92% | 7.00% | 7.09% |
| MM051 | 6.00% | 6.00% | 11.93% | 11.93% | 11.93% | 11.93% | 12.06% | 12.20% |
| MM052 | 16.67% | 16.67% | 27.59% | 28.51% | 28.51% | 28.51% | 28.51% | 28.52% |
| MM053 | 10.00% | 10.00% | 12.93% | 13.00% | 13.00% | 13.00% | 13.04% | 13.08% |
| MM054 | 28.65% | 28.65% | 31.99% | 31.99% | 31.99% | 31.99% | 31.99% | 31.99% |
| MM055 | 6.55% | 6.55% | 2.22% | 3.13% | 3.13% | 3.13% | 3.14% | 3.16% |
| MM058 | 44.17% | 44.17% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% |
| MM059 | 5.58% | 5.58% | -1.61% | -0.24% | -0.24% | -0.24% | -0.15% | -0.06% |
| MM060 | 7.73% | 7.73% | 6.59% | 6.59% | 6.59% | 6.59% | 6.62% | 6.65% |
| MM061 | 5.29% | 5.29% | 4.47% | 4.64% | 4.64% | 4.64% | 4.64% | 4.64% |
| MM062 | 6.48% | 6.48% | 10.31% | 10.93% | 10.93% | 10.93% | 11.02% | 11.11% |
| MX039 | | | -1.65% | -1.12% | -1.12% | -1.12% | -1.10% | -1.09% |
| MX044 | | | -2.58% | -1.89% | -1.89% | -1.89% | -1.78% | -1.67% |
| MX048 | | | -5.74% | -3.35% | -3.35% | -3.35% | -3.29% | -3.22% |
| MX051 | | | -4.21% | -4.21% | -4.21% | -4.21% | -4.14% | -4.07% |
| MX052 | | | -4.48% | -3.94% | -3.94% | -3.94% | -3.94% | -3.94% |
| MX053 | | | -5.59% | -5.55% | -5.55% | -5.55% | -5.52% | -5.50% |
| MX054 | | | -0.26% | -0.25% | -0.25% | -0.25% | -0.25% | -0.25% |
| MX055 | | | -7.26% | -6.79% | -6.79% | -6.79% | -6.79% | -6.78% |
| MX058 | | | -1.85% | -1.58% | -1.58% | -1.58% | -1.48% | -1.38% |
| MX059 | | | -8.73% | -7.75% | -7.75% | -7.75% | -7.69% | -7.63% |
| MX060 | | | -3.32% | -3.32% | -3.32% | -3.32% | -3.29% | -3.27% |
| MX061 | | | -3.07% | -2.95% | -2.95% | -2.95% | -2.95% | -2.95% |
| MX062 | | | -2.65% | -2.28% | -2.28% | -2.28% | -2.23% | -2.17% |
| PM040 | 4.60% | 0.00% | 2.30% | -7.27% | -7.27% | -7.27% | -7.27% | -7.27% |
| PM041 | 5.18% | 5.00% | 6.21% | 9.21% | 9.21% | 9.21% | 9.21% | 9.21% |
| PM043 | 6.80% | 5.00% | 8.46% | 5.41% | 5.41% | 5.41% | 5.41% | 5.41% |
| PM050 | 66.94% | 66.94% | 71.86% | 71.86% | 72.13% | 72.40% | 72.04% | 72.21% |
| PX045 | | | -7.52% | -6.38% | -6.38% | -6.38% | -6.38% | -6.38% |
| PX046 | | | -5.19% | -4.32% | -4.32% | -4.32% | -4.32% | -4.32% |
| PX047 | | | -0.57% | -0.53% | -0.53% | -0.53% | -0.42% | -0.32% |
| PX049 | | | -2.24% | -1.76% | -1.76% | -1.76% | -1.71% | -1.66% |
| PX056 | | | -0.45% | -0.45% | -0.45% | -0.45% | -0.38% | -0.31% |

Table 6: Aggregate Simulation Results for AFTA-CEPT
In Percentage

| OUTPUT | No TFP | With TFP 2% | With TFP 2% and price change | With TFP 4% | With TFP 4% and price change |
|----------------|--------|-------------|------------------------------|-------------|------------------------------|
| agriculture | 0.01 | 0.09 | 0.05 | 0.17 | 0.10 |
| food mfg | -1.02 | -1.02 | -1.00 | -1.02 | -0.97 |
| others | -0.12 | -0.12 | -0.12 | -0.12 | -0.12 |
| all industries | -0.22 | -0.20 | -0.21 | -0.19 | -0.19 |

| GVA | No TFP | With TFP 2% | With TFP 2% and price change | With TFP 4% | With TFP 4% and price change |
|----------------|--------|-------------|------------------------------|-------------|------------------------------|
| agriculture | 0.03 | 1.24 | 1.14 | 2.45 | 2.27 |
| food mfg | -3.36 | -3.36 | -3.26 | -3.36 | -3.17 |
| others | -0.26 | -0.26 | -0.26 | -0.26 | -0.26 |
| all industries | -0.50 | -0.14 | -0.16 | 0.21 | 0.18 |

| WAGE BILL | No TFP | With TFP 2% | With TFP 2% and price change | With TFP 4% | With TFP 4% and price change |
|-------------|--------|-------------|------------------------------|-------------|------------------------------|
| agriculture | 0.01 | 0.09 | 0.05 | 0.18 | 0.10 |
| food mfg | -1.24 | -1.02 | -1.22 | -1.24 | -1.19 |
| others | -0.11 | -0.12 | -0.10 | -0.11 | -0.10 |

| INTERMEDIATE DEMAND | No TFP | With TFP 2% | With TFP 2% and price change | With TFP 4% | With TFP 4% and price change |
|---------------------|--------|-------------|------------------------------|-------------|------------------------------|
| agriculture | -0.26 | -0.57 | -0.55 | -0.88 | -0.84 |
| food mfg | -1.26 | -1.77 | -1.78 | -2.28 | -2.30 |
| others | -0.08 | -0.31 | -0.31 | -0.37 | -0.38 |
| all industries | -0.19 | -0.45 | -0.45 | -0.58 | -0.58 |

| FINAL DEMAND | No TFP | With TFP 2% | With TFP 2% and price change | With TFP 4% | With TFP 4% and price change |
|----------------|--------|-------------|------------------------------|-------------|------------------------------|
| agriculture | -0.1 | -0.03 | 0.43 | 0.04 | 0.50 |
| food mfg | 1.02 | 1.20 | 0.99 | 1.37 | 1.16 |
| others | -0.51 | -0.07 | -0.19 | 0.38 | 0.23 |
| all industries | -0.19 | 0.12 | 0.12 | 0.44 | 0.43 |

| IMPORTS | No TFP | With TFP 2% | With TFP 2% and price change | With TFP 4% | With TFP 4% and price change |
|-------------|--------|-------------|------------------------------|-------------|------------------------------|
| agriculture | -3.48 | -7.64 | 2.37 | -11.78 | -0.77 |
| food mfg | 12.57 | 11.91 | 10.84 | 11.27 | 10.08 |
| others | -0.17 | -0.16 | -0.27 | 0.06 | -0.07 |

| EXPORTS | No TFP | With TFP 2% | With TFP 2% and price change | With TFP 4% | With TFP 4% and price change |
|-------------|--------|-------------|------------------------------|-------------|------------------------------|
| agriculture | 0.72 | 0.97 | 0.83 | 1.22 | 0.93 |
| food mfg | 1.05 | 1.10 | 1.18 | 1.15 | 1.30 |
| others | 0.25 | 0.15 | 0.15 | 0.02 | 0.03 |

| TRADE BALANCE | No TFP | With TFP 2% | With TFP 2% and price change | With TFP 4% | With TFP 4% and price change |
|----------------|---------------|---------------|------------------------------|---------------|------------------------------|
| agriculture | 390,040.41 | 757,455.38 | -53,155.08 | 1,123,393.75 | 211,068.84 |
| food mfg | -2,028,732.63 | -1,875,442.38 | -1,630,044.13 | -1,727,336.25 | -1,426,074.25 |
| others | 1,546,293.25 | 1,188,784.00 | 1,721,142.50 | -206,606.88 | 415,522.13 |
| all industries | -92,399.00 | 70,797.00 | 37,943.00 | -810,549.00 | -799,483.00 |

Table 7: CEPT Results for Select Agriculture and Food Manufacturing Sectors

IMPACT ON MAJOR SECTORS - Percentage Change

| OUTPUT | No TFP | With TFP 2% | With TFP 2% and price change | With TFP 4% | With TFP 4% and price change |
|--------------------------------|--------|-------------|------------------------------|-------------|------------------------------|
| Agriculture | | | | | |
| Corn-MM | 0.00 | 0.10 | 0.06 | 0.21 | 0.12 |
| Corn-MX | 0.00 | 0.06 | 0.04 | 0.12 | 0.07 |
| Vegetable-MM | 0.00 | 0.07 | 0.04 | 0.13 | 0.07 |
| Vegetable-MX | 0.00 | 0.06 | 0.03 | 0.12 | 0.07 |
| Banana-PX | 0.00 | 0.00 | 0 | 0.00 | 0.00 |
| Coconut-PX | 0.00 | 0.04 | 0.02 | 0.08 | 0.04 |
| Coffee-PX | 0.00 | 0.07 | 0.04 | 0.14 | 0.07 |
| Rice&Corn Milling-PM | 0.00 | 0.05 | 0.03 | 0.10 | 0.06 |
| Hog-PM | 0.02 | 0.25 | 0.15 | 0.48 | 0.27 |
| Food Manufacturing | | | | | |
| Meat&meat processing-MM | -3.35 | -3.35 | -3.34 | -3.35 | -3.33 |
| Meat&meat processing- MX | 0.03 | 0.03 | 0.03 | 0.03 | 0.04 |
| Sugar Milling-MM | 0.02 | 0.02 | 0.02 | 0.02 | 0.02 |
| Sugar Milling- MX | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 |
| Coffee Roasting & Procesing-MM | 0.00 | 0.00 | 0 | 0.00 | 0.00 |
| Coffee Roasting & Procesing-MX | 0.07 | 0.07 | 0.12 | 0.07 | 0.18 |
| GVA | No TFP | With TFP 2% | With TFP 2% and price change | With TFP 4% | With TFP 4% and price change |
| Agriculture | | | | | |
| Corn-MM | 0.01 | 0.84 | 0.76 | 1.68 | 1.51 |
| Corn-MX | 0.00 | 0.47 | 0.43 | 0.93 | 0.85 |
| Vegetable-MM | 0.00 | 0.43 | 0.39 | 0.87 | 0.78 |
| Vegetable-MX | 0.00 | 0.39 | 0.35 | 0.78 | 0.70 |
| Banana-PX | 0.01 | 0.97 | 0.89 | 1.93 | 1.78 |
| Coconut-PX | 0.00 | 0.33 | 0.3 | 0.65 | 0.60 |
| Coffee-PX | 0.00 | 0.50 | 0.45 | 1.01 | 0.91 |
| Rice&Corn Milling-PM | 0.01 | 2.17 | 2.11 | 4.33 | 4.21 |
| Hog-PM | 0.13 | 1.90 | 1.63 | 3.69 | 3.14 |
| Food Manufacturing | | | | | |
| Meat&meat processing-MM | -20.93 | -20.93 | -20.85 | -20.93 | -20.77 |
| Meat&meat processing- MX | 0.14 | 0.14 | 0.18 | 0.14 | 0.23 |
| Sugar Milling-MM | -12.95 | -12.95 | 0.13 | 0.13 | 0.14 |
| Sugar Milling- MX | 0.07 | 0.07 | 0.07 | 0.07 | 0.07 |
| Coffee Roasting & Procesing-MM | 0.42 | 0.42 | 0.74 | 0.42 | 1.06 |
| Coffee Roasting & Procesing-MX | 0.24 | 0.24 | 0.43 | 0.24 | 0.62 |
| IMPORTS | No TFP | With TFP 2% | With TFP 2% and price change | With TFP 4% | With TFP 4% and price change |
| Agriculture | | | | | |
| Corn-MM | -0.95 | -16.15 | -15.78 | -31.35 | -30.6 |
| Vegetable-MM | -4.39 | -9.79 | 2.68 | -15.11 | -1.9 |
| Rice&Corn Milling-PM | -6.03 | -5.85 | -5.06 | -5.63 | -4.06 |
| Hog-PM | -2.03 | -5.8 | 16.75 | -9.54 | 14.61 |
| Food Manufacturing | | | | | |
| Meat&meat processing-MM | 20.39 | 20.9 | 46.21 | 21.42 | 46.68 |
| Sugar Milling-MM | -5.6 | -4.61 | -4.64 | -3.62 | -3.67 |
| Coffee Roasting & Procesing-MM | -0.59 | -0.17 | -0.19 | 0.25 | 0.21 |
| EXPORTS | No TFP | With TFP 2% | With TFP 2% and price change | With TFP 4% | With TFP 4% and price change |
| Agriculture | | | | | |
| Corn-MX | 0.18 | 2.97 | 2.9 | 5.76 | 5.62 |
| Vegetable-MX | 0.38 | 0.91 | 0.82 | 1.43 | 1.26 |
| Banana-PX | 0.13 | 0.18 | 0.18 | 0.24 | 0.23 |
| Coconut-PX | 1.91 | 2.47 | 1.96 | 3.03 | 2.01 |
| Coffee-PX | 3.63 | 7.21 | 6.08 | 10.79 | 8.53 |
| Food Manufacturing | | | | | |
| Meat&meat processing- MX | 1 | 0.72 | 0.76 | 0.44 | 0.51 |
| Sugar Milling- MX | 1.1 | 0.91 | 0.91 | 0.71 | 0.72 |
| Coffee Roasting & Procesing-MX | 0.66 | 0.34 | 0.51 | 0.02 | 0.37 |

Table 8: EPR Results for the CEPT

| | Tariff Rates | | E P R | | | | | |
|---------------------------|--------------|--------|--------|--------|--------|--------|----------------------|----------------------|
| | | | 2003 | CEPT | TFP 2% | TFP 4% | TFP 2% w/ ? price | TFP 4% w/ ? price |
| | 2003 | CEPT | 2003 | CEPT | TFP 2% | TFP 4% | w/ ? price | w/ ? price |
| AGRICULTURE | | | | | | | | |
| MM002 | 27.00% | 27.00% | 30.29% | 30.30% | 30.75% | 31.20% | 30.56% | 30.81% |
| MM003 | 10.78% | 10.78% | 11.41% | 11.41% | 11.66% | 11.90% | 11.55% | 11.68% |
| MM008 | 7.00% | 7.00% | 7.89% | 7.89% | 8.39% | 8.89% | 8.15% | 8.41% |
| MM009 | 5.97% | 5.97% | 6.41% | 6.41% | 6.73% | 7.06% | 6.58% | 6.75% |
| MM013 | 3.00% | 3.00% | 3.02% | 3.02% | 3.58% | 4.13% | 3.31% | 3.59% |
| MM018 | 3.08% | 3.80% | 3.09% | 3.09% | 3.24% | 3.39% | 3.17% | 3.25% |
| MX002 | | | -0.97% | -0.97% | -0.77% | -0.57% | -0.86% | -0.74% |
| MX003 | | | -0.50% | -0.50% | -0.30% | -0.10% | -0.39% | -0.28% |
| MX008 | | | -0.52% | -0.52% | -0.19% | 0.13% | -0.35% | -0.18% |
| MX009 | | | -0.33% | -0.32% | -0.11% | 0.10% | -0.22% | -0.11% |
| MX013 | | | -0.63% | -0.63% | -0.19% | 0.26% | -0.40% | -0.17% |
| MX018 | | | -0.18% | -0.18% | -0.05% | 0.07% | -0.11% | -0.05% |
| PM016 | 3.00% | 3.00% | 3.00% | 3.00% | 3.33% | 3.65% | 3.17% | 3.34% |
| PM017 | 3.00% | 3.00% | 3.02% | 3.02% | 3.29% | 3.56% | 3.16% | 3.30% |
| PM019 | 26.20% | 26.20% | 34.48% | 34.59% | 35.60% | 36.61% | 35.15% | 35.72% |
| PX005 | | | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% |
| PX006 | | | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% |
| PX007 | | | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% |
| PX010 | | | -0.16% | -0.15% | -0.02% | 0.11% | -0.09% | -0.02% |
| PX015 | | | -0.22% | -0.22% | 0.01% | 0.23% | -0.10% | 0.02% |
| FOOD MANUFACTURING | | | | | | | | |
| MM039 | 37.64% | 30.00% | 45.36% | 35.61% | 35.61% | 35.61% | 35.64% | 35.67% |
| MM044 | 8.40% | 5.00% | 18.66% | 9.62% | 9.62% | 9.62% | 9.78% | 9.95% |
| MM048 | 5.08% | 5.00% | 3.83% | 3.71% | 3.71% | 3.71% | 3.80% | 3.88% |
| MM051 | 6.00% | 5.00% | 11.93% | 8.73% | 8.73% | 8.73% | 8.87% | 9.00% |
| MM052 | 16.67% | 5.00% | 27.59% | 3.91% | 3.91% | 3.91% | 3.91% | 3.91% |
| MM053 | 10.00% | 5.00% | 12.93% | 2.53% | 2.53% | 2.53% | 2.57% | 2.61% |
| MM054 | 28.65% | 28.65% | 31.99% | 32.03% | 32.03% | 32.03% | 32.03% | 32.03% |
| MM055 | 6.55% | 5.00% | 2.22% | -1.15% | -1.15% | -1.15% | -1.13% | -1.12% |
| MM058 | 44.17% | 44.17% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% |
| MM059 | 5.58% | 5.00% | -1.61% | -2.63% | -2.63% | -2.63% | -2.54% | -2.46% |
| MM060 | 7.73% | 5.00% | 6.59% | 2.77% | 2.77% | 2.77% | 2.81% | 2.84% |
| MM061 | 5.29% | 5.00% | 4.47% | 4.19% | 4.19% | 4.19% | 4.20% | 4.20% |
| MM062 | 6.48% | 6.48% | 10.31% | 10.56% | 10.56% | 10.56% | 10.65% | 10.74% |
| MX039 | | | -1.65% | -1.60% | -1.60% | -1.60% | -1.58% | -1.57% |
| MX044 | | | -2.58% | -2.52% | -2.52% | -2.52% | -2.41% | -2.30% |
| MX048 | | | -5.74% | -5.69% | -5.69% | -5.69% | -5.62% | -5.56% |
| MX051 | | | -4.21% | -4.15% | -4.15% | -4.15% | -4.08% | -4.01% |
| MX052 | | | -4.48% | -3.89% | -3.89% | -3.89% | -3.89% | -3.89% |
| MX053 | | | -5.59% | -5.02% | -5.02% | -5.02% | -4.99% | -4.97% |
| MX054 | | | -0.26% | -0.23% | -0.23% | -0.23% | -0.23% | -0.23% |
| MX055 | | | -7.26% | -6.98% | -6.98% | -6.98% | -6.98% | -6.97% |
| MX058 | | | -1.85% | -1.71% | -1.71% | -1.71% | -1.61% | -1.50% |
| MX059 | | | -8.73% | -8.67% | -8.67% | -8.67% | -8.61% | -8.54% |
| MX060 | | | -3.32% | -3.27% | -3.27% | -3.27% | -3.24% | -3.22% |
| MX061 | | | -3.07% | -2.92% | -2.92% | -2.92% | -2.92% | -2.92% |
| MX062 | | | -2.65% | -2.51% | -2.51% | -2.51% | -2.45% | -2.40% |
| PM040 | | | 2.30% | 2.80% | 2.80% | 2.80% | 2.80% | 2.80% |
| PM041 | 5.18% | 5.00% | 6.21% | 6.02% | 6.02% | 6.02% | 6.02% | 6.02% |
| PM043 | 6.80% | 5.00% | 8.46% | 5.79% | 5.79% | 5.79% | 5.79% | 5.79% |
| PM050 | 66.94% | 66.94% | 71.86% | 71.87% | 72.14% | 72.41% | 72.04% | 72.22% |
| PX045 | | | -7.52% | -6.19% | -6.19% | -6.19% | -6.19% | -6.19% |
| PX046 | | | -5.19% | -4.32% | -4.32% | -4.32% | -4.32% | -4.32% |
| PX047 | | | -0.57% | -0.56% | -0.56% | -0.56% | -0.45% | -0.34% |
| PX049 | | | -2.24% | -2.19% | -2.19% | -2.19% | -2.14% | -2.09% |
| PX056 | | | -0.45% | -0.40% | -0.40% | -0.40% | -0.33% | -0.26% |

Table 9: Aggregate Simulation Results for 1994 Base Scenario
In Percentage

| OUTPUT | No TFP | With TFP 2% | With TFP 2% and price change | With TFP 4% | With TFP 4% and price change |
|----------------|--------|-------------|------------------------------|-------------|------------------------------|
| agriculture | 1.48 | 1.57 | 1.54 | 1.67 | 1.6 |
| food mfg | -2.9 | -2.9 | -2.87 | -2.9 | -2.85 |
| others | -0.05 | -0.05 | -0.05 | -0.05 | -0.05 |
| all industries | -0.15 | -0.14 | -0.14 | -0.12 | -0.12 |

| GVA | No TFP | With TFP 2% | With TFP 2% and price change | With TFP 4% | With TFP 4% and price change |
|----------------|--------|-------------|------------------------------|-------------|------------------------------|
| agriculture | 1.22 | 2.47 | 2.37 | 3.71 | 3.53 |
| food mfg | -10.52 | -10.52 | -10.44 | -10.52 | -10.35 |
| others | -0.13 | -0.13 | -0.13 | -0.13 | -0.13 |
| all industries | -0.81 | -0.45 | -0.46 | -0.08 | -0.11 |

| WAGE BILL | No TFP | With TFP 2% | With TFP 2% and price change | With TFP 4% | With TFP 4% and price change |
|-------------|--------|-------------|------------------------------|-------------|------------------------------|
| agriculture | 2.63 | 2.72 | 2.68 | 2.81 | 2.73 |
| food mfg | -2.48 | -2.48 | -2.45 | -2.48 | -2.43 |
| others | -0.02 | -0.02 | -0.02 | -0.02 | -0.02 |

| INTERMEDIATE DEMAND | No TFP | With TFP 2% | With TFP 2% and price change | With TFP 4% | With TFP 4% and price change |
|---------------------|--------|-------------|------------------------------|-------------|------------------------------|
| agriculture | -2.57 | -2.88 | -2.87 | -3.19 | -3.15 |
| food mfg | -0.43 | -0.94 | -0.95 | -1.44 | -1.46 |
| others | 0 | -0.23 | -0.23 | -0.3 | -0.3 |
| all industries | -0.32 | -0.58 | -0.58 | -0.71 | -0.71 |

| FINAL DEMAND | No TFP | With TFP 2% | With TFP 2% and price change | With TFP 4% | With TFP 4% and price change |
|----------------|--------|-------------|------------------------------|-------------|------------------------------|
| agriculture | -0.86 | -0.79 | -0.8 | -0.72 | -0.73 |
| food mfg | -0.14 | 0.04 | 0.03 | 0.22 | 0.21 |
| others | -1.02 | -0.56 | -0.58 | -0.1 | -0.14 |
| all industries | -0.85 | -0.53 | -0.54 | -0.2 | -0.23 |

| IMPORTS | No TFP | With TFP 2% | With TFP 2% and price change | With TFP 4% | With TFP 4% and price change |
|-------------|--------|-------------|------------------------------|-------------|------------------------------|
| agriculture | -82.81 | -87.29 | -86.3 | -91.76 | -89.77 |
| food mfg | 15.59 | 14.95 | 14.83 | 14.32 | 14.09 |
| others | -0.58 | -0.56 | -0.58 | -0.34 | -0.37 |

| EXPORTS | No TFP | With TFP 2% | With TFP 2% and price change | With TFP 4% | With TFP 4% and price change |
|-------------|--------|-------------|------------------------------|-------------|------------------------------|
| agriculture | 4.48 | 4.73 | 4.58 | 4.98 | 4.69 |
| food mfg | -4.08 | -4.03 | -3.96 | -3.99 | -3.83 |
| others | 0.34 | 0.23 | 0.24 | 0.1 | 0.11 |

| TRADE BALANCE | No TFP | With TFP 2% | With TFP 2% and price change | With TFP 4% | With TFP 4% and price change |
|----------------|---------------|---------------|------------------------------|---------------|------------------------------|
| agriculture | 7,238,343.50 | 7,631,359.00 | 7,530,290.00 | 8,022,957.50 | 7,820,331.00 |
| food mfg | -4,843,240.50 | -4,695,089.50 | -4,638,502.50 | -4,552,160.00 | -4,439,466.50 |
| others | 3,705,177.50 | 3,309,333.50 | 3,403,647.25 | 1,875,071.13 | 2,061,780.00 |
| all industries | 6,100,281.00 | 6,245,603.00 | 6,295,435.00 | 5,345,869.00 | 5,442,644.00 |

Table 10: BASE Results for Select Agriculture and Food Manufacturing Sectors

IMPACT ON MAJOR SECTORS - Percentage Change

| OUTPUT | No TFP | With TFP 2% | With TFP 2% and price change | With TFP 4% | With TFP 4% and price change |
|--------------------------------|---------|-------------|------------------------------|-------------|------------------------------|
| Agriculture | | | | | |
| Corn-MM | 23.02 | 23.15 | 23.10 | 23.28 | 23.19 |
| Corn-MX | -0.79 | -0.72 | -0.74 | -0.64 | -0.69 |
| Vegetable-MM | 3.25 | 3.32 | 3.29 | 3.39 | 3.33 |
| Vegetable-MX | -0.11 | -0.05 | -0.07 | 0.02 | -0.04 |
| Banana-PX | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Coconut-PX | 0.00 | 0.04 | 0.02 | 0.08 | 0.04 |
| Coffee-PX | 0.00 | 0.07 | 0.03 | 0.13 | 0.07 |
| Rice&Corn Milling-PM | -1.38 | -1.30 | -1.32 | -1.23 | -1.26 |
| Hog-PM | -0.21 | 0.02 | -0.08 | 0.25 | 0.05 |
| Food Manufacturing | | | | | |
| Meat&meat processing-MM | -1.85 | -1.85 | -1.84 | -1.85 | -1.83 |
| Meat&meat processing- MX | -0.02 | -0.02 | -0.01 | -0.02 | 0.00 |
| Sugar Milling-MM | -0.02 | -0.02 | -0.02 | -0.02 | -0.01 |
| Sugar Milling- MX | -0.01 | -0.01 | -0.01 | -0.01 | -0.01 |
| Coffee Roasting & Procesing-MM | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Coffee Roasting & Procesing-MX | 0.00 | 0.00 | 0.05 | 0.00 | 0.11 |
| GVA | No TFP | With TFP 2% | With TFP 2% and price change | With TFP 4% | With TFP 4% and price change |
| Agriculture | | | | | |
| Corn-MM | 37.57 | 38.33 | 38.26 | 39.08 | 38.95 |
| Corn-MX | -3.66 | -3.13 | -3.17 | -2.60 | -2.68 |
| Vegetable-MM | 4.59 | 5.01 | 4.97 | 5.43 | 5.35 |
| Vegetable-MX | -0.49 | -0.09 | -0.13 | 0.30 | 0.23 |
| Banana-PX | -0.07 | 0.89 | 0.82 | 1.86 | 1.71 |
| Coconut-PX | -0.02 | 0.31 | 0.28 | 0.63 | 0.58 |
| Coffee-PX | 0.00 | 0.50 | 0.45 | 1.00 | 0.90 |
| Rice&Corn Milling-PM | -10.02 | -7.69 | -7.75 | -5.36 | -5.49 |
| Hog-PM | -1.11 | 0.68 | 0.41 | 2.49 | 1.94 |
| Food Manufacturing | | | | | |
| Meat&meat processing-MM | -11.52 | -11.52 | -11.44 | -11.52 | -11.36 |
| Meat&meat processing- MX | -0.09 | -0.09 | -0.05 | -0.09 | -0.01 |
| Sugar Milling-MM | -0.13 | -0.13 | -0.13 | -0.13 | -0.13 |
| Sugar Milling- MX | -0.07 | -0.07 | -0.07 | -0.07 | -0.07 |
| Coffee Roasting & Procesing-MM | -15.38 | -15.38 | -15.05 | -15.38 | -14.72 |
| Coffee Roasting & Procesing-MX | 0.00 | 0.00 | 0.19 | 0.00 | 0.37 |
| IMPORTS | No TFP | With TFP 2% | With TFP 2% and price change | With TFP 4% | With TFP 4% and price change |
| Agriculture | | | | | |
| Corn-MM | -262.3 | -277.67 | -277.3 | -293.05 | -292.3 |
| Vegetable-MM | -141.78 | -147.24 | -146.51 | -152.63 | -151.16 |
| Rice&Corn Milling-PM | 70.74 | 69.37 | 70.15 | 68.04 | 69.6 |
| Hog-PM | 0.3 | -3.52 | -1.93 | -7.32 | -4.13 |
| Food Manufacturing | | | | | |
| Meat&meat processing-MM | 10.75 | 11.28 | 11.22 | 11.81 | 11.7 |
| Sugar Milling-MM | -5.11 | -4.1 | -4.13 | -3.08 | -3.13 |
| Coffee Roasting & Procesing-MM | 2.69 | 3.12 | 3.1 | 3.56 | 3.52 |
| EXPORTS | No TFP | With TFP 2% | With TFP 2% and price change | With TFP 4% | With TFP 4% and price change |
| Agriculture | | | | | |
| Corn-MX | 2 | 4.82 | 4.75 | 7.64 | 7.51 |
| Vegetable-MX | 3.8 | 4.34 | 4.25 | 4.87 | 4.69 |
| Banana-PX | 0.64 | 0.69 | 0.69 | 0.74 | 0.73 |
| Coconut-PX | 7.63 | 8.19 | 7.68 | 8.75 | 7.73 |
| Coffee-PX | 0.7 | 4.32 | 3.19 | 7.93 | 5.67 |
| Food Manufacturing | | | | | |
| Meat&meat processing- MX | 0.67 | 0.38 | 0.42 | 0.1 | 0.17 |
| Sugar Milling- MX | 0.99 | 0.79 | 0.79 | 0.59 | 0.6 |
| Coffee Roasting & Procesing-MX | 0.73 | 0.4 | 0.58 | 0.07 | 0.42 |

Table 11: EPR Results for the 1994 Base Scenario

| | Tariff Rates | | E P R | | | | | |
|---------------------------|--------------|---------|--------|---------|------------|------------|------------|------------|
| | | | 2003 | Base | TFP 2% | TFP 4% | TFP 2% | TFP 4% |
| | 2003 | Base | 2003 | Base | w/ ? price | w/ ? price | w/ ? price | w/ ? price |
| AGRICULTURE | | | | | | | | |
| MM002 | 27.00% | 115.00% | 30.29% | 130.26% | 130.83% | 131.39% | 130.63% | 131.01% |
| MM003 | 10.78% | 22.00% | 11.41% | 23.49% | 23.74% | 23.99% | 23.63% | 23.77% |
| MM008 | 7.00% | 44.00% | 7.89% | 53.83% | 54.32% | 54.82% | 54.08% | 54.34% |
| MM009 | 5.97% | 48.00% | 6.41% | 54.56% | 54.89% | 55.23% | 54.74% | 54.92% |
| MM013 | 3.00% | 3.00% | 3.02% | 3.02% | 3.58% | 4.13% | 3.31% | 3.59% |
| MM018 | 3.08% | 27.00% | 3.09% | 28.69% | 28.85% | 29.00% | 28.77% | 28.85% |
| MX002 | | | -0.97% | -3.60% | -3.34% | -3.09% | -3.43% | -3.26% |
| MX003 | | | -0.50% | -0.86% | -0.65% | -0.45% | -0.74% | -0.63% |
| MX008 | | | -0.52% | -0.52% | -0.20% | 0.13% | -0.35% | -0.19% |
| MX009 | | | -0.33% | -0.65% | -0.43% | -0.21% | -0.53% | -0.42% |
| MX013 | | | -0.63% | -0.63% | -0.19% | 0.26% | -0.40% | -0.17% |
| MX018 | | | -0.18% | -0.26% | -0.13% | -0.01% | -0.19% | -0.13% |
| PM016 | 3.00% | 3.00% | 3.00% | 34.26% | 34.59% | 34.91% | 34.43% | 34.60% |
| PM017 | 3.00% | 3.00% | 3.02% | 2.99% | 3.26% | 3.53% | 3.13% | 3.27% |
| PM019 | 26.20% | 26.20% | 34.48% | 33.54% | 34.57% | 35.61% | 34.13% | 34.71% |
| PX005 | | | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% |
| PX006 | | | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% |
| PX007 | | | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% |
| PX010 | | | -0.16% | -0.17% | -0.03% | 0.10% | -0.10% | -0.03% |
| PX015 | | | -0.22% | -0.22% | 0.00% | 0.23% | -0.11% | 0.01% |
| FOOD MANUFACTURING | | | | | | | | |
| MM039 | 37.64% | 33.51% | 45.36% | 39.97% | 39.97% | 39.97% | 40.00% | 40.03% |
| MM044 | 8.40% | 8.40% | 18.66% | 6.81% | 6.81% | 6.81% | 6.98% | 7.15% |
| MM048 | 5.08% | 5.08% | 3.83% | -7.76% | -7.76% | -7.76% | -7.68% | -7.59% |
| MM051 | 6.00% | 6.00% | 11.93% | -31.98% | -31.98% | -31.98% | -31.84% | -31.71% |
| MM052 | 16.67% | 16.67% | 27.59% | 27.57% | 27.57% | 27.57% | 27.57% | 27.57% |
| MM053 | 10.00% | 10.00% | 12.93% | 7.83% | 7.83% | 7.83% | 7.87% | 7.91% |
| MM054 | 28.65% | 28.65% | 31.99% | 31.95% | 31.95% | 31.95% | 31.95% | 31.95% |
| MM055 | 6.55% | 6.55% | 2.22% | -0.75% | -0.75% | -0.75% | -0.74% | -0.72% |
| MM058 | 44.17% | 39.73% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% |
| MM059 | 5.58% | 4.96% | -1.61% | -28.62% | -28.62% | -28.62% | -28.53% | -28.44% |
| MM060 | 7.73% | 7.73% | 6.59% | -8.19% | -8.19% | -8.19% | -8.16% | -8.12% |
| MM061 | 5.29% | 5.29% | 4.47% | 4.33% | 4.33% | 4.33% | 4.33% | 4.33% |
| MM062 | 6.48% | 6.48% | 10.31% | 8.83% | 8.83% | 8.83% | 8.92% | 9.01% |
| MX039 | | | -1.65% | -1.68% | -1.68% | -1.68% | -1.67% | -1.65% |
| MX044 | | | -2.58% | -10.45% | -10.45% | -10.45% | -10.34% | -10.23% |
| MX048 | | | -5.74% | -14.68% | -14.68% | -14.68% | -14.62% | -14.55% |
| MX051 | | | -4.21% | -27.62% | -27.62% | -27.62% | -27.55% | -27.48% |
| MX052 | | | -4.48% | -4.49% | -4.49% | -4.49% | -4.49% | -4.49% |
| MX053 | | | -5.59% | -8.46% | -8.46% | -8.46% | -8.44% | -8.42% |
| MX054 | | | -0.26% | -0.28% | -0.28% | -0.28% | -0.28% | -0.28% |
| MX055 | | | -7.26% | -8.76% | -8.76% | -8.76% | -8.76% | -8.75% |
| MX058 | | | -1.85% | -1.85% | -1.85% | -1.85% | -1.74% | -1.64% |
| MX059 | | | -8.73% | -27.14% | -27.14% | -27.14% | -27.08% | -27.02% |
| MX060 | | | -3.32% | -14.48% | -14.48% | -14.48% | -14.46% | -14.43% |
| MX061 | | | -3.07% | -3.17% | -3.17% | -3.17% | -3.17% | -3.16% |
| MX062 | | | -2.65% | -3.54% | -3.54% | -3.54% | -3.48% | -3.43% |
| PM040 | 4.60% | 4.60% | 2.30% | 2.30% | 2.30% | 2.30% | 2.31% | 2.31% |
| PM041 | 5.18% | 5.18% | 6.21% | 6.21% | 6.21% | 6.21% | 6.21% | 6.21% |
| PM043 | 6.80% | 6.80% | 8.46% | 8.44% | 8.44% | 8.44% | 8.44% | 8.44% |
| PM050 | 66.94% | 66.94% | 71.86% | 63.97% | 64.40% | 64.83% | 64.30% | 64.64% |
| PX045 | | | -7.52% | -7.53% | -7.53% | -7.53% | -7.53% | -7.53% |
| PX046 | | | -5.19% | -5.29% | -5.29% | -5.29% | -5.29% | -5.29% |
| PX047 | | | -0.57% | -0.88% | -0.88% | -0.88% | -0.77% | -0.67% |
| PX049 | | | -2.24% | -6.20% | -6.20% | -6.20% | -6.15% | -6.10% |
| PX056 | | | -0.45% | -0.45% | -0.45% | -0.45% | -0.38% | -0.31% |

Table 12: Summary of Simple Average Tariffs

| | T94* | T03 | T eh | Tcept | Tbase |
|-------------|-------------|------------|-------------|--------------|--------------|
| Agriculture | 33.80% | 15.60% | 13.60% | 15.60% | 38.51% |
| Food Mfg | 35.81% | 12.80% | 10.98% | 10.56% | 12.23% |
| Others | 20.08% | 5.96% | 5.92% | 5.43% | 5.96% |

* based on Price Comparison from Manasan and Querubin (1997)

Table 13: Comparative Table of Simulation Results
PRODUCTION

No TFP

| OUTPUT | EH | AFTA-CEPT | BASE |
|----------------|-------|-----------|-------|
| agriculture | -0.8 | 0.01 | 1.48 |
| food mfg | -0.18 | -1.02 | -2.9 |
| others | 0 | -0.12 | -0.05 |
| all industries | -0.18 | -0.22 | -0.15 |

with TFP 2%

| OUTPUT | EH | AFTA-CEPT | BASE |
|----------------|-------|-----------|-------|
| agriculture | -0.72 | 0.09 | 1.57 |
| food mfg | -0.18 | -1.02 | -2.9 |
| others | 0 | -0.12 | -0.05 |
| all industries | -0.16 | -0.20 | -0.14 |

with TFP 4%

| OUTPUT | EH | AFTA-CEPT | BASE |
|----------------|-------|-----------|-------|
| agriculture | -0.64 | 0.17 | 1.67 |
| food mfg | -0.18 | -1.02 | -2.9 |
| others | 0 | -0.12 | -0.05 |
| all industries | -0.15 | -0.19 | -0.12 |

with TFP 2% and price adjustment

| OUTPUT | EH | AFTA-CEPT | BASE |
|----------------|-------|-----------|-------|
| agriculture | -0.76 | 0.05 | 1.54 |
| food mfg | -0.16 | -1.00 | -2.87 |
| others | 0 | -0.12 | -0.05 |
| all industries | -0.17 | -0.21 | -0.14 |

with TFP4% and price adjustment

| OUTPUT | EH | AFTA-CEPT | BASE |
|----------------|-------|-----------|-------|
| agriculture | -0.71 | 0.10 | 1.6 |
| food mfg | -0.13 | -0.97 | -2.85 |
| others | 0 | -0.12 | -0.05 |
| all industries | -0.15 | -0.19 | -0.12 |

GVA/INCOME

No TFP

| GVA | EH | AFTA-CEPT | BASE |
|----------------|-------|-----------|--------|
| agriculture | -1.99 | 0.03 | 1.22 |
| food mfg | -0.78 | -3.36 | -10.52 |
| others | 0 | -0.26 | -0.13 |
| all industries | -0.66 | -0.50 | -0.81 |

with TFP 2%

| GVA | EH | AFTA-CEPT | BASE |
|----------------|-------|-----------|--------|
| agriculture | -0.77 | 1.24 | 2.47 |
| food mfg | -0.78 | -3.36 | -10.52 |
| others | 0 | -0.26 | -0.13 |
| all industries | -0.31 | -0.14 | -0.45 |

with TFP 4%

| GVA | EH | AFTA-CEPT | BASE |
|----------------|-------|-----------|--------|
| agriculture | 0.46 | 2.45 | 3.71 |
| food mfg | -0.78 | -3.36 | -10.52 |
| others | 0 | -0.26 | -0.13 |
| all industries | 0.05 | 0.21 | -0.08 |

with TFP 2% and price adjustment

| GVA | EH | AFTA-CEPT | BASE |
|----------------|-------|-----------|--------|
| agriculture | -0.87 | 1.14 | 2.37 |
| food mfg | -0.68 | -3.26 | -10.44 |
| others | 0 | -0.26 | -0.13 |
| all industries | -0.32 | -0.16 | -0.46 |

with TFP4% and price adjustment

| GVA | EH | AFTA-CEPT | BASE |
|----------------|-------|-----------|--------|
| agriculture | 0.26 | 2.27 | 3.53 |
| food mfg | -0.59 | -3.17 | -10.35 |
| others | 0.01 | -0.26 | -0.13 |
| all industries | 0.02 | 0.18 | -0.11 |