

# Agricultural Price Distortions, Poverty and Inequality in the Philippines

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## **Abstract**

This paper analyzes the poverty and inequality implications of removing agricultural and non-agricultural price distortions in the domestic market of the Philippines and abroad. Liberalization in the rest of the world is poverty and inequality reducing, whereas full domestic liberalization increases national poverty and inequality. Poverty declines while inequality increases marginally in the combined scenario of both global and domestic agriculture reform. Although the reduction in the national poverty headcount is small in the latter scenario, the poorest of the poor – particularly those living in the rural areas – emerge as “winners”, given their strong reliance on agricultural production and unskilled labor wages.

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# **Agricultural Price Distortions, Poverty and Inequality in the Philippines**

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The Philippine agricultural sector employs 36 percent of the labor force and accounts for roughly 14 percent of the nation's Gross Domestic Product (GDP). When the agricultural-based food processing sector is included, the whole of agriculture and food contributes 26 percent to GDP. From the 1950s to the 1970s, government policies were biased against agriculture. These policies included the government's import substitution policy until the 1980s which created a bias in favor of manufacturing and penalized returns to agricultural investments and exports, export taxes and exchange rate over-valuation which greatly reduced earnings from agriculture, and government intervention through the creation of government corporations that siphoned off the gains from trade (Intal and Power 1990, David 2003). Then the trade reform program in the 1980s led to a shift from taxing to protecting agriculture relative to non-agricultural sectors, and these policies became more pronounced when the country became a member of the World Trade Organization (WTO) in 1995. As a result, the current system of protection favors agriculture with both applied tariff rates and nominal rates of assistance to agriculture substantially higher than for manufacturing (Aldaba 2005, David, Intal and Balisacan 2009). However, two decades of protection have failed to induce competitiveness and productivity growth in agriculture.

This chapter analyzes what the poverty and inequality implications would be of removing agricultural and non-agricultural price distortions in the domestic markets of the Philippines, and also in markets abroad. The analysis uses results from 'rest of the world trade liberalization' simulations from the global LINKAGE model<sup>1</sup> of the World Bank (see Anderson, Valenzuela and van der Mensbrugge 2010) as exogenous shocks, along with national liberalization shocks, to derive effects based on the Philippine computable general equilibrium (CGE) model of Cororaton and Corong (2009). The global model incorporates

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<sup>1</sup> In this paper, the LINKAGE model (van der Mensbrugge 2005) is also referred to as the global model. Both terms are used interchangeably.

new estimates of agricultural protection/assistance for various developing countries including the Philippines,<sup>2</sup> and simulates scenarios involving full world trade liberalization in all sectors and in agriculture only. The global simulations generate changes in export and import prices for the Philippines at the border, as well as changes in world export demand for Philippine products.<sup>3</sup> These results, together with the new estimates of protection/assistance from David, Intal and Balisacan (2009) for the Philippines, are applied as shocks to the Philippine CGE model in order to analyze the distributional, welfare and poverty impacts of various trade liberalization scenarios for the country.

We conduct our simulation analysis in stages to assess the differing impacts that international markets and domestic market liberalization may entail. In the first stage, we use the changes in the border export and import prices and the changes in the world export demand for Philippine products from the global model into the Philippine model without altering the existing trade protection system in the country. In the second stage, we simulate unilateral trade liberalization in the Philippines without incorporating any changes from the global model. Finally, we combine the rest of the world with the unilateral liberalization shocks to assess their total effects.

Six policy experiments are conducted, with separate scenarios for trade liberalization in all sectors as compared with in agriculture sectors only. The agriculture sector is defined here to include primary agriculture and lightly processed food.<sup>4</sup> In each scenario, we generate results at the macro and sectoral level as well as vectors of changes in household income, consumer prices and sectoral employment shares. The latter three are then used as inputs into a micro-simulation procedure to calculate the impact on poverty and inequality. The latter draws on data from a national household survey conducted in 2000.

The chapter is organized as follows. The next section sheds light on the degree of price distortions and trade protection as well as poverty trends in the Philippines. The following section presents the structure of the Philippine CGE model, which is based on the national social accounting matrix (SAM) as of 2000. The policy experiments and the results

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<sup>2</sup> Estimates of agricultural protection/assistance for the Philippines, based on David, Intal and Balisacan (2009), are incorporated in the World Bank's global agricultural distortions database (Anderson and Valenzuela 2008). Those estimates cover five decades, but the representative values for CGE modeling as of 2004 that are used here are available in Valenzuela and Anderson (2008).

<sup>3</sup> These vectors of changes are generated by simulating the global model with no Philippine trade liberalization.

<sup>4</sup> This definition is maintained throughout the study. Agriculture is defined as primary agriculture (excluding fishing, forestry and agricultural services) and lightly processed food, while non-agriculture refers to all other sectors including highly processed foods, tobacco and beverages.

are then discussed, before the final section provides a summary of findings and some policy implications.

### **Philippine trade and assistance policies and poverty trends**

In 1949, the Philippines embarked on a development strategy geared towards industrial import substitution with lesser emphasis on the agricultural and export sectors. It provided protection to domestic producers of final goods with high tariff rates on non-essential consumer goods and low tariffs on essential producer inputs. However, this policy did not accomplish much, as the growth of manufacturing value added and industrial employment increased minimally. In 1970, the government shifted towards export promotion, with tax exemptions and fiscal incentives given to capital intensive firms located in export processing zones. However, this strategy also achieved very little, as the highly skewed structure of tariff protection in favor of import-substituting manufactured goods remained. Moreover, the imposition of export taxes, the policy of keeping an over-valued exchange rate, and the presence of government corporations which not only regulated domestic prices but also siphoned off gains from domestic and international trade, created a strong bias against agriculture and exports.

The restrictive trade policies adopted between the 1950s and the late 1970s that prevented efficient resource allocation and smooth functioning of markets penalized the domestic economy in three respects. First, import controls resulted in an over-valued exchange rate that favored import-substituting firms. Second, continued protection increased domestic output prices which impeded forward linkages. Third, tariff escalations and import controls weakened backward linkages as tariffs on capital and intermediate goods were kept low relative to finished products (Austria and Medalla 1996). This policy also promoted rent-seeking activities and distorted economic incentives on investments in agriculture. The agricultural sector, which served as the country's backbone in providing the necessary foreign exchange needed by the import-dependent manufacturing sector, stagnated while the industrial sector ventured into import-dependent assembly operations with minimal value-added content and little or no forward and backward linkages.

Realizing the pitfalls of the import-substitution policy followed by an unsuccessful export-promotion strategy, the government implemented a series of trade reform programs

(TRP) starting in 1981.<sup>5</sup> The Philippines also has participated more actively in the multilateral trading system since it joined the World Trade Organization (WTO) in 1995. For example, between 1995 and 1999 the country complied with all of its multilateral commitments within the prescribed timeframes (WTO 1999). These commitments included tariff bindings at a maximum of 10 percentage points over the year 1995 applied rate on roughly 65 percent of all tariff lines, tariff bindings on selected information technology products, and binding of market access in selected services sectors (Austria 2001). Even so, there continues to be a substantial tariff binding overhang, especially in agriculture.<sup>6</sup>

By the turn of the century, the country slowed down its pace of trade reforms (WTO 2005). Although the average applied Most Favored Nation (MFN) tariff rate declined from 9.7 to 5.8 percent between 1999 and 2003, it then rose to 7.4 percent in 2004. This reversal of the tariff adjustment process was brought about by presidential discretion, aimed at helping problematic domestic industries and responding to lobbying from domestic interest groups.

### *Estimates of nominal rate of assistance to agriculture*

David, Intal and Balisacan (2009) recently estimated the nominal rate of assistance (NRA) to key industries in the agricultural sector. The NRA is the percentage difference between the domestic and the border price and thus measures how policy-induced distortions directly affect producer incentives. The NRA for coconut (copra or dried coconut) is negative throughout the years shown in Table 1, largely due to export taxes, a coconut levy, and a copra export ban. The currency devaluation in the 1970s and the world commodity boom in the middle of that decade did not translate into higher profits for coconut farmers, but rather to higher revenue for the government and lower raw material costs for the coconut oil milling industry. Although these policies began to be eliminated from 1986, coconut farmers remain penalized owing to the continued existence of a government corporation which controls 70-80 percent of coconut oil milling, thereby retaining a monopsonistic command over domestic price of copra.

The NRA for corn has always been positive and exhibits an increasing trend. There is not much political pressure on corn compared to rice because it is a subsistence crop for

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<sup>5</sup> The TRPs were major components of the structural programs prescribed by multilateral agencies (including the World Bank and International Monetary Fund) in the 1980s. The Philippines is currently on the fourth phase of its TRP. See Cororaton, Cockburn and Corong (2006) for a detailed discussion.

<sup>6</sup> Tariff binding overhang refers to the difference between a country's bound tariffs (tariff rates which a country commits in the WTO not to exceed) and its applied tariffs.

upland farmers in the Southern part of the country. Nonetheless, it is also a major animal feed ingredient. Among agricultural crops, sugar has had the highest NRA since the 1960s. There was a shift in the burden of protection from United States' consumers in the 1960s and early 1970s when a major part of domestic production was exported to the United States market through an export quota to Filipino producers and food processors (known as the Laurel-Langley Agreement). This agreement ended in 1974, resulting in a dramatic drop in Philippine sugar exports to the United States.<sup>7</sup>

The NRA for chicken has been consistently high and well above that for pork. However, the government imposed the same level of in-quota and out-of-quota tariffs for both commodities after the ratification of the WTO agreement in 1995. On the other hand, cattle were not included as part of Philippines' sensitive products list in the WTO. Hence, cattle's NRA has been low compared to chicken and pork. In the early 1990s, the government attempted to promote cattle fattening activities and allowed duty-free imports of young cattle while at the same time imposing more restrictive non-tariff barriers on beef. Nevertheless, cattle fattening activities did not prosper as tariffs on beef fell.

Before the mid-1980s, the NRAs for agricultural inputs such as fertilizer, agricultural chemicals and farm machinery were generally higher than the NRAs for agricultural crops, averaging well above 20 percent (David, Intal and Baliscan 2009). This was largely due to the government's industrial promotion policies that increased domestic prices of manufactured inputs to agriculture. However, after this period and during the trade liberalization process there were substantial reductions in agricultural input protection, down to around 10 percent in the latter 1990s and to a uniform 3 percent in 2000-04.

### ***Poverty trends***

In both rural and urban areas, over 60 percent of the expenditure of poor households is on food, of which almost half is on cereals, primarily rice and corn (Table 2). Rural dwellers spend proportionately more on food than their urban counterparts. Food consumption among non-poor households is somewhat less (38.8 percent), with urban non-poor households spending the least amount on food and cereals (8 percent).

Figure 1 presents the evolution of the poverty headcount index between 1985 and 2000. The national headcount index decreased from almost 50 percent to roughly 34 percent over that period. However, this fall was mainly concentrated in urban areas, especially in the

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<sup>7</sup> Sugar exports accounted for only 10 percent of domestic production during this period.

National Capital Region where poverty was already low. In contrast, the rural headcount index fell only modestly, from 56 to 49 percent as compared with the fall from 44 to 23 percent for urban areas.

### **The CGE model**

The national CGE model used in this study<sup>8</sup> is calibrated to the year 2000 Social Accounting Matrix (SAM) of the Philippines.<sup>9</sup> There are 41 production sectors and four factors: two labor types (skilled workers with at least a college diploma, and unskilled) plus capital and land. Institutions include the government, firms, households and the rest of the world. Household categories are defined by income deciles. Output (X) is a composite of value added (VA) and intermediate inputs. Output is sold either to the domestic market (D) or to the export market (E) or both. The model assumes perfect substitutability between E and D. A finite elasticity of export demand is assumed. Domestic market supply comes from two sources, domestic output and imports (M), with substitution between D and M depending on the changes in relative prices of D and M and on a constant elasticity of substitution (CES) function.

Sectoral output is a Leontief function of intermediate inputs and value added. Value added in agriculture is a CES function of skilled labor, unskilled labor, capital and land. Non-agricultural value added is also a CES function of the same factors except land. Capital and land are each sector specific, skilled and unskilled labor are mobile across sectors but limited within skill category, and land use is mobile within the agricultural sector.

Households earn their income from factors of production, transfers, foreign remittances and dividends, while at the same time paying direct income tax to the government. Household savings is a fixed proportion of disposable income and household demand is represented by a linear expenditure system (LES).

Government revenue is the sum of direct taxes on household and firm income, indirect taxes on domestic and imported goods, and other receipts. The government spends on consumption of goods and services, transfers and other payments. In the present version of the model, we assume a fixed government balance. Since shifts in policy will result in

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<sup>8</sup> The specification of the model is based on “EXTER” (see Decaluwé, Dumont and Robichaud 2000). For a complete discussion and specification of the model, see Cororaton and Corong, 2009.

<sup>9</sup> See Cororaton and Corong (2009) for details on the SAM construction.



changes in government income and expenditure, the government balance is held fixed through a tax replacement variable. For the present analysis we use an indirect tax replacement on domestic sales, but we also compare the results with the effects under a direct tax replacement on household income. Either way, the tax replacement is endogenously determined so as to maintain a fixed government balance level.

Foreign savings are held fixed. The nominal exchange rate is the model's numéraire. We introduce a weighted price of investment and derive total investment in real prices, which is held fixed by introducing an adjustment factor in the household savings function. The equilibrium in the model is achieved when supply of and demand for goods and services are equal and investment is equal to savings.

Table 3 presents the production structure in the SAM. Generally, agricultural and service sectors have higher value added shares (as a percent of output) compared to the industrial sector. In agriculture, coconut and forestry have the highest value added shares of almost 90 percent, while petroleum refining has the lowest among industrial sectors at 14 percent. The capital-output ratio in agriculture is generally lower than in industry and service sectors. The largest employer of labor is the service sector. More than 90 percent of labor input into agricultural production is unskilled labor. The share of skilled labor employed in the industrial sector is substantially higher compared to the agricultural sector. The structure of indirect tax reveals that tobacco and alcohol followed by petroleum have the highest indirect tax, with 23 and 18 percent, respectively (last column of table 3).

Table 4 shows that almost 50 percent of exports come from electrical products. A major part of this sector is the semi-conductor industry. Sizeable amounts of exports also come from machinery and transport equipment. Almost 90 percent of the production of electrical products is exported. The machinery and transport equipment industry also has a high export intensity ratio, at 73 percent,<sup>10</sup> followed by other manufacturing, coconut oil, leather, fertilizer, other chemicals, garments, fruit processing, and fish processing. On the import side, electrical products as well as machinery and transport equipment account for 35 and 12 percent of total imports, respectively, so these two sectors have high import intensity ratios. Similar sectors where imports are a major source of domestic supply include other crops, cattle, mining and crude oil, milk and dairy, fruit processing, fish processing, coconut oil, sugar milling, other food, textile, leather, paper, fertilizer, other chemicals, petroleum, cement, and transportation and communication.

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<sup>10</sup> The export (import) intensity ratio is defined as the sector's exports (imports) divided by its output (domestic supply).

Table 4 also shows the values of key elasticity parameters used in the model: the import substitution elasticity ( $\sigma_m$ ) in the CES composite good function, the production substitution elasticity ( $\sigma_{va}$ ) in the CES value added production function, and the export demand elasticity ( $\eta$ ) which is obtained from the Armington parameter of the global model.

The consumption structure of households is presented in table 5. Rice is a significant staple for Filipinos, especially among poorer households: it accounts for 14.3 of total expenditure for the first decile of households, but its share decreases substantially as households become richer. Fish and meat, fruits and vegetables, and other food are the other significant items in household consumption. Generally, lower income groups have substantial expenditure on food and food related products. For instance, food items accounts for 42.4 of total expenditure for the first decile compared with 13.4 percent for the tenth decile. Richer households spend more on services relative to poorer ones. Products of special interest are corn, sugar, chicken, meat processing, milk and dairy, fruit processing, fish processing, rice and corn milling, sugar milling. The share of expenditure on these special products declines as we move to the higher decile: they account for 25 percent of consumption in the first decile but only 8.6 percent in the tenth decile.

## **Simulations**

All policy experiments reported in this study use an indirect tax replacement to maintain fixed government balance. We generate results at the macro and sectoral level as well as vectors of changes in household income, consumer prices and sectoral employment shares. The latter three are then used as inputs in a micro-simulation procedure that calculates the impact on poverty and inequality, based on year 2000 household survey. Sensitivity analysis with alternative direct tax replacement schemes is also undertaken.

### ***Definition of policy experiments***

Table 6 shows the sectoral correspondence between the Philippine CGE and the global model, as well as information on the sectoral tariff rates and export subsidies based on the new estimates of nominal rate of protection/assistance for the Philippines. The Philippine CGE model is initially solved using new these estimates of protection/assistance to serve as

the base from which all subsequent simulations are compared. In certain policy experiments, the global simulation results from the LINKAGE model are used as policy shocks to the Philippine model, following the method proposed by Horridge and Zhai (2006).

The six policy experiments are:

- *ROW-ALL* – Rest of the world (ROW) trade liberalization in all sectors, excluding the Philippines. This experiment uses the results of the global model under full ROW liberalization in Table 6 and retains all existing trade distortions (tariff rates and export subsidies) in the Philippines.
- *ROW-AGR* – Rest of the world liberalization in agriculture and lightly processed food only. As with *ROW-ALL*, we utilize the results of the global model except just under ROW agriculture and lightly processed food liberalization, again with all existing Philippine trade distortions being retained.
- *PHIL-ALL* – Unilateral trade liberalization in all sectors. All Philippine trade distortions are eliminated. No changes in the sectoral border export and import prices or in export demand are included in this unilateral liberalization.
- *PHIL-AGR* – Unilateral agriculture trade liberalization. All trade distortions in primary agriculture and lightly processed foods in the Philippines are eliminated. Similar to *PHIL-ALL*, there are no changes in the sectoral border export and import prices or export demand in this unilateral liberalization.
- *COMB-ALL* – Full rest of the world and Philippine trade liberalization, that is, *ROW-ALL* and *PHIL-ALL* combined to cause global liberalization.
- *COMB-AGR* – Rest of the world and Philippine liberalization in agriculture and lightly processed foods. This scenario combines *ROW-AGR* and *PHIL-AGR*.

## ***Results***

In this section we present modeling results from the six policy experiments lists in the previous section sequentially, and then report the impacts on household income and welfare and then on poverty and inequality. The section concludes with some additional results that show the sensitivity of the core results to changes in the treatment of tax adjustments in the model.

### ***Rest of the world trade liberalization in all sectors (ROW-ALL)***

Results from the LINKAGE model in table 6 indicate that this first policy experiment leads to higher export prices and export demand for Philippine products. Within agriculture, a significant shift in export demand is observed among sugar milling as well as raw fruits and vegetables (with 1.5 and 1.1 percent, respectively). This is also true for fruit and fish processing (1.2 percent), whereas slightly more modest export demand shifts are observed in other industrial and services sectors. At the same time, full ROW liberalization would lead to higher world import prices for most Philippine goods.

Table 7 shows that overall export prices in local currency increase more in the agricultural sectors than the non-agricultural sectors, by an average of 3.6 versus 2.4 percent. So too do export volumes: they expand 9.8 percent for agriculture compared with a modest 0.3 percent rise for non-agricultural exports. Local import prices also increase more in agriculture than in non-agriculture (3.0 versus 1.1 percent). Substitution towards imported goods is observed owing to a larger increase in the price of domestically produced goods relative to their imported counterparts. Because of this, agricultural and non-agricultural import volumes increase by 0.9 and 1.1 percent, respectively (second column of table 7).

The entire agricultural sector benefits from the more-favorable international market conditions. Agricultural output and value added prices increase by 3.5 and 3.9 percent, respectively. Thus, returns to agriculture-specific factors, in particular land and agricultural capital (which increase by 5.1 and 4.7 percent, respectively), rise relative to wage rates (3 percent) and to the returns to non-agricultural capital (2.9 percent). Unskilled wage increase

slightly more than skilled wage, as unskilled workers are used more intensively in the expanding agricultural sector.

By contrast, for non-agricultural sectors, the fall in domestic sales offsets export expansion, such that the volume of output contracts by 0.1 percent. Essentially, this is traceable to the import-domestic price substitution effects discussed earlier, the fall in world import prices for essential consumer goods like garments (table 6), and the real exchange rate appreciation. In spite of falling output volumes, non-agricultural output prices still increase by 2.5 percent owing to higher export prices. Hence, returns to factors such as non-agricultural capital and skilled workers, which are used intensively in non-agriculture, increase as well.

### ***Rest of the world trade liberalization in agriculture only (ROW-AGR)***

The results of *ROW-AGR* scenario are similar but smaller in magnitude compared to *ROW-ALL*. We will only focus on different results in this scenario since the mechanisms driving the model results are essentially the same to *ROW-ALL*. Agricultural exports increase by 11 percent (table 7) mainly due to significant export demand shift in sugar, raw fruits and vegetables (1.6 and 1.2 percent, respectively, in Table 6). A distinct feature of this scenario is that domestic agriculture prices increase less than the rise in agricultural import prices (1.7 versus 2.7 percent). In the face of more expensive agricultural imports, domestic demand expands while imports fall (0.1 and 1.2 percent, respectively). With this, agricultural output expands as agricultural domestic demand account for a larger share of domestic agriculture output.

The absence of non-agricultural liberalization results in a 0.1 percent decline in non-agricultural exports, since most non-agricultural goods have little or no change in world export demand (table 6). Non-agricultural imports rise while domestic demand declines (0.3 versus 0.1 percent), as domestic prices increase more relative to import prices (0.9 and 0.3 percent, respectively). The contraction in domestic demand together with the 0.1 percent decline in exports leads to a 0.1 percent dip in non-agricultural output. Nonetheless, non-agricultural output and value added prices still increase, owing to higher export and domestic prices.

***Full unilateral trade liberalization in the Philippines (PHIL-ALL)***

This experiment eliminates all sectoral tariff rates and export subsidies in the Philippines and assumes no changes from the global model. *PHIL-ALL* leads to a 7.2 and 2.1 percent decline in the local price of imported agricultural and non-agriculture products, respectively (Table 7). Import prices fall more and import volumes correspondingly increase more in agriculture than in non-agriculture, as the initial distortions were higher in agriculture. In the face of cheaper imports relative to domestic prices, domestic demand declines for local agricultural and non-agricultural producers. At the same time, they benefit from cost savings on their imported inputs, resulting in 2.3 and 1.7 percent falls in the domestic cost of production in the agricultural and non-agricultural sectors, respectively. The real exchange rate depreciates by 1.6 percent, making Philippine-made products relatively cheaper in the international market. This, coupled with falling domestic prices in the face of cheaper imports and input cost savings, encourages producers to reallocate resources towards the export market (table 7).

While exports rise for both agriculture and non-agriculture, domestic demand falls more for agriculture. Since domestic demand represents a larger share in agricultural output, agricultural output contracts while non-agricultural output expands. Output and value added prices in both agriculture and non-agriculture fall, but the fall in the former is higher than in the latter. The result of all these adjustments is a fall in all factor returns, with factors used intensively in agriculture experiencing a much higher reduction: returns to agricultural capital and land decline by 5.7 and 4.6 percent, respectively, whereas non-agricultural capital returns fall by just 1.3 percent. Nominal wages for unskilled workers fall more relative to skilled wages, as unskilled workers are used more intensively in the agricultural sector.

***Unilateral agriculture only trade liberalization in the Philippines (PHIL-AGR)***

Unilateral liberalization in agriculture and lightly processed food results in substantial expansion in agricultural imports (17 percent) owing to the significant decline in local agricultural import prices (7.9 percent). At the same time, the removal of domestic agricultural distortions also generates cost savings for the export-oriented lightly processed sector, given its reliance on primary agricultural inputs. Thus, agricultural industries, which in the context of this study include lightly processed food processors, reorient their production towards the export market, resulting in a 6.2 percent export expansion and a 2.8

percent reduction in domestic sales. The net result is a contraction in agricultural output, since domestic sales comprise a larger share of total agricultural output. As a result, agricultural value added and value added prices fall along with the returns to all agricultural factors. Returns to land drop 3.5 percent, returns to agricultural capital decline by 4.5 percent, and wages of unskilled workers fall by 1.2 percent.

The results for non-agricultural sectors are the opposite. Import prices increase marginally by 0.1 percent while domestic prices fall by 0.7 percent, resulting in 0.2 percent expansion in domestic sales. Domestic prices decrease more relative to world prices (0.7 versus 0.3 percent), leading to a 1 percent export expansion. This, together with higher domestic demand, allows overall non-agricultural output to expand by 0.3 percent.

A comparison of the sectoral results between *PHIL-ALL* and *PHIL-AGR* in table 7 confirms the heavier price burden of agricultural protection on the Philippine economy. Indeed, removing agricultural distortions account for at least two thirds of the price reduction in export, import, domestic, output, value added and consumer price index.<sup>11</sup> This is also true for factor prices, where between 40 and 80 percent of the fall in factor returns is traceable to the removal of agricultural protection.

### ***Rest of the world and Philippine trade liberalization in all sectors (COMB-ALL)***

This experiment combines both rest of the world and domestic trade liberalization. The ROW trade liberalization impact dominates the unilateral trade liberalization effects for both agriculture and non-agricultural sectors. Local import prices decline particularly in the agricultural sector, in spite of the increase in world commodity prices, indicating the substantial level of domestic distortions in the Philippines. Cheaper imports crowd out their domestically produced counterparts leading to a contraction in domestic sales for domestic producers, once again hitting the agricultural sector much harder than the non-agricultural sector. At the same time, rising world export prices, real exchange rate depreciation and cost savings on imported inputs allow domestic producers to successfully reorient a large share of their production toward the more profitable export market. Given the greater reliance of the agricultural sector on domestic sales, the net impact is a contraction in the agricultural sector and an expansion of the non-agricultural sector.

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<sup>11</sup> Ratio of prices in *PHIL-AGR* relative to *PHIL-ALL* in Table 7: Export (-1.3/-1.8 = 0.7); Import (-7.9/-7.2 = 1.1); Domestic (-2.2/-2.3 = 1.0); Output (-2.3/-3.1 = 0.8); Value Added (-2.9/-4 = 0.7); Consumer price index (-1.1/-1.3 = 0.8); Skilled wage (-0.9/-1.6=0.4); Unskilled wage (-1.2/-2.5=0.5); return to land (-3.5/-4.7=0.7); return to agricultural capital (-4.5/-5.7=0.8); return to non-agricultural capital (-0.5/-1.3=0.4).

Output prices for both agriculture and non-agricultural sectors increase (0.4 and 0.9 percent, respectively), with the former experiencing a smaller increase owing to a substantial level of domestic agricultural distortions in the base. All factor prices with the exception of returns to agricultural capital increase especially for non-agricultural sectors, although by less than in *ROW-ALL*. The output volume impacts are the opposite, with unilateral liberalization dominating rest of the world trade liberalization effects. Thus, overall agricultural output declines while overall output of non-agricultural sectors improves (-1.9 and 0.3 percent, respectively).

### ***Rest of the world and Philippine trade liberalization in agriculture only (COMB-AGR)***

The unilateral agricultural trade liberalization (*PHIL-AGR*) scenario dominates global agricultural trade liberalization (*ROW-AGR*). Output, price and volume in agriculture decline, as do agricultural factor prices. Once again, local import prices in agriculture decline in spite of rising world commodity prices, indicating the substantial level of domestic distortions in the Philippines. The positive impact of higher world commodity prices is dominated by the negative impact of domestic agricultural distortions imposed by the government. Thus, returns to factors used intensively in agriculture (land, agricultural capital and unskilled wages) fall in response to declining agricultural output prices.

By contrast, local import prices in non-agricultural sectors increase. This is expected since the country's non-agricultural trade distortions are already low relative to international standards.<sup>12</sup> Thus, the overall output price of non-agricultural products increases by 0.2 percent, resulting in an output expansion and consequently higher returns to non-agricultural factors (Table 7).

### ***Household income, consumer price index, and welfare***

The changes in nominal household income, nominal consumer price indices (based on household-specific consumer baskets) and real income/welfare are presented in Table 8. In interpreting the changes in household-specific consumer prices, recall from above that primary and processed food account for a significant share of household expenditure,

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<sup>12</sup> This is because the various previous rounds of trade reforms in the country primarily focused on reducing non-agricultural distortions.



especially for the lower income groups, and that both primary and processed food items have higher initial tariff rates than other goods (tables 4 and 5).

*ROW-ALL*, the scenario of global trade liberalization in all sectors (excluding the Philippines) registers the greatest increase in nominal household income, as rising world prices translate into higher factor returns. For the same reason, consumer prices also increase the most in this scenario. Nonetheless, the greater nominal income growth for all households outweighs the detrimental effects of rising consumer prices, with the result that welfare increases for all household groups. Income and consumer price variations tend to be higher for the poorest deciles, which are more tightly linked to the agricultural sector and which post generally better welfare results. The results under *ROW-AGR* are similar but less than half as large. Results are qualitatively similar and again display a generally pro-poor effect (Table 8).

The two domestic liberalization scenarios (*PHIL-ALL* and *PHIL-AGR*) all result in falling consumer prices, driven by the reduction in local import and export prices as the Philippine's own trade-related distortions are eliminated. This price reduction is greater when (agricultural and non-agricultural) domestic liberalizations are combined. We see that removing domestic agricultural distortions reduces consumer prices more than the removal of non-agricultural distortions, given the high share of agriculture in household consumption and their higher initial levels of protection. A comparison of changes in consumer prices for scenarios *PHIL-ALL* and *PHIL-AGR* show that roughly 1.8 out of the 2.2 percent reduction in the consumer price index of the first decile is due to the elimination of domestic agricultural distortions alone (Table 8).

Also observe that nominal incomes fall under the two unilateral liberalization scenarios. However, the consumer price effects dominate such that, despite falling nominal incomes, welfare/real income increases more under agricultural trade liberalization. Furthermore, these welfare gains accrue proportionately more to poorer deciles owing to their higher agricultural consumption.

These welfare gains are further bolstered with *ROW* and unilateral trade liberalization combined. Nominal income increases under the full *ROW* and domestic trade liberalization scenario, but this is somewhat offset by soaring consumer prices. Overall, it is the combined global and domestic agricultural trade liberalization (*COMB-AGR*) scenario that provides the highest increase in welfare. This is because the nominal income gains from the rest of the world trade liberalization are largely conserved and to which are added the consumer price reductions from domestic trade liberalization. In this case, the poorest deciles emerge as the

“winners”, both due to domestic agricultural trade liberalization and the pro-agricultural nature of rest of the world trade liberalization.

### *Effects on poverty and inequality*

The micro-simulation process utilized in the present study<sup>13</sup> makes use of the year 2000 family income and expenditure survey (FIES) of the Philippines (NSO 2000). In order to estimate the likely poverty and inequality impacts of labor market conditions arising from trade liberalization, we use in a sequential manner certain information from the CGE model and apply it as an input into the micro-simulation procedure. In particular, we use the vectors of changes in total income of households; wage income, capital income and other income; household specific consumer price indices to update the nominal value of the poverty line; and sectoral employment shares.

The method we employ is to incorporate changes in the employment status of households after the simulation through a random process. In this way, it is possible to capture households/laborers moving in and out of employment (at the micro level) by taking into account changes in sectoral employment arising from a policy shift (at the macro level). For instance, households with no labor income, due to unemployment, may become employed and consequently earn labor income. Similarly, employed households may become unemployed and earn no labor income at all after the policy change. Household labor income is affected by changes in wages as well as the chance of getting unemployed after the policy shock. The micro-simulation process is repeated 30 times,<sup>14</sup> allowing us to derive confidence intervals<sup>15</sup> on our Foster-Greer-Thorbecke (FGT) indices and Gini coefficient estimates.

In order to take advantage of the richness of the micro-simulation procedure, we calculate poverty indices and Gini coefficients based on the demographic characteristics of the household head: gender, skill level and location (urban or rural). In total, the final FGT indices are derived for 8 categories of household heads. Using demographic characteristics instead of income deciles to evaluate changes in poverty and income distribution is preferable, because it allows for a better policy evaluation and identification of the gainers and losers from trade liberalization.

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<sup>13</sup> This is a modified approach of the original version proposed by Vos (2005).

<sup>14</sup> Vos (2005) observes that 30 iterations are sufficient, as repeating this process additionally does not significantly alter the results.

<sup>15</sup> Results on confidence intervals are available from the contact author upon request.

The poverty and inequality results in all experiments are summarized in Table 9. Inequality marginally worsens in all unilateral liberalization scenarios, but slightly improves in the ROW liberalization scenarios. The latter is due to the increase in nominal income among poorer households while the former results from greater decrease in poorer household's nominal income relative to richer households (table 8).

Rest of the world liberalization reduces poverty at the national level and favors unskilled households, as rising world demand and export prices for Philippine-made products bring about higher agricultural factor returns (table 7). In contrast, unilateral liberalization favors skilled households such that national poverty indices worsen. This is because the removal of the Philippines' own distortions results in resource reallocation towards outward oriented and externally competitive non-agricultural sectors that employ skilled workers intensively.

Poverty generally falls under the combined global and domestic liberalization scenario, with the poverty reducing impact of ROW liberalization dominating the poverty increasing effect of unilateral liberalization. In contrast, inequality marginally rises with the inequality increasing effect of unilateral liberalization dominating the inequality reducing effect of ROW liberalization. The combined global and domestic agricultural reform is the most poverty friendly scenario. Although the national poverty headcount decreases marginally, all household groups with the slight exception of urban households headed by an unskilled worker share in the benefits from the poverty friendliness of trade liberalization. Indeed, the poorest of the poor particularly those residing in the rural areas emerge as "winners", because of their reliance on agricultural production and wages unskilled labor.

These results are consistent with those obtained by Cororaton, Cockburn, and Corong (2006). However, their results suggest a worsening of both the poverty gap and severity of poverty while the current results find the opposite, especially under the combined ROW and Philippine agricultural liberalization. This difference is traceable to the use of more-recent estimates of trade protection on key food items (such as rice, corn, sugar and processed meat) which, when eliminated, result in a significant fall in consumer prices faced by lower-income groups (table 7).

*Sensitivity analysis: indirect and direct tax replacement*

The results discussed above are derived using indirect tax replacement. Are the results sensitive to the tax replacement used? This section compares the above results with those when a direct tax replacement closure is adopted. We focus on analyzing the poverty and inequality results of *COMB-ALL* (full ROW and domestic trade liberalization) and *COMB-AGR* (ROW and domestic agriculture trade liberalization).

The sensitivity analyses are presented in Table 9. The directions of change in poverty indices and inequality are generally the same regardless of the tax replacement scheme. However, the magnitudes are marginally higher under the direct tax scenario, owing to lesser increase in consumer prices since direct taxes are used to compensate for foregone tariff revenues.

### **Summary and policy implications**

Starting in the 1980s, the government shifted from taxing to protecting agriculture relative to non-agricultural sectors. However, two decades of protection failed to induce competitiveness and productivity growth as agriculture became inward looking and inefficient. This study analyzed the poverty and inequality implications of removing the agricultural and non-agricultural price distortions as of 2004 in the domestic markets of the Philippines, and compared those effects with what would happen if policies abroad were to be liberalized.

Rest of the world liberalization (ROW) reduces poverty at the national level and favors unskilled households in the Philippines, as higher world export prices and export demand for Philippine-made products allow Filipino producers to benefit from favorable international market conditions. Nominal income improves significantly, outweighing the impact of higher consumer prices. ROW trade liberalization in all sectors generates almost uniform increases in real incomes across household types, while ROW trade liberalization in agriculture brings about progressive changes in real income that benefit lower-income groups more.

Unilateral trade liberalization leads to falling consumer prices, driven by the reduction in local import and export prices as the Philippine's own trade-related distortions are eliminated. Import prices fall more and import volumes correspondingly increase more in agriculture than in non-agriculture, as the initial distortions are higher in agriculture. However, unilateral liberalization favors skilled households such that national poverty indices

and inequality worsen. This is because the removal of the Philippines' own distortion results in resource reallocation towards outward-oriented and externally competitive non-agricultural sectors that employ skilled workers intensively.

The combined global and domestic agricultural reform appears to be the most poverty friendly scenario for the Philippines. Although the national poverty headcount decreases only marginally, all household groups with the slight exception of urban households headed by an unskilled worker share the benefits from the poverty friendliness of that trade liberalization. The poorest of the poor – particularly those living in the rural areas – emerge as “winners”, given their reliance on agricultural production and wages from unskilled labor. Thus, taking a pro-active trade liberalization stance, by fully participating with the rest of the world in trade liberalization efforts through including its own domestic liberalization appears to be in the best interests of the Philippines. Sensitivity analysis confirms that the results are not affected by differing tax replacement assumptions, as a similar pattern of effects emerge regardless of whether indirect or direct tax replacements are used.

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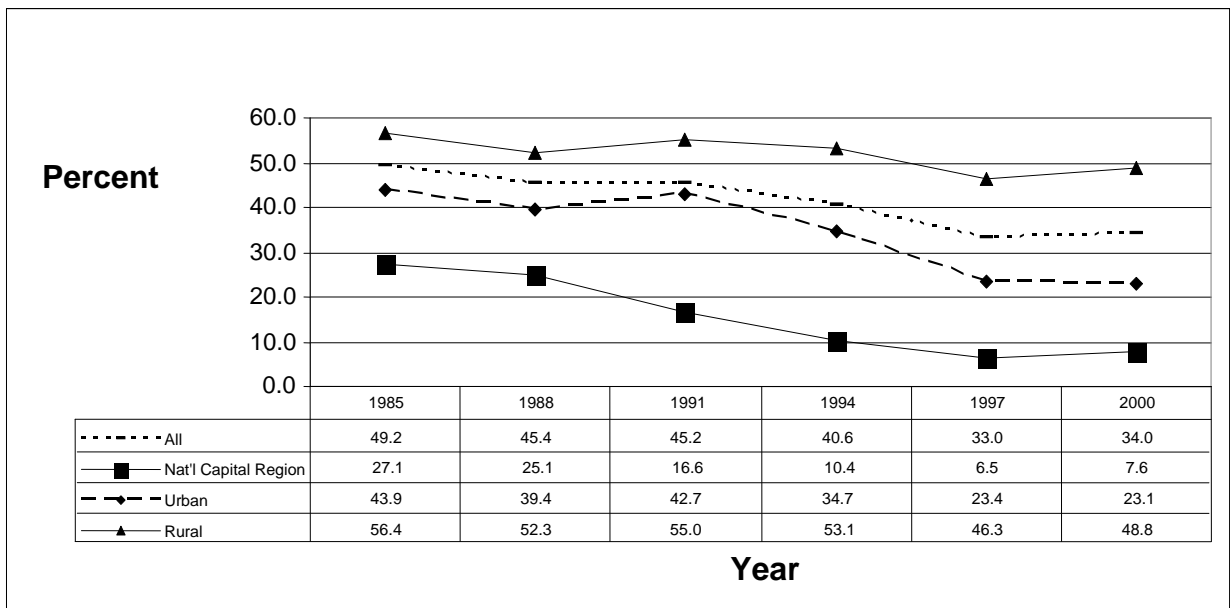
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Figure 1: Trends in poverty indices, the Philippines, 1985 to 2000



Source: NSO (various years).



Table 1: Nominal rate of assistance to major agricultural commodities, the Philippines, 1960 to 2004

(percent)

	1960-64	1965-69	1970-74	1975-79	1980-84	1985-89	1990-94	1995-99	2000-04
Rice	6	-1	-10	-18	-16	14	21	53	51
Corn	19	38	14	24	20	60	63	79	55
Sugar:	18	121	-12	2	60	13	49	97	79
Domestic	4	78	-39	-29	14	112	45	99	75
Export	28	154	16	17	89	161	77	90	130
Coconut:									
Copra	-12	-20	-25	-17	-27	-21	-15	-8	-14
Coconut oil	-3	-18	-21	-8	-17	-4	7	1	6
Beef	60	-16	-47	-18	-2	-8	26	15	-17
Pork	-30	14	3	-6	36	51	25	21	-8
Chicken	-	67	29	28	38	43	57	42	52
Other	10	10	32	32	16	17	10	5	5

Source: David, Intal and Balisacan (2009).

Table 2: Poverty incidence and food expenditure shares, the Philippines, 1997 and 2000

	<b>Rural</b>				<b>Urban</b>			
	1997		2000		1997		2000	
Poverty incidence (percent of pop'n)	50.7		48.8		21.6		18.6	
Expenditure shares	<b>Poor</b>		<b>Nonpoor</b>		<b>Poor</b>		<b>Nonpoor</b>	
(percent of total):	1997	2000	1997	2000	1997	2000	1997	2000
All food	63.6	63.6	47.6	47.6	61.4	60.8	38.8	38.7
Cereals (mostly rice)	29.5	28.8	15.4	14.6	24.5	23	8.6	8.2

Source: NSO (1997, 2000).

Table 3: Production structure, the Philippines,<sup>a</sup> 2000

(percent)

	Value added/output (%)	Value added share	Output share	Employment share	Capital labor ratio (%)	Share of skilled labor	Share of unskilled labor	Land output ratio (%)	Indirect tax rate
<b>Agriculture</b>									
<b>Primary Agriculture</b>									
Palay	77.5	2.0	1.4	3.1	41	6.2	93.8	7.3	3.3
Corn	78.5	0.6	0.4	1.0	25	6.2	93.8	5.3	3.5
Coconut	88.9	0.6	0.4	0.8	59	6.2	93.8	10.3	0.9
Fruits and vegetables	79.7	2.2	1.5	2.4	88	6.2	93.8	11.3	3.4
Sugar	69.7	0.3	0.2	0.3	83	6.2	93.8	11.2	1.8
Other crops	77.3	0.6	0.4	0.5	105	6.2	93.8	13.7	1.3
Hogs	63.7	1.4	1.1	1.6	84	9.5	90.5	6.8	2.2
Cattle	71.9	0.4	0.3	0.4	111	9.5	90.5	11.0	1.2
Chickens	60.7	1.3	1.1	1.4	92	9.5	90.5	8.7	2.4
<b>Lightly Processed Food</b>									
Meat processing	20.5	1.1	2.8	0.8	196	25.0	75.0		1.6
Milk and dairy	31.1	0.3	0.5	0.2	210	25.0	75.0		1.0
Coconut and edible oil	28.7	0.5	0.9	0.2	574	25.0	75.0		0.9
Rice and corn milling	34.8	1.4	2.1	1.2	126	25.0	75.0		2.0
Sugar milling	22.0	0.2	0.4	0.1	191	25.0	75.0		1.4
<b>Non-Agriculture</b>									
<b>Other primary products and Mining</b>									
Agricultural services	84.7	0.4	0.2	0.5	61	6.2	93.8	10.0	2.8
Forestry	89.4	0.2	0.1	0.1	217	16.9	83.1	33.0	3.9
Fishing	77.4	2.8	1.9	2.1	216	2.4	97.6	3.8	1.7
Mining	63.0	0.6	0.5	0.4	253	30.5	69.5		2.2
Crude oil and natural gas	34.6	0.0	0.0	0.0					0.0
<b>Highly Processed Food, and Tobacco</b>									
Fruit processing	36.5	0.4	0.5	0.3	166	25.0	75.0		2.2
Fish processing	28.5	0.3	0.6	0.2	355	25.0	75.0		1.3
Other processed food	30.9	1.3	2.3	1.2	162	25.0	75.0		1.6
Tobacco and alcohol	40.4	1.0	1.4	1.0	156	57.7	42.3		22.9
<b>Manufacturing</b>									
Textile	37.3	1.0	1.4	1.0	130	6.4	93.6		0.7
Garments and footwear	46.1	2.1	2.4	1.9	162	4.5	95.5		0.5
Leather and rubber-wear	42.9	0.7	0.9	0.7	143	9.8	90.2		0.4
Paper and wood products	39.3	1.7	2.3	1.5	163	23.5	76.5		0.7
Fertilizer	39.7	0.1	0.2	0.1	140	37.8	62.2		0.5
Other chemicals	41.1	1.9	2.4	1.5	201	37.8	62.2		1.0
Petroleum	14.2	0.7	2.6	0.8	114	42.4	57.6		17.7
Cement and related products	41.7	0.7	0.9	0.6	165	29.8	70.2		1.9
Metal and related products	36.9	1.9	2.7	1.4	210	8.4	91.6		1.1
Machineries and transport equipment	40.0	3.6	4.8	1.8	368	30.4	69.6		1.7
Electrical and related products	45.5	8.5	9.9	7.3	171	39.5	60.5		1.2
Other manufacturing	48.1	1.4	1.6	1.4	135	6.7	93.3		1.8
<b>Other Industry</b>									
Construction	53.0	3.9	3.9	5.5	67	14.9	85.1		1.4
Utilities	68.3	3.4	2.6	1.9	324	43.7	56.3		3.2
<b>Services</b>									
Transportation & communications	53.6	7.0	6.9	5.3	210	18.2	81.8		1.2
Wholesale trade	66.1	13.2	10.6	10.7	192	25.6	74.4		1.1
Other service	63.5	20.2	16.8	17.5	171	31.5	68.5		2.9
Public services	72.2	8.2	6.0	19.3	41	60.7	39.3		0.0

<sup>a</sup> va = value added; x = output; \*Share of labor type to total labor employed in the sector.

Source: Based on the national model in Cororaton, and Corong (2009).

Table 4: Trade structure and elasticity parameters, the Philippines, 2000

	Elasticities <sup>a</sup>				Exports (percent)		Imports (percent)	
	sig_va	sig_m	eta	sig_e	share	Intensity <sup>b</sup>	share	Intensity <sup>b</sup>
<b>Agriculture</b>								
<b>Primary Agriculture</b>								
Palay	0.8	2.2	4.5	2.2	0.0	0.0	0.0	0.0
Corn	0.8	2.5	4.9	2.5	0.0	0.1	0.1	8.4
Coconut	0.8	2.4	4.8	2.4	0.0	0.2	0.0	0.0
Fruits and vegetables	0.8	2.0	3.9	2.0	1.2	15.1	0.3	6.2
Sugar	0.8	3.0	5.9	3.0	0.0	0.0	0.0	0.0
Other crops	0.8	2.0	3.9	2.0	0.1	2.8	1.2	44.2
Hogs	0.8	2.0	3.9	2.0	0.0	0.0	0.0	0.0
Cattle	0.8	2.0	3.9	2.0	0.0	0.2	0.1	9.2
Chicken	0.8	2.0	3.9	2.0	0.0	0.0	0.0	0.4
<b>Lightly Processed Food</b>								
Meat processing	1.5	2.0	3.9	2.0	0.0	0.0	0.4	3.4
Milk and dairy	1.5	2.0	3.9	2.0	0.0	1.7	1.0	33.6
Coconut and edible oil	1.5	2.0	3.9	2.0	1.5	32.9	0.6	19.0
Rice and corn milling	1.5	2.2	4.5	2.2	0.0	0.0	0.8	8.8
Sugar milling	1.5	3.0	5.9	3.0	0.2	8.3	0.1	8.2
<b>Non-Agriculture</b>								
<b>Other primary products and Mining</b>								
Agricultural services	0.8	2.2	4.3	2.2	0.0	0.0	0.0	0.1
Forestry	0.8	2.2	4.3	2.2	0.1	10.3	0.0	0.6
Fishing	0.8	2.2	4.3	2.2	0.8	7.9	0.0	0.3
Mining	0.8	2.2	4.3	2.2	0.4	15.8	1.4	45.8
Crude oil and natural gas	0.8	2.2	4.3	2.2	0.0	0.0	7.5	99.6
<b>Highly Processed Food, and Tobacco</b>								
Fruit processing	1.5	2.0	3.9	2.0	0.7	24.1	0.3	13.9
Fish processing	1.5	2.0	3.9	2.0	0.7	22.0	0.2	7.4
Other processed food	1.5	2.0	3.9	2.0	0.6	4.8	0.9	9.3
Tobacco and alcohol	1.5	2.0	3.9	2.0	0.1	1.4	0.3	5.7
<b>Manufacturing</b>								
Textile	1.5	2.1	4.1	2.1	1.2	16.9	2.7	36.7
Garments and footwear	1.5	2.1	4.1	2.1	0.2	1.8	0.1	1.3
Leather and rubber-wear	1.5	2.0	4.1	2.0	1.3	26.6	2.3	45.6
Paper and wood products	1.5	2.0	4.1	2.0	2.3	19.7	1.8	19.3
Fertilizer	1.5	2.0	4.1	2.0	0.1	16.8	0.5	49.4
Other chemicals	1.5	2.0	4.1	2.0	0.9	7.4	5.0	35.4
Petroleum	1.5	2.0	4.1	2.0	1.6	11.8	1.8	16.6
Cement and related products	1.5	2.0	4.1	2.0	0.4	9.5	0.5	13.8
Metal and related products	1.5	2.0	4.1	2.0	2.5	17.4	4.2	31.7
Machineries and transport equipment	1.5	2.0	4.1	2.0	18.3	73.2	12.5	70.6
Electrical and related products	1.5	2.0	4.1	2.0	45.9	89.0	35.2	88.9
Other manufacturing	1.5	2.0	4.1	2.0	3.7	44.3	2.0	36.1
<b>Other Industry</b>								
Construction	1.5	1.0	2.1	1.0	0.3	1.5	0.3	1.9
Utilities	1.5	1.0	2.1	1.0	0.0	0.0	0.0	0.0
<b>Services</b>								
Transportation & communications	1.5	1.0	2.1	1.0	3.7	10.2	8.1	24.2
Wholesale trade	1.5	1.0	2.1	1.0	2.9	5.2	0.6	1.5
Other service	1.5	1.0	2.1	1.0	8.4	9.5	6.9	10.0
Public services								

<sup>a</sup> sig\_va = substitution parameter in CES value added function; sig\_m = substitution parameter in CES composite good function; eta = export demand elasticity; sig\_e = substitution parameter in CET.

<sup>b</sup> export ÷ output; imports ÷ composite good.

Source: Based on the national model in Cororaton, and Corong (2009).

Table 5: Structure of household expenditure, by decile, the Philippines,<sup>a</sup> 2000  
(percent)

	Decile									
	1	2	3	4	5	6	7	8	9	10
<b>Agriculture</b>										
<b>Primary Agriculture</b>										
Corn	0.5	0.4	0.4	0.3	0.3	0.2	0.2	0.2	0.1	0.1
Coconut	0.3	0.3	0.3	0.3	0.2	0.2	0.2	0.2	0.2	0.1
Fruits and vegetables	4.1	3.8	3.6	3.4	3.1	2.8	2.5	2.2	1.9	1.3
Sugar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Other crops	0.2	0.2	0.2	0.2	0.2	0.1	0.1	0.1	0.1	0.0
Chickens	0.8	0.9	0.9	1.0	1.1	1.1	1.1	1.1	1.0	0.7
<b>Lightly Processed Food</b>										
Meat processing	4.2	4.6	4.9	5.6	6.2	6.8	7.1	6.8	6.3	4.2
Milk and dairy	1.1	1.2	1.3	1.3	1.4	1.3	1.3	1.2	1.1	0.8
Coconut and edible oil	0.7	0.6	0.6	0.6	0.5	0.5	0.4	0.4	0.3	0.2
Rice and corn milling	14.3	12.9	11.7	10.0	8.4	6.9	5.7	4.5	3.4	1.8
Sugar milling	1.2	1.1	1.0	1.0	0.9	0.8	0.7	0.6	0.5	0.3
<b>Non-Agriculture</b>										
<b>Other primary products and Mining</b>										
Forestry	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Fishing	6.8	6.4	6.1	5.5	4.9	4.2	3.6	3.1	2.5	1.5
Mining	0.1	0.1	0.1	0.0	0.0	0.0	0.1	0.1	0.1	0.1
<b>Highly Processed Food, and Tobacco</b>										
Fruit processing	1.2	1.1	1.0	0.9	0.9	0.8	0.7	0.6	0.5	0.4
Fish processing	2.0	1.9	1.8	1.6	1.4	1.2	1.1	0.9	0.7	0.4
Other processed food	5.1	4.8	4.7	4.3	4.0	3.7	3.3	2.9	2.5	1.6
Tobacco and alcohol	4.5	4.8	4.9	4.8	4.5	4.2	3.6	3.1	2.6	1.6
<b>Mining and Manufacturing</b>										
Textile	0.8	0.9	1.0	1.0	1.0	1.0	0.9	0.9	0.9	0.8
Garments and footwear	1.7	1.9	2.1	2.2	2.2	2.1	2.1	2.0	2.0	1.7
Leather and rubber-wear	0.3	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.3
Paper and wood products	0.8	0.7	0.7	0.7	0.6	0.6	0.6	0.6	0.7	0.9
Fertilizer	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Other chemicals	2.7	2.4	2.2	2.1	1.9	1.8	1.8	1.9	2.2	3.1
Petroleum	1.9	1.6	1.6	1.6	1.6	1.5	1.5	1.4	1.3	0.9
Cement and related products	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Machineries and transport equipment	0.1	0.3	0.3	0.5	0.7	0.9	1.0	1.1	1.1	1.3
Electrical and related products	0.3	0.7	0.8	1.1	1.5	1.8	1.9	2.1	2.2	2.4
Other manufacturing	0.6	0.8	0.9	0.9	1.0	1.1	1.1	1.1	1.1	1.0
Other Industry										
Utilities	3.4	3.0	2.9	2.9	2.9	2.8	2.8	2.6	2.3	1.7
<b>Services</b>										
Transportation & communications	6.0	7.0	7.3	8.2	9.4	10.1	11.5	12.9	14.7	17.4
Wholesale trade	17.8	17.5	17.1	16.7	16.3	15.9	15.7	15.5	15.3	14.6
Other service	16.5	17.5	18.8	20.8	22.2	24.8	26.9	29.3	32.0	38.7
<b>Total</b>	100	100	100	100	100	100	100	100	100	100

<sup>a</sup> There is no household consumption from "Agricultural Services" and "Crude oil and Natural Gas Mining".

Source: Based on the national model in Cororaton, and Corong (2009)

Table 6: Exogenous demand and price shocks due to liberalization in the rest of the world

Philippine CGE Model	LINKAGE Model	Trade distortions		Full trade liberalization, excluding Philippines <sup>b</sup>			Agric. trade liberalization excluding Philippines <sup>c</sup>		
		Tariff, %	Export subsidy, % (<0 = tax)	Export price, % change	Import price, % change	Export demand shifter, <sup>a</sup> %	Export price, % change	Import price, % change	Export demand shifter, <sup>a</sup> %
<b>Agriculture</b>									
<b>Primary Agriculture</b>									
Palay	Paddy rice	19.6	0.0	0.0	0.0	1.0	0.0	0.0	1.0
Corn	Other grains	29.6	0.0	0.0	6.1	1.0	0.0	5.7	1.0
Coconut	Oil seeds	4.8	-10.0	0.0	-0.8	1.0	0.0	-0.5	1.0
Fruits and vegetables	Vegetables and fruits	8.7	0.0	5.7	2.4	1.1	3.8	1.7	1.2
Sugar	Sugar cane and beet	0.0	0.0	0.0	0.0	1.0	0.0	0.0	1.0
Other crops	Other crops	3.9	0.0	5.9	1.3	1.0	3.9	1.4	1.0
Hogs	Other livestock	-18.7	0.0	5.6	-1.0	1.0	3.6	0.1	1.0
Cattle		-18.7	0.0	5.6	-1.0	1.0	3.6	0.1	1.0
Chicken	Cattle sheep etc	10.0	0.0	0.0	5.6	1.0	0.0	5.5	1.0
<b>Lightly Processed Food</b>									
Meat processing	Beef and sheep meat	9.0	0.0	3.7	2.8	0.5	2.0	4.5	0.5
Milk and dairy	Dairy products	4.1	0.0	4.9	7.0	1.1	4.2	7.4	1.1
Coconut and edible oil	Vegetable oils and fats	4.4	0.0	2.6	-1.1	1.0	0.9	-1.7	1.0
Rice and corn milling	Processed rice	29.0	0.0	5.3	4.3	0.8	3.3	1.6	0.8
Sugar milling	Refined sugar	73.2	0.0	3.9	2.1	1.5	2.0	0.8	1.6
<b>Non-Agriculture</b>									
<b>Other primary products and Mining</b>									
Agricultural services		2.7	-1.0	2.8	0.6	1.1	1.0	0.9	1.0
Forestry		2.7	-1.0	2.8	0.6	1.1	1.0	0.9	1.0
Fishing	Other primary products	2.7	-1.0	2.8	0.6	1.1	1.0	0.9	1.0
Mining		2.7	-1.0	2.8	0.6	1.1	1.0	0.9	1.0
Crude oil and natural gas		2.7	-1.0	2.8	0.6	1.1	1.0	0.9	1.0
<b>Highly Processed Food, and Tobacco</b>									
Fruit processing	Other food, beverages and tobacco	6.0	0.0	3.6	1.6	1.2	2.0	-0.4	1.0
Fish processing		6.0	0.0	3.6	1.6	1.2	2.0	-0.4	1.0
Other processed food		6.0	0.0	3.6	1.6	1.2	2.0	-0.4	1.0
Tobacco and alcohol		6.0	0.0	3.6	1.6	1.2	2.0	-0.4	1.0
<b>Manufacturing</b>									
Textile		8.0	-1.7	2.0	-0.2	1.0	1.1	0.4	1.0
Garments and footwear	Textile and wearing apparel	8.0	-1.7	2.0	-0.2	1.0	1.1	0.4	1.0
Leather and rubber-wear		8.0	-1.7	2.0	-0.2	1.0	1.1	0.4	1.0
Paper and wood products		3.5	0.0	2.1	1.5	1.0	0.7	0.3	1.0
Fertilizer		3.5	0.0	2.1	1.5	1.0	0.7	0.3	1.0
Other chemicals		3.5	0.0	2.1	1.5	1.0	0.7	0.3	1.0
Petroleum		3.5	0.0	2.1	1.5	1.0	0.7	0.3	1.0
Cement and related products	Other manufacturing	3.5	0.0	2.1	1.5	1.0	0.7	0.3	1.0
Metal and related products		3.5	0.0	2.1	1.5	1.0	0.7	0.3	1.0
Machineries and transport equipment		3.5	0.0	2.1	1.5	1.0	0.7	0.3	1.0
Electrical and related products		3.5	0.0	2.1	1.5	1.0	0.7	0.3	1.0
Other manufacturing		3.5	0.0	2.1	1.5	1.0	0.7	0.3	1.0
<b>Other Industry</b>									
Construction		0.0	0.0	2.9	-0.1	1.0	1.1	0.2	1.0
Utilities	Services	0.0	0.0	2.9	-0.1	1.0	1.1	0.2	1.0
<b>Services</b>									
Transport and communications		0.0	0.0	2.9	-0.1	1.0	1.1	0.2	1.0
Wholesale trade	Services	0.0	0.0	2.9	-0.1	1.0	1.1	0.2	1.0
Other service		0.0	0.0	2.9	-0.1	1.0	1.1	0.2	1.0

<sup>a</sup> Derived using  $(1+0.01*p)(1+0.01*q)^{(1/ESUBM)}$ , where p is export price change, q export volume change and ESUBM is the Armington import elasticity, taken from the Linkage Model. <sup>b</sup> Rest of the World liberalization in all sectors, excluding the Philippines. <sup>c</sup> Rest of the World liberalization in agriculture only, excluding the Philippines.

Source: Linkage model simulations (see Anderson, Valenzuela and van der Mensbrugge 2010).

Table 7: Aggregate simulation results of prospective liberalizations for the Philippines, agriculture and non-agriculture<sup>a</sup>  
(percent change from the baseline)

	ROW-ALL		ROW-AGR		PHIL-ALL		PHIL-AGR		COMB-ALL		COMB-AGR	
	Agri.	Non-Agri.	Agri.	Non-Agri.	Agri.	Non-Agri.	Agri.	Non-Agri.	Agri.	Non-Agri.	Agri.	Non-Agri.
<b>Real GDP</b>	0.3		0.1		0.8		0.2		1.1		0.3	
<b>Prices</b>												
Real exchange rate	-1.0		-0.4		1.6		0.8		0.6		0.4	
Export price in local currency	3.6	2.4	2.0	0.8	-1.8	-1.0	-1.3	-0.3	1.8	1.4	0.7	0.4
Import price in local currency	3.0	1.1	2.7	0.3	-7.2	-2.1	-7.9	0.1	-4.5	-1.1	-5.4	0.5
Domestic price	3.5	2.6	1.7	0.9	-2.3	-1.7	-2.2	-0.7	1.2	0.8	-0.5	0.2
Output price	3.5	2.5	1.7	0.9	-3.1	-1.6	-2.3	-0.6	0.4	0.9	-0.6	0.3
Value added price	3.9	2.9	2.0	1.0	-4.0	-1.6	-2.9	-0.7	-0.1	1.3	-0.8	0.2
Consumer price index	2.6		1.0		-1.3		-1.1		1.2		-0.1	
<b>Volume</b>												
Imports	0.9	1.1	-1.2	0.3	15.1	2.1	17.0	0.7	16.2	3.2	15.8	1.0
Exports	9.8	0.3	11.0	-0.1	8.5	3.5	6.2	1.1	19.5	3.8	18.2	0.9
Domestic demand	0.2	-0.2	0.1	-0.1	-3.1	-0.6	-2.8	0.2	-2.9	-0.8	-2.6	0.0
Composite good	0.2	0.2	0.0	0.0	-0.8	0.0	-0.4	0.1	-0.6	0.1	-0.4	0.1
Output	0.6	-0.1	0.6	-0.1	-2.5	0.3	-2.4	0.3	-1.9	0.3	-1.7	0.2
Value added	0.7	-0.1	0.7	-0.1	-2.3	0.3	-2.2	0.3	-1.6	0.2	-1.5	0.2
<b>Factor Prices</b>												
Nominal wages of skilled workers	2.9		1.0		-1.6		-0.9		1.3		0.1	
Nominal wages of unskilled workers	3.1		1.1		-2.2		-1.2		0.8		-0.1	
Nominal return to land	5.1		3.0		-4.7		-3.5		0.3		-0.5	
Nominal return to capital	4.7	2.9	2.9	0.9	-5.7	-1.3	-4.5	-0.5	-1.2	1.6	-1.7	0.4

<sup>a</sup> Agri includes primary agriculture and lightly processed food; Non-Agri includes other primary products, highly processed foods, manufacturing and services.

ROW-ALL - Rest of the World Liberalization in all sectors, excluding the Philippines.

ROW-AGR - Rest of the World Liberalization in agriculture only, excluding the Philippines.

PHIL-ALL - Unilateral Full trade liberalization - Philippines only.

PHIL-AGR - Unilateral Agricultural trade liberalization - Philippines only.

COMB-ALL - ROW-ALL and PHIL-ALL combined.

COMB-AGR - ROW-AGR and PHIL-AGR combined.

Source: Authors' national CGE model simulation results.

Table 8: Effects of prospective liberalizations on real household consumption, by income group, the Philippines

(percent)

Household	ROW-ALL			ROW-AGR			PHIL-ALL		
	Change in nominal income	Change in consumer price	EV <sup>a</sup>	Change in nominal income	Change in consumer price	EV <sup>a</sup>	Change in nominal income	Change in consumer price	EV <sup>a</sup>
Decile 1	3.3	2.9	0.4	1.3	1.2	0.1	-1.9	-2.2	0.3
Decile 2	3.3	2.9	0.4	1.3	1.1	0.1	-1.9	-2.0	0.2
Decile 3	3.3	2.8	0.4	1.3	1.1	0.1	-1.9	-2.0	0.1
Decile 4	3.2	2.8	0.4	1.2	1.1	0.1	-1.8	-1.8	0.0
Decile 5	3.2	2.8	0.4	1.2	1.1	0.1	-1.8	-1.7	-0.1
Decile 6	3.1	2.7	0.4	1.2	1.1	0.1	-1.7	-1.6	-0.2
Decile 7	3.0	2.6	0.4	1.1	1.1	0.1	-1.7	-1.4	-0.2
Decile 8	2.9	2.6	0.4	1.1	1.0	0.1	-1.6	-1.3	-0.3
Decile 9	2.8	2.5	0.3	1.1	1.0	0.0	-1.5	-1.2	-0.3
Decile 10	2.9	2.4	0.5	1.1	1.0	0.1	-1.4	-1.0	-0.4
Overall	3.0	2.6	0.4	1.1	1.0	0.1	-1.6	-1.3	-0.3

Household	PHIL-AGR			COMB-ALL			COMB-AGR		
	Change in nominal income	Change in consumer price	EV <sup>a</sup>	Change in nominal income	Change in consumer price	EV <sup>a</sup>	Change in nominal income	Change in consumer price	EV <sup>a</sup>
Decile 1	-1.2	-2.0	0.8	1.4	0.7	0.7	0.1	-0.8	0.9
Decile 2	-1.2	-1.8	0.7	1.4	0.8	0.6	0.1	-0.7	0.8
Decile 3	-1.2	-1.8	0.6	1.4	0.8	0.5	0.1	-0.6	0.7
Decile 4	-1.2	-1.6	0.4	1.4	0.9	0.4	0.1	-0.5	0.5
Decile 5	-1.1	-1.5	0.3	1.4	1.0	0.3	0.1	-0.4	0.4
Decile 6	-1.1	-1.3	0.2	1.3	1.1	0.2	0.1	-0.2	0.3
Decile 7	-1.1	-1.2	0.1	1.3	1.2	0.1	0.0	-0.1	0.2
Decile 8	-1.1	-1.1	0.0	1.3	1.2	0.1	0.0	0.0	0.1
Decile 9	-1.1	-1.0	-0.1	1.3	1.3	0.0	0.0	0.0	0.0
Decile 10	-1.0	-0.8	-0.3	1.4	1.4	0.0	0.0	0.2	-0.1
Overall	-1.1	-1.1	0.0	1.4	1.2	0.1	0.0	-0.1	0.1

<sup>a</sup> EV = equivalent variation in income.

ROW-ALL - Rest of the World Liberalization in all sectors, excluding the Philippines.

ROW-AGR - Rest of the World Liberalization in agriculture only, excluding the Philippines.

PHIL-ALL - Unilateral Full trade liberalization - Philippines only.

PHIL-AGR - Unilateral Agricultural trade liberalization - Philippines only.

COMB-ALL - ROW-ALL and PHIL-ALL combined.

COMB-AGR - ROW-AGR and PHIL-AGR combined.

Source: Authors' national CGE model simulation results.



Table 9: Income inequality and poverty effects of prospective liberalizations by location, gender and skills, the Philippines

(percent change relative to 2000 index)

Variable <sup>a</sup>	2000 Index	ROW-ALL	ROW-AGR	PHIL-ALL	PHIL-AGR	COMB-ALL	COMB-AGR	COMB-ALL	COMB-AGR	
										Indirect Tax Replacement
<b>All Philippines</b>	Gini	0.51	-0.2	-0.2	0.4	0.3	0.2	0.1	0.1	0.1
	P0	33.5	-0.9	-0.6	1.1	0.4	0.1	-0.1	0.0	-0.1
	P1	10.3	-1.9	-1.2	1.6	0.4	-0.4	-0.9	-0.4	-0.7
	P2	4.3	-2.8	-2.0	2.0	0.4	-0.8	-1.5	-0.9	-1.3
<b>All Urban</b>	Gini	0.48	-0.2	-0.2	0.4	0.3	0.2	0.1	0.2	0.1
	P0	18.6	-1.6	-0.9	2.0	0.8	0.1	-0.2	0.1	0.0
	P1	5.0	-1.9	-1.0	3.2	1.7	0.4	-0.1	0.4	0.1
	P2	2.0	-2.0	-1.1	4.7	2.7	0.8	0.0	0.9	0.5
Urban-male-skilled	P0	3.2	0.1	0.0	-1.5	-1.4	-0.7	-0.7	-1.2	-1.6
	P1	0.7	-1.4	-0.2	-2.0	-3.4	-2.2	-2.6	-3.4	-3.4
	P2	0.2	-1.7	-0.4	-2.6	-4.4	-2.7	-3.3	-4.4	-4.3
Urban-male-unskilled	P0	23.3	-1.6	-0.9	2.1	0.9	0.1	-0.2	0.1	0.1
	P1	6.4	-1.8	-1.0	3.2	1.7	0.5	-0.1	0.5	0.2
	P2	2.5	-2.0	-1.1	4.8	2.8	0.8	0.1	1.0	0.5
Urban-female-skilled	P0	0.9	0.0	0.0	-2.3	-1.9	-1.0	-1.5	-1.2	-1.4
	P1	0.1	-2.5	-0.6	-0.8	-3.1	-2.7	-3.4	-2.8	-3.7
	P2	0.0	-4.1	-1.0	-0.2	-4.4	-4.1	-5.2	-4.4	-5.5
Urban-female-unskilled	P0	15.2	-2.1	-1.2	1.8	0.6	-0.1	-0.4	0.1	-0.2
	P1	3.9	-2.3	-1.1	3.7	2.3	0.5	0.0	0.5	0.1
	P2	1.6	-2.4	-1.3	5.1	3.4	1.0	0.1	1.0	0.6
<b>All Rural</b>	Gini	0.43	-0.1	-0.1	0.5	0.2	0.2	0.1	0.1	0.1
	P0	48.7	-0.9	-0.6	0.6	0.0	-0.1	-0.3	-0.2	-0.3
	P1	15.9	-1.4	-0.8	1.6	0.4	-0.1	-0.6	-0.2	-0.5
	P2	6.8	-1.7	-0.9	2.7	1.1	0.1	-0.6	0.0	-0.4
Rural-male-skilled	P0	12.0	0.0	0.0	-1.4	-2.1	-1.6	-3.1	-1.7	-2.8
	P1	3.5	-1.0	-0.2	-1.4	-2.3	-1.8	-2.2	-1.7	-1.9
	P2	1.4	-1.2	-0.3	-1.5	-2.7	-2.2	-2.6	-2.0	-2.3
Rural-male-unskilled	P0	52.4	-0.9	-0.6	0.6	0.0	-0.1	-0.3	-0.2	-0.3
	P1	17.2	-1.3	-0.7	1.6	0.5	-0.1	-0.6	-0.2	-0.5
	P2	7.4	-1.6	-0.9	2.7	1.2	0.1	-0.6	0.0	-0.4
Rural-female-skilled	P0	14.7	0.0	0.0	-0.7	-2.1	0.0	-0.8	-0.2	-1.0
	P1	4.1	-1.0	-0.2	-1.1	-4.4	-1.1	-2.5	-1.2	-2.5
	P2	1.4	-1.6	-0.3	-1.6	-6.3	-1.7	-3.7	-1.9	-3.8
Rural-female-unskilled	P0	34.9	-1.3	-0.9	0.8	0.2	-0.2	-0.4	-0.2	-0.1
	P1	10.8	-1.8	-1.1	2.0	0.6	-0.1	-0.6	-0.1	-0.4
	P2	4.4	-2.3	-1.3	3.7	1.6	0.3	-0.4	0.2	-0.1

<sup>a</sup> Gini = Gini Coefficient; P0=poverty headcount; P1=poverty gap; P2=poverty severity

ROW-ALL - Rest of the World Liberalization in all sectors, excluding the Philippines.

ROW-AGR - Rest of the World Liberalization in agriculture only, excl. the Philippines.

PHIL-ALL - Unilateral Full trade liberalization - Philippines only.

PHIL-AGR - Unilateral Agricultural trade liberalization - Philippines only.

COMB-ALL - ROW-ALL and PHIL-ALL combined.

COMB-AGR - ROW-AGR and PHIL-AGR combined.

Source: Authors' national CGE model simulation results.