Global Trade Reforms, Poverty and Inequality in the Philippines[1]

Caesar B. Cororaton, Erwin L. Corong and John Cockburn[2]

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Abstract

This paper analyzes the poverty and inequality implications of removing agricultural and non-agricultural price distortions in the international and domestic markets of the Philippines. Rest of world liberalization is poverty reducing, whereas domestic liberalization increases national poverty and inequality. Combined global and domestic agriculture reform appears to be poverty and inequality friendly. Although the reduction in national poverty headcount and inequality is small, the poorest of the poor emerge as "winners" given their reliance on agricultural production and higher returns on unskilled labor wages.

Keywords: Poverty, Agricultural Trade, Trade Liberalization, Philippines

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[2] C. Cororaton (c.cororaton@cgiar.org) – International Food Policy Research Institute; E. Corong (erwin.corong.1@ulaval.ca) and J. Cockburn (jcoc@ecn.ulaval.ca) – Poverty and Economic Policy (PEP) Research Network and Laval University. We are grateful to Kym Anderson, Thomas Hertel, Will Martin, Ernesto Valenzuela, Dominique van der Mensbrugghe and participants at the "Agricultural Price Distortions, Inequality and Poverty Workshop", Washington DC, 16-17 November 2007. Funding for this study was provided by the World Bank-Netherlands Partnership Program (BNPP). E. Corong and J. Cockburn would like to acknowledge additional funding from the Poverty and Economic Policy (PEP) research network, which is financed by the Australian Aid Agency, the Canadian International Development Agency and the International Development Research Centre.

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1. Introduction

The Philippine agricultural sector employs 35 percent of the labor force and accounts for roughly 20 percent of Gross Domestic Product (GDP). With food processing included, agriculture contributes 40 percent of GDP and employs two-thirds of the labor force. From the 1950s to the 1970s, government policies were biased against agriculture (David, 2003; Intal and Power, 1990). These policies included: (a) the government's import substitution policy until the 1980s which created a bias in favor of manufacturing and against agriculture and exports, effectively penalizing returns to agricultural investments; (b) export taxes and exchange rate over-valuation, which greatly reduced earnings from agriculture; and (c) government intervention through the creation of government corporations that siphoned off the gains from trade (Intal and Power 1990).

With the advent of the Philippines' trade reform program in the 1980s, the government shifted from taxing towards protecting agriculture relative to non-agricultural sectors. These policies became more pronounced especially 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 manufacturing (Aldaba 2005; David, Intal and Balisacan 2006). However, the two decades of protection failed to induce competitiveness and productivity growth in agriculture.

This paper analyzes the poverty and inequality implications of removing agricultural and non-agricultural price distortions in the international markets and in the domestic markets of the Philippines. The analysis uses world trade liberalization results from the global LINKAGE model[3] of the World Bank (van der Mensbrugghe, 2004) and derives results for rest of the world and domestic liberalization from the Philippine computable general equilibrium (CGE) model of Cororaton and Corong (2007). The global model incorporates new estimates of net protection/assistance for various countries including the Philippines[4] 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[5]. These information together with the new estimates of protection/assistance of David, Intal and Balisacan (2006) for the Philippines, are applied as shocks to the Philippine CGE model in order to analyze the distribution, welfare and poverty impacts of various trade liberalization scenarios on 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 exiting trade protection system in the country. In the second stage, we simulate unilateral trade

[3] In this paper, the LINKAGE model is also referred to as the global model. Both terms are used interchangeably.
[4] Estimates of net protection/assistance for the Philippines were based on David, Intal and Baliscan (2006).
[5] These vectors of changes are generated by simulating the global model with no Philippine trade liberalization.

liberalization in the Philippines without incorporating any changes from the global model. Finally, we combine both rest of the world and unilateral liberalization to assess the total effects.

Six policy experiments are conducted with separate scenarios for trade liberalization in all sectors and in agriculture sectors only. In this paper, agriculture sector includes primary agriculture and lightly processed food[6]. 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 input to a micro-simulation procedure to calculate the impact on poverty and inequality based on year 2000 household survey.

The paper is organized as follows. Section 2 sheds light on the degree of trade protection in the Philippines, while section 3 presents the structure of the Philippine CGE model based on the year 2000 social accounting matrix (SAM). Section 4 lays out the policy experiments and the results, whereas section 5 provides a summary of findings and some insights for policy.

2. Philippine Trade Policies and Poverty Trends

2.1 Trade Policies

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 rates 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. But this strategy achieved very little as the continued presence of a highly skewed inter-sectoral 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 the 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 created serious distortions that prevented resource allocation and efficient functioning of markets (Austria and Medalla, 1996). They 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.

This policy structure promoted rent-seeking activities and distorted economic incentives on investments in agriculture. The agricultural sector, which served as the country's backbone that provided the necessary foreign exchange needed by the import-dependent manufacturing sector, stagnated and eroded its comparative advantage. This prolonged system of protection

[6] This definition is maintained throughout the paper, i.e., agriculture is defined as primary agriculture (excluding fishing, forestry and agricultural services) and lightly processed food, while non-agriculture includes all other sectors including highly processed foods, tobacco and beverages.

simply resulted in the industrial sector venturing on import-dependent-assembly-type 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 1981[7].

The Philippines participated in the multilateral trading system when it joined the World Trade Organization (WTO) in 1995. Between 1995 and 1999 the country has complied with all of its multilateral commitments within the prescribed timeframes (WTO 1999). These commitments include: (a) tariff bindings at a maximum of 10 percentage points over the year 1995 applied rate on roughly 65 percent of all tariff lines; (b) tariff bindings on selected information technology products; and (c) binding of market access in selected services sectors (Austria, 2001). In spite of these, substantial tariff overhang[8] especially in agriculture remained.

By the turn of the century, the country slowed down on further promoting 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 however went up to 7.4 percent in 2004. This reversal resulted from a tariff adjustment process brought about by presidential discretion to help problematic domestic industries and lobbying from domestic groups.

2.2 Estimates of Nominal Rate of Assistance

David, Intal and Balisacan (2006) recently estimated the nominal rate of assistance (NRA) to agriculture and non-agricultural sectors. The NRA is the percentage difference between the domestic and the border price and thus measures how policy-induced distortions directly affect producer incentives. Table 2.1 shows estimates of NRA to major agricultural commodities. The NRA for coconut (copra or dried coconut) is negative through the years largely due to export tax, coconut levy, and copra export ban. The currency devaluation in the 1970s and the world commodity boom did not translate into higher profits for coconut farmers, but higher revenue for the government and lower raw material costs for the coconut oil milling industry. Although these policies were eliminated beginning 1986, coconut farmers remain penalized owing to the continued existence of a government corporation which control 70 to 80 percent of coconut oil milling, thereby retaining monopsonist command over domestic prices 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 eaten as subsistence crop among upland farmers in the Southern part of the country. Nonetheless, it is a major animal feed ingredient. Among agricultural crops, sugar has the highest NRA since the 1960s. There was a shift in the burden of protection from United States' (US) consumers in the 1960s and early 1970s when a major part of domestic production was exported to the US market through an export quota to Filipino producers and food processors (known as the Laurel-Langley

[7] The TRPs were major components of the structural programs prescribed by multilateral agencies (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

[8] Tariff overhang is the difference between bound tariffs (tariff rates which a country commit not to exceed in the WTO) and applied tariffs

Agreement). This ended in 1974 resulting in a dramatic drop in Philippine sugar exports to the US[9].

The NRA for chicken has been consistently high when compared to hog. However, the government imposed the same level of in-quota and out-quota tariffs for both commodities after the ratification of the WTO agreement in 1995. On the other hand, cattle was not included as part of Philippines' sensitive products list in the WTO. Hence, cattle's NRA has been low compared to chicken and hog. 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 imposed more restrictive non-tariff barrier on beef. Nevertheless, cattle fattening activities did not prosper as tariffs on beef fell.

Table 2.1 - Nominal Rate of Direct Assistance to Major Agricultural Commodities in the Philippines, (%)

	1960-4	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 Use	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
Others	10	10	32	32	16	17	10	5	5

Source: David, Intal, and Balisacan, 2007

Table 2.2 - Nominal Rate of Direct Assistance to Agricultural Inputs in the Philippines, (%)

	1960-4	1965-69	1970-74	1975-79	1980-84	1985-89	1990-94	1995-99	2000-04
Fertilzer /a/									
Urea	49	55	-13	28	21	11	5	3.4	3
Ammophos	17	32	-9	54	19	15	12	3	3
Pesticide /b/	24	24	29	35	35	20	16	7.2 /c/	3
Tractors /b/									
2-wheel	24	20	21	24	24	12	10	10	3
4-wheel	24	20	21	24	24	12	10	10	3
Treshers /b/	24	24	24	24	24	30	22	10	3
Water pumps /b/	46	46	46	46	46	30	24	10	3

/a/ Based on price comparison, i.e., the percentage difference between the ex-warehouse price and the CIF import unit value

/b/ Based on book tariff rates. Implicit tariff from 1960-84 includes the import tariff and advance sale tax (10 percent and 25 percent) mark-up respectively. The advance sale tax was abolished in 1986 and hence the implicit tariffs from 1985 onwards includes tariff rate only.

/c/ This refers to insecticide

Source: David, Intal, and Balisacan, 2007

[9] It should be noted that sugar exports only accounted for 10 percent of domestic production during this period.

Before the mid-1980s, the NRAs for agricultural inputs such as fertilizers, agricultural chemicals, and farm machineries were generally higher than the NRAs for agricultural crops, with the exception of sugar (Table 2.2). 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 was a substantial reduction in the NRAs for agricultural inputs. During the period 2000-04, the NRAs on agricultural inputs were at pegged at a uniform rate of 3 percent.

2.3 Poverty Trends

In both rural and urban areas, over 60 percent of poor households' expenditure is on food, of which almost half is on cereals—primarily rice and corn (Table 2.3). Rural dwellers spend proportionately more on food than their urban counterparts. Food consumption among non-poor households is slightly less, with urban non-poor households spending the least amount on food and cereals (38 and 8 percent respectively).

Figure 2.1 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 by the year 2000. However, this fall was mainly concentrated in urban areas, especially in the capital (National Capital Region), where poverty is already low. In contrast, the rural headcount index only fell by 13 percent during the last two decades (from 56.6 to 48.8 percent versus 27.1 to 7.6 percent in NCR and 43.9 to 23.1 percent in all urban areas).

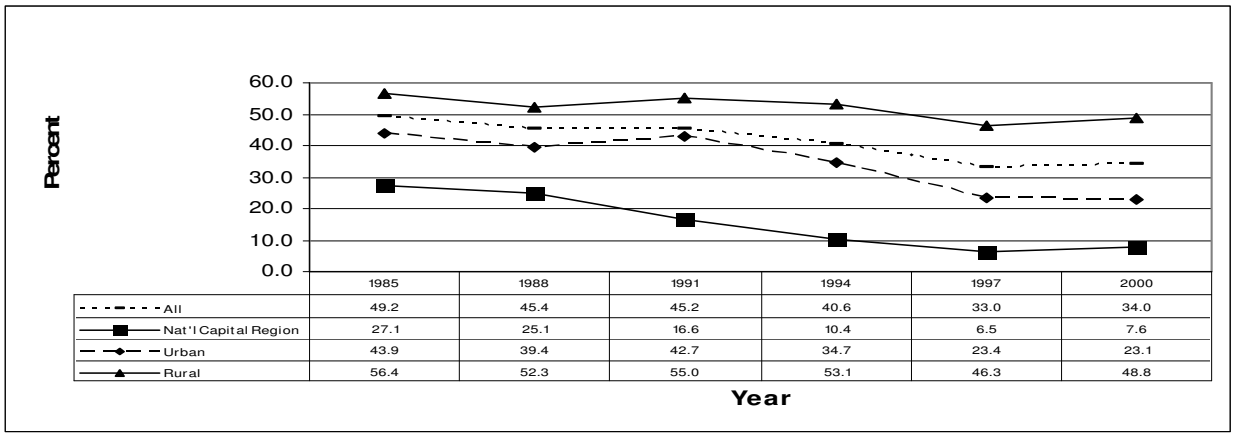
Table 2.3 - Food and poverty

	Rural				Urban			
Poverty		1997	2000			1997	2000	
Incidence		50.7	48.8			21.6	18.6	
	Poor		Nonpoor		Poor		Nonpoor	
Consumption % /a/	1997	2000	1997	2000	1997	2000	1997	2000
Food	63.6	63.6	47.6	47.6	61.4	60.8	38.8	38.7
Cereals /b/	29.5	28.8	15.4	14.6	24.5	23	8.6	8.2

/a/ Percent of Total; /b/ largely rice

Source: 1997 and 2000 Family Income and Expenditure Survey.

Figure 2.1 - Trends in Poverty Indices



	1985	1988	1991	1994	1997	2000
All	49.2	45.4	45.2	40.6	33.0	34.0
Nat'l Capital Region	27.1	25.1	16.6	10.4	6.5	7.6
Urban	43.9	39.4	42.7	34.7	23.4	23.1
Rural	56.4	52.3	55.0	53.1	46.3	48.8

3. The CGE Model

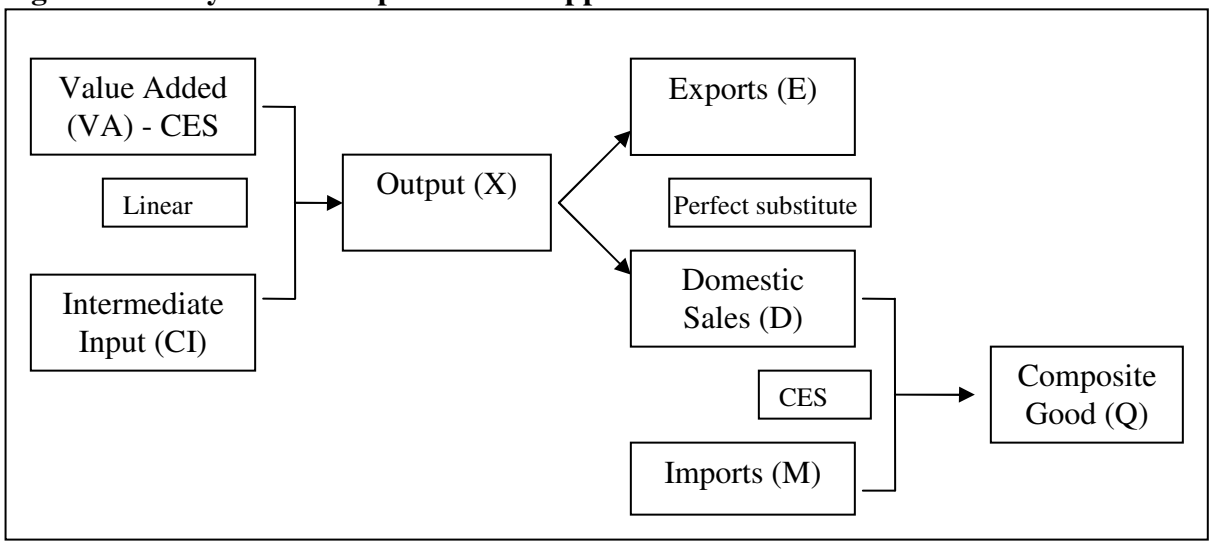
3.1 Model Specification

The CGE model[10] is calibrated to the year 2000 Social Accounting Matrix (SAM) of the Philippines. There are 41 production sectors[11], two labor types (skilled[12] and unskilled labor), capital and land. Institutions include the government, firms, households and the rest of the world. Household categories are defined by income deciles.

The basic relationships in the model are shown in Figure 3.1. Output (X) is a composite of value added (VA) and intermediate input. 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 upon the changes in relative prices of D and M and on the substitution parameter through a constant elasticity of substitution (CES) function.

Figure 3.2 describes the model's production structure. Sectoral output is a Leontief function of intermediate input 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 is sector specific. Skilled and unskilled labor is mobile across sectors but limited within skill category. Land use is mobile across agriculture.

Figure 3.1 - Key relationships in the Philippine CGE model

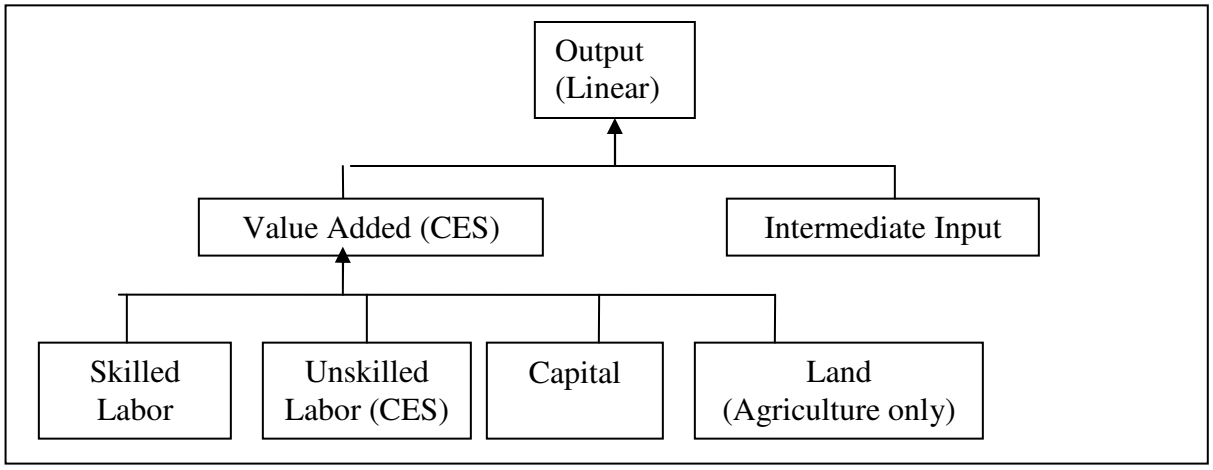


[10] The specification of the model is generally based on "EXTER" (Decaluwé, Dumont, Robichaud, 2000, http://www.pep-net.org/). There are other CGE specifications like the IFPRI Standard CGE Models (Lofgren, et al. 2002)

[11] See succeeding table 4.2 for a detailed sectoral breakdown.

[12] Skilled labor refers to workers with at least a college diploma.

Figure 3.1 - Output Determination



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

Government revenue is the sum of direct tax on household and firm income, indirect tax on domestic and imported goods, and other receipts. Government spends on consumption of goods and services, transfers and other payments. In the present version of the model, we assume fixed government balance. Since shifts in policy will result in changes in government income and expenditure, the government balance is held fixed through a tax replacement variable. In the 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 is held fixed. The nominal exchange rate is the model's numéraire. Furthermore, we introduce a weighted price of investment and derive total investment in real prices. Total investment in real prices is held fixed by introducing an adjustment factor in the household savings function. The equilibrium in the model is achieved when supply and demand of goods and services are equal and investment is equal to savings.

3.2 Economic Structure in the SAM and Model Parameters

Table 3.1 presents the production and trade structure in the SAM as well as the production and trade elasticities used in the model. Generally, agricultural and service sectors have higher value added ratios (value added over output) compared to the industrial sector. In agriculture, coconut and forestry have the highest value added ratios of almost 90 percent, while petroleum refining has the lowest value added ratio of 14 percent among industrial sectors. The capital-output ratio in agriculture is generally lower than 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.

Almost 50 percent of exports come from electrical products. A major part of this sector is the semi-conductor industry. Sizeable amount of exports also comes from machinery and transport equipment. In terms of export intensity ratio[13], almost 90 percent of the production of electrical products is exported. Machinery and transport equipment also has a high export intensity ratio at 73 percent followed by other manufacturing, coconut oil, leather, fertilizer, other chemicals, garments, fruit processing, and fish processing. On the other hand, electrical products as well as machinery and transport equipment account for 35 and 12 percent of total imports respectively. As expected, these two sectors have high import intensity ratios. Similar sectors where import is a major source of domestic supply include other crops, cattle, mining and crude oil, milk and diary, fruit processing, fish processing, coconut oil, sugar milling, other food, textile, leather, paper, fertilizer, other chemicals, petroleum, cement, and transportation and communication. On the other hand, the structure of indirect tax reveals that tobacco and alcohol followed by petroleum have the highest indirect tax with 22.9 and 17.7 percent respectively.

Table 3.1 also shows the values of key elasticity parameters used in the model: the import substitution elasticity (sig_m) in the CES composite good function; and the production substitution elasticity (sig_va) in the CES value added production function. The values of the export demand elasticity (eta) are obtained from the Armington parameter of the global model.

Households' consumption structure is presented in Table 3.2. Rice is a significant staple for Filipinos especially among poorer households. It accounts for 14.3 of total consumption for the first decile, 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 consumption on food and food related products. For instance, food items accounts for 42.4 of total consumption for the first decile compared with 13.4 percent for the tenth decile. Moreover, richer households consume more services relative to poorer ones. Table 3.2 also shows the combined shares of the nine special products in the overall consumption of each of the household groups. The share of these special products[14] in consumption declines as we move to the higher decline. They account for 25.2 percent of consumption in the first decile but only 8.6 percent in the tenth decile.

[13] Export (Import) intensity ratio is defined as the sector's export (import) divided by its output (domestic supply)

[14] These products are: corn, sugar, chicken, meat processing, milk and dairy, fruit processing, fish processing, rice and corn milling, sugar milling

Table 3.1 - Elasticity Parameters, Production and Trade Structure

	Production										Trade						
						Share of *					Elasticities			Exports (%)		Imports (%)	
	Value-added ratio va ÷ x, %	Value added share, %	Output share, %	Employ-memt share,%	Capital-labor ratio	skilled labor, %	unskilled labor, %	Land-output ratio, %	Indirect tax rate,%	sig_va	sig_m	eta	sig_e	share	intensity**	share	intensity***
Agriculture																	
Primary Agriculture																	
Palay	77.5	2.0	1.4	3.1	0.4	6.2	93.8	7.3	3.3	0.8	2.2	4.5	2.2	0.0	0.0	0.0	0.0
Corn	78.5	0.6	0.4	1.0	0.3	6.2	93.8	5.3	3.5	0.8	2.5	4.9	2.5	0.0	0.1	0.1	8.4
Coconut	88.9	0.6	0.4	0.8	0.6	6.2	93.8	10.3	0.9	0.8	2.4	4.8	2.4	0.0	0.2	0.0	0.0
Fruits and vegetables	79.7	2.2	1.5	2.4	0.9	6.2	93.8	11.3	3.4	0.8	2.0	3.9	2.0	1.2	15.1	0.3	6.2
Sugar	69.7	0.3	0.2	0.3	0.8	6.2	93.8	11.2	1.8	0.8	3.0	5.9	3.0	0.0	0.0	0.0	0.0
Other crops	77.3	0.6	0.4	0.5	1.0	6.2	93.8	13.7	1.3	0.8	2.0	3.9	2.0	0.1	2.8	1.2	44.2
Hogs	63.7	1.4	1.1	1.6	0.8	9.5	90.5	6.8	2.2	0.8	2.0	3.9	2.0	0.0	0.0	0.0	0.0
Cattle	71.9	0.4	0.3	0.4	1.1	9.5	90.5	11.0	1.2	0.8	2.0	3.9	2.0	0.0	0.2	0.1	9.2
Chicken	60.7	1.3	1.1	1.4	0.9	9.5	90.5	8.7	2.4	0.8	2.0	3.9	2.0	0.0	0.0	0.0	0.4
Lightly Processed Food																	
Meat processing	20.5	1.1	2.8	0.8	2.1	25.0	75.0		1.6	1.5	2.0	3.9	2.0	0.0	0.0	0.4	3.4
Milk and dairy	31.1	0.3	0.5	0.2	2.2	25.0	75.0		1.0	1.5	2.0	3.9	2.0	0.0	1.7	1.0	33.6
Coconut and edible oil	28.7	0.5	0.9	0.2	5.7	25.0	75.0		0.9	1.5	2.0	3.9	2.0	1.5	32.9	0.6	19.0
Rice and corn milling	34.8	1.4	2.1	1.2	1.3	25.0	75.0		2.0	1.5	2.2	4.5	2.2	0.0	0.0	0.8	8.8
Sugar milling	22.0	0.2	0.4	0.1	1.9	25.0	75.0		1.4	1.5	3.0	5.9	3.0	0.2	8.3	0.1	8.2
Non-Agriculture																	
Other primary products and Mining																	
Agricultural services	84.7	0.4	0.2	0.5	0.6	6.2	93.8	10.0	2.8	0.8	2.2	4.3	2.2	0.0	0.0	0.0	0.1
Forestry	89.4	0.2	0.1	0.1	2.2	16.9	83.1	33.0	3.9	0.8	2.2	4.3	2.2	0.1	10.3	0.0	0.6
Fishing	77.4	2.8	1.9	2.1	2.0	2.4	97.6	3.8	1.7	0.8	2.2	4.3	2.2	0.8	7.9	0.0	0.3
Mining	63.0	0.6	0.5	0.4	2.5	30.5	69.5		2.2	0.8	2.2	4.3	2.2	0.4	15.8	1.4	45.8
Crude oil and natural gas	34.6	0.0	0.0	0.0					0.0	0.8	2.2	4.3	2.2	0.0	0.0	7.5	99.6
Highly Processed Food, and Tobacco																	
Fruit processing	36.5	0.4	0.5	0.3	1.7	25.0	75.0		2.2	1.5	2.0	3.9	2.0	0.7	24.1	0.3	13.9
Fsih processing	28.5	0.3	0.6	0.2	3.5	25.0	75.0		1.3	1.5	2.0	3.9	2.0	0.7	22.0	0.2	7.4
Other processed food	30.9	1.3	2.3	1.2	1.6	25.0	75.0		1.6	1.5	2.0	3.9	2.0	0.6	4.8	0.9	9.3
Tobacco and alcohol	40.4	1.0	1.4	1.0	1.6	57.7	42.3		22.9	1.5	2.0	3.9	2.0	0.1	1.4	0.3	5.7
Manufacturing																	
Textile	37.3	1.0	1.4	1.0	1.3	6.4	93.6		0.7	1.5	2.1	4.1	2.1	1.2	16.9	2.7	36.7
Garments and footwear	46.1	2.1	2.4	1.9	1.6	4.5	95.5		0.5	1.5	2.1	4.1	2.1	0.2	1.8	0.1	1.3
Leather and rubberwear	42.9	0.7	0.9	0.7	1.4	9.8	90.2		0.4	1.5	2.0	4.1	2.0	1.3	26.6	2.3	45.6
Paper and wood products	39.3	1.7	2.3	1.5	1.6	23.5	76.5		0.7	1.5	2.0	4.1	2.0	2.3	19.7	1.8	19.3
Fertilizer	39.7	0.1	0.2	0.1	1.4	37.8	62.2		0.5	1.5	2.0	4.1	2.0	0.1	16.8	0.5	49.4
Other chemicals	41.1	1.9	2.4	1.5	2.0	37.8	62.2		1.0	1.5	2.0	4.1	2.0	0.9	7.4	5.0	35.4
Petroleum	14.2	0.7	2.6	0.8	1.1	42.4	57.6		17.7	1.5	2.0	4.1	2.0	1.6	11.8	1.8	16.6
Cement and other related products	41.7	0.7	0.9	0.6	1.7	29.8	70.2		1.9	1.5	2.0	4.1	2.0	0.4	9.5	0.5	13.8
Metal and related products	36.9	1.9	2.7	1.4	2.1	8.4	91.6		1.1	1.5	2.0	4.1	2.0	2.5	17.4	4.2	31.7
Machineries and transporation equipment	40.0	3.6	4.8	1.8	3.7	30.4	69.6		1.7	1.5	2.0	4.1	2.0	18.3	73.2	12.5	70.6
Eletrical and related products	45.5	8.5	9.9	7.3	1.7	39.5	60.5		1.2	1.5	2.0	4.1	2.0	45.9	89.0	35.2	88.9
Other manufacturing	48.1	1.4	1.6	1.4	1.4	6.7	93.3		1.8	1.5	2.0	4.1	2.0	3.7	44.3	2.0	36.1
Other Industry																	
Construction	53.0	3.9	3.9	5.5	0.7	14.9	85.1		1.4	1.5	1.0	2.1	1.0	0.3	1.5	0.3	1.9
Utilities	68.3	3.4	2.6	1.9	3.2	43.7	56.3		3.2	1.5	1.0	2.1	1.0	0.0	0.0	0.0	0.0
Services																	
Transportation & communications	53.6	7.0	6.9	5.3	2.1	18.2	81.8		1.2	1.5	1.0	2.1	1.0	3.7	10.2	8.1	24.2
Wholesale trade	66.1	13.2	10.6	10.7	1.9	25.6	74.4		1.1	1.5	1.0	2.1	1.0	2.9	5.2	0.6	1.5
Other service	63.5	20.2	16.8	17.5	1.7	31.5	68.5		2.9	1.5	1.0	2.1	1.0	8.4	9.5	6.9	10.0
Public services	72.2	8.2	6.0	19.3		60.7	39.3		0.0								

va-value added; x- output
eta=export demand elasticity
Source: 2000 Social Accounting Matrix

sig_m=substitution parameter in CES composite good function
* Share of labor type to total labor employed in the sector

sig_e=substitution parameter in CET
** export ÷ output;

sig_va=substitution parameter in CES value added function
*** imports ÷ composite good

Table 3.2 - Household Consumption Structure (% distribution)

	Decile									
	1	2	3	4	5	6	7	8	9	10
Agriculture										
Primary Agriculture										
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
Chicken	0.8	0.9	0.9	1.0	1.1	1.1	1.1	1.1	1.0	0.7
Lightly Processed Food										
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
Non-Agriculture										
Other primary products and Mining										
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
Highly Processed Food, and Tobacco										
Fruit processing	1.2	1.1	1.0	0.9	0.9	0.8	0.7	0.6	0.5	0.4
Fsih 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
Mining and Manufacturing										
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 rubberwear	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 other related products	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Machineries and transporation equipment	0.1	0.3	0.3	0.5	0.7	0.9	1.0	1.1	1.1	1.3
Eletrical 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
Services										
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
Total	100	100	100	100	100	100	100	100	100	100

Note: There is no household consumption from "Agricultural Services" and "Crude oil and Natural Gas Mining"

Source: 2000 Social Accounting Matrix

4. Simulations

All policy experiments 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 input to a micro-simulation procedure to calculate the impact on poverty and inequality based on year 2000 household survey. Sensitivity analysis on alternative direct tax replacement scheme is also undertaken to compare simulation results.

4.1 Definition of Policy Experiments

Table 4.1 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[15]. The Philippine CGE model is initially solved using new these estimates of protection/assistance to serve as the base with which all subsequent simulations are compared.

The six policy experiments are:

1. *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 4.1 and retains all existing trade distortions (tariff rates and export subsidies) in the country.

2. *ROW-AGR* – ROW liberalization in agriculture and lightly processed food only. Similar to *ROW-ALL*, we utilize the results of the global model under ROW agriculture and lightly processed food liberalization with all existing Philippine trade distortions being retained.

3. *PHIL-ALL* – Unilateral trade liberalization in all sectors. All Philippine trade distortions are eliminated. No changes in the sectoral border export and import prices and in the export demand shifters are observed owing to unilateral liberalization focus.

4. *PHIL-AGR* – Unilateral agriculture trade liberalization. All trade distortions in primary agriculture and lightly processed food items are eliminated. Similar to PHIL-ALL, there are no changes in the sectoral border export and import prices and export demand shifters due to unilateral liberalization focus.

5. *COMB-ALL* – Full ROW and Philippine trade liberalization, i.e., *ROW-ALL* and *PHIL-ALL* combined.

6. *COMB-AGR* – ROW and Philippine liberalization in agriculture and lightly foods. This scenario combines *ROW-AGR* and *PHIL-AGR*.

[15] These are not exactly the same rates as in the original estimates of David, Intal and Balisacan (2007) because they have been recalibrated to the global model.

Trade 4.1 - Inputs from LINKAGE Model

Philippine CGE Model	LINKAGE Model	Trade Distortions		Full Trade Lib., excl. Philippines[2]			Agri. Trade Lib., excl. Philippines[3]		
		Tariff, %	Export Subsidy, % (<0 is a Tax)	World Export Price, % change	World Import Price, % change	Export Demand Shifter, % /1/	World Export Price, % change	World Import Price, % change	Export Demand Shifter, % /1/
Agriculture									
Primary Agriculture									
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	Other livestock	-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
Lightly Processed Food									
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
Non-Agriculture									
Other primary products and Mining									
Agricultural services	Other primary products	2.7	-1.0	2.8	0.6	1.1	1.0	0.9	1.0
Forestry	Other primary products	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	Other primary products	2.7	-1.0	2.8	0.6	1.1	1.0	0.9	1.0
Crude oil and natural gas	Other primary products	2.7	-1.0	2.8	0.6	1.1	1.0	0.9	1.0
Highly Processed Food, and Tobacco									
Fruit processing	Other food, beverages and tobacco	6.0	0.0	3.6	1.6	1.2	2.0	-0.4	1.0
Fsih processing	Other food, beverages and tobacco	6.0	0.0	3.6	1.6	1.2	2.0	-0.4	1.0
Other processed food	Other food, beverages and tobacco	6.0	0.0	3.6	1.6	1.2	2.0	-0.4	1.0
Tobacco and alcohol	Other food, beverages and tobacco	6.0	0.0	3.6	1.6	1.2	2.0	-0.4	1.0
Manufacturing									
Textile	Textile and wearing apparel	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 rubberwear	Textile and wearing apparel	8.0	-1.7	2.0	-0.2	1.0	1.1	0.4	1.0
Paper and wood products	Other manufacturing	3.5	0.0	2.1	1.5	1.0	0.7	0.3	1.0
Fertilizer	Other manufacturing	3.5	0.0	2.1	1.5	1.0	0.7	0.3	1.0
Other chemicals	Other manufacturing	3.5	0.0	2.1	1.5	1.0	0.7	0.3	1.0
Petroleum	Other manufacturing	3.5	0.0	2.1	1.5	1.0	0.7	0.3	1.0
Cement and other related products	Other manufacturing	3.5	0.0	2.1	1.5	1.0	0.7	0.3	1.0
Metal and related products	Other manufacturing	3.5	0.0	2.1	1.5	1.0	0.7	0.3	1.0
Machineries and transporation equipment	Other manufacturing	3.5	0.0	2.1	1.5	1.0	0.7	0.3	1.0
Eletrical and related products	Other manufacturing	3.5	0.0	2.1	1.5	1.0	0.7	0.3	1.0
Other manufacturing	Other manufacturing	3.5	0.0	2.1	1.5	1.0	0.7	0.3	1.0
Other Industry									
Construction	Services	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
Services									
Transportation & communications	Services	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	Services	0.0	0.0	2.9	-0.1	1.0	1.1	0.2	1.0

/1/ Derived using (1+0.01*p)(1+0.01*q)^(1/ESUBM); where p is export price change, q export volume change; and ESBUM Arimington elasticity, all from the Linkage Model

/2/ Rest of the World Liberalization in all sectors, excluding the Philippines ; /3/ Rest of the World Liberalization in agriculture only, excluding the Philippines

4.2 Results

Rest of the World Trade Liberalization in all sectors (ROW-ALL)

Results from the LINKAGE model (Table 4.1) indicate that this policy leads to higher world export prices and export demand for Philippine made products. Within agriculture, 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 highly processed fruits and fish processing (1.2 percent), whereas modest export demand shifts are observed in other industrial and services sectors. Export prices in local currency increase more in the agricultural sectors than the non-agricultural sectors (3.6 versus 2.4 percent), as do export volumes—with a significant 9.8 percent expansion in agriculture exports relative to a modest 0.3 percent rise in non-agriculture exports (table 4.2).

At the same time, full ROW liberalization results in higher world import prices for most Philippine made products. Local import prices also increase more in agriculture than in non-agriculture (3 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 imports increase by 0.9 and 1.1 percent respectively.

Table 4.2 - Major Sectoral Effects: Agriculture and Non-Agriculture (% change from the base)

	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.
Prices												
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	
Volume												
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
Factor Prices												
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

Note: Agri includes primary agriculture and lightly processed food, while 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

The entire agricultural sector benefits from the now favorable international market condition. Agricultural output and value added prices increases 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 relatively to wage rates (roughly 3 percent) and 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.

In contrast, for non-agricultural sectors, the fall in domestic sales offsets export expansion, such that 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 4.1); 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 world 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 lesser 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 4.2) mainly due to significant export demand shift in sugar, raw fruits and vegetables (1.6 and 1.2 percent respectively in Table 4.1). 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 4.1). 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 agriculture and non-agriculture products, respectively (Table 4.2). 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 a 2.3 and 1.7 percent fall in the domestic cost of production for agriculture and non-agriculture 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 towards the export market (table 4.2).

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 falls, but the fall in the former is higher than 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. Return to agricultural capital and land decline by 5.7 and 4.6 percent respectively, whereas non-agricultural capital returns fall by 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 sectors, which in the context of this paper include lightly processed food sectors, 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. Return to land drops by 3.5 percent, return to agricultural capital declines by 4.5 percent, whereas wage of unskilled workers declines by 1.2 percent.

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

A comparison of the sectoral results between *PHIL-ALL and PHIL-AGR* in table 4.2 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[16]. This is also true for factor

[16] Ratio of prices in *PHIL-AGR* relative to *PHIL-ALL* (Table 4.2). 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)

prices where between 40 to 80 percent of the fall in factor returns is traceable to 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-agriculture 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.

Output prices for both agriculture and non-agriculture sector increases (0.4 and 0.9 percent), with the former experiencing a smaller increase owing to substantial level of domestic agricultural distortions at the base. All factor prices with the exception of return to agricultural capital increase especially for non-agricultural sectors, although smaller when compared to *ROW-ALL*. On the other hand, the output volume impacts are quite the opposite with unilateral liberalization dominating rest of the world trade liberalization effects. Thus, overall agricultural output declines while overall output of non-agriculture improves (1.9 and 0.3 percent respectively).

Rest of the World and Philippine Trade Liberalization in Agriculture only (COMB-AGR)

The unilateral agriculture trade liberalization (*PHIL-AGR*) scenario dominates over global agriculture trade liberalization (*ROW-AGR*). Output price and volume in agriculture decline as do agricultural factor prices. Once again, local import prices in agricultural decline in spite of the soaring 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, return to factors used intensively in agriculture (land, agricultural capital and unskilled wages) fall in light of declining agricultural output prices.

In 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[17]. Thus, overall output price of non-agriculture increases by 0.2 percent, resulting in an output expansion and consequently higher returns to non-agricultural factors (Table 4.2).

[17] This is because the various rounds of trade reform program in the country primarily focused on reducing non-agricultural distortions

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 4.3. In interpreting the changes in household specific consumer prices, we should remember from section 3 that: (i) primary and processed food accounts for a significant share of household expenditure especially for the lower income groups; (ii) both primary and processed food items have higher initial tariff rates than other goods (table 3.2).

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. Consumer prices also increase the most in this scenario for the same reason. 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 (Table 4.3). 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.

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 liberalization 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 (Table 4.3) 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.

We also observe that nominal incomes fall under the two unilateral liberalization scenarios. However, the consumer price effects dominate, such that welfare/real income increases more under agricultural trade liberalization despite falling nominal incomes. 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 is somewhat offset by soaring consumer prices. Overall, it is the combined global and domestic agricultural trade liberalization (*ROW-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, while the consumer price reductions from domestic trade liberalization are added. 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.

Table 4.3 - Household Welfare and Prices

	ROW-ALL			*ROW-AGR*			*PHIL-ALL*			*PHIL-AGR*			*COMB-ALL*			*COMB-AGR*		
Household	Change in Nominal Income, %	Change in Consumer Price, %	EV/Income, %	Change in Nominal Income, %	Change in Consumer Price, %	EV/Income, %	Change in Nominal Income, %	Change in Consumer Price, %	EV/Income, %	Change in Nominal Income, %	Change in Consumer Price, %	EV/Income, %	Change in Nominal Income, %	Change in Consumer Price, %	EV/Income, %	Change in Nominal Income, %	Change in Consumer Price, %	EV/Income, %
Decile 1	3.3	2.9	0.4	1.3	1.2	0.1	-1.9	-2.2	0.3	-1.2	-2.0	0.8	1.4	0.7	0.7	0.1	-0.8	0.9
Decile 2	3.3	2.9	0.4	1.3	1.1	0.1	-1.9	-2.0	0.2	-1.2	-1.8	0.7	1.4	0.8	0.6	0.1	-0.7	0.8
Decile 3	3.3	2.8	0.4	1.3	1.1	0.1	-1.9	-2.0	0.1	-1.2	-1.8	0.6	1.4	0.8	0.5	0.1	-0.6	0.7
Decile 4	3.2	2.8	0.4	1.2	1.1	0.1	-1.8	-1.8	0.0	-1.2	-1.6	0.4	1.4	0.9	0.4	0.1	-0.5	0.5
Decile 5	3.2	2.8	0.4	1.2	1.1	0.1	-1.8	-1.7	-0.1	-1.1	-1.5	0.3	1.4	1.0	0.3	0.1	-0.4	0.4
Decile 6	3.1	2.7	0.4	1.2	1.1	0.1	-1.7	-1.6	-0.2	-1.1	-1.3	0.2	1.3	1.1	0.2	0.1	-0.2	0.3
Decile 7	3.0	2.6	0.4	1.1	1.1	0.1	-1.7	-1.4	-0.2	-1.1	-1.2	0.1	1.3	1.2	0.1	0.0	-0.1	0.2
Decile 8	2.9	2.6	0.4	1.1	1.0	0.1	-1.6	-1.3	-0.3	-1.1	-1.1	0.0	1.3	1.2	0.1	0.0	0.0	0.1
Decile 9	2.8	2.5	0.3	1.1	1.0	0.0	-1.5	-1.2	-0.3	-1.1	-1.0	-0.1	1.3	1.3	0.0	0.0	0.0	0.0
Decile 10	2.9	2.4	0.5	1.1	1.0	0.1	-1.4	-1.0	-0.4	-1.0	-0.8	-0.3	1.4	1.4	0.0	0.0	0.2	-0.1
Overall	3.0	2.6	0.4	1.1	1.0	0.1	-1.6	-1.3	-0.3	-1.1	-1.1	0.0	1.4	1.2	0.1	0.0	-0.1	0.1

EV = equivalent variation

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

Poverty and Distributional Effects

The micro-simulation process[18] uses the year 2000 family income and expenditure survey (FIES) of the Philippines. In order 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 them as input to the micro-simulation procedure. In particular, we use the vectors of changes in: (a) total income of households; (b) wage income, capital income and other income; (c) household specific consumer price indices to update the nominal value of the poverty line; and (d) 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[19] allowing us to derive confidence intervals on our 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: (1) Gender; (2) Skill level; and (3) location, urban-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 as it allows for a better policy evaluation and identification of the gainers and losers from trade liberalization. The poverty and inequality results in all experiments are summarized in Table 4.4.

Inequality marginally worsens in all unilateral liberalization scenarios, but marginally improves in the combined ROW and Philippine agricultural liberalization (table 4.4). The latter is due to the fall in nominal income among poorer households while the former results from greater increase in poorer household's nominal income relative to richer households (table 4.3).

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 4.2). In contrast, unilateral liberalization favors skilled households such that national poverty indices 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.

[18] This is a modified approach of the original version proposed by Vos (2005).
[19] Vos (2005) observes that 30 iterations are sufficient. Repeating this process additionally does not significantly alter the results.

Table 4.4 - Poverty Effects in the Philippines by Area, Gender, and Skills (% change relaitve to 2000 Index)

	Variable	2000 Index	*ROW-ALL*	*ROW-AGR*	*PHIL-ALL*	*PHIL-AGR*	*COMB-ALL*	*COMB-AGR*
All Philippines	Gini	0.5	0.0	0.0	0.2	0.1	0.0	-0.1
	P0	33.5	-1.1	-0.7	1.0	0.2	-0.1	-0.2
	P1	10.3	-1.5	-0.8	2.0	0.7	0.0	-0.5
	P2	4.3	-1.8	-0.9	3.2	1.5	0.3	-0.5
All Urban	P0	18.6	-1.6	-0.9	2.0	0.7	0.0	-0.1
	P1	5.0	-1.8	-1.0	3.2	1.7	0.4	-0.1
	P2	2.0	-2.0	-1.1	4.8	2.9	0.8	0.1
Urban-male-skilled	P0	3.2	0.1	0.0	-1.4	-1.2	-1.0	-0.6
	P1	0.7	-1.3	-0.3	-1.6	-3.2	-2.6	-2.4
	P2	0.2	-1.5	-0.4	-2.1	-3.9	-3.1	-3.1
Urban-male-unskilled	P0	23.3	-1.6	-0.9	2.1	0.8	0.1	0.0
	P1	6.4	-1.8	-1.0	3.3	1.8	0.4	0.0
	P2	2.5	-2.0	-1.0	4.9	3.0	0.9	0.2
Urban-female-skilled	P0	0.9	0.0	0.0	-2.2	-1.5	-0.3	-0.3
	P1	0.1	-2.6	-0.6	-1.0	-2.9	-2.2	-2.8
	P2	0.0	-4.4	-1.0	-0.3	-4.3	-3.8	-4.8
Urban-female-unskilled	P0	15.2	-1.9	-1.5	2.1	0.7	-0.2	-0.4
	P1	3.9	-2.2	-1.3	3.8	2.1	0.4	-0.1
	P2	1.6	-2.5	-1.5	4.9	3.2	0.8	0.1
All Rural	P0	48.7	-0.9	-0.6	0.6	0.0	-0.1	-0.3
	P1	15.9	-1.4	-0.8	1.6	0.4	-0.1	-0.6
	P2	6.8	-1.7	-0.9	2.8	1.1	0.1	-0.6
Rural-male-skilled	P0	12.0	0.0	0.1	-0.9	-2.0	-1.6	-2.7
	P1	3.5	-1.0	-0.2	-0.9	-2.2	-1.6	-2.0
	P2	1.4	-1.2	-0.3	-1.0	-2.6	-1.8	-2.6
Rural-male-unskilled	P0	52.4	-0.8	-0.6	0.6	0.0	-0.1	-0.3
	P1	17.2	-1.4	-0.7	1.6	0.4	-0.1	-0.6
	P2	7.4	-1.7	-0.9	2.7	1.1	0.1	-0.6
Rural-female-skilled	P0	14.7	0.0	0.0	-1.5	-0.2	-1.7	-0.7
	P1	4.1	-1.0	-0.2	-2.2	-1.1	-3.2	-2.5
	P2	1.4	-1.6	-0.3	-3.1	-1.9	-4.7	-3.7
Rural-female-unskilled	P0	34.9	-1.3	-0.9	0.9	0.2	0.0	-0.2
	P1	10.8	-1.9	-1.1	2.1	0.4	0.0	-0.7
	P2	4.4	-2.2	-1.1	3.7	1.3	0.5	-0.7

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, 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

Nonetheless, 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. The combined global and domestic agriculture reform appears to be the most poverty friendly scenario. Although the national poverty headcount decreases marginally, all household groups with the exception of urban male skilled headed households share from the poverty friendliness of trade liberalization. Indeed, the poorest of the poor the poorest of the poor emerge as “winners” given 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 generally traceable to the use of recent estimates of trade protection on key food items (such as rice, corn, sugar, and processed meat), which when eliminated, results in a significant fall in consumer prices faced by lower income groups (table 4.2).

Sensitivity Analysis: Indirect and direct Tax Replacement

The results discussed above were derived using indirect tax replacement. Are the results sensitive to the tax replacement used? This section compares the results 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 4.5.

The direction of changes in poverty indices and inequality is generally the same regardless of the tax replacement scheme. However, detailed examination reveals that the magnitude is marginally higher under the direct tax scenario, owing to lesser increase in consumer prices since direct tax is used to compensate for foregone tariff revenues. Certainly, this is the reason why poverty indices fell slightly among urban male unskilled headed households.

Table 4.5- PovertyEffects: Indirect and Direct Tax Replacement

			COMB-ALL		*COMB-AGR*	
			Tax Replacement		Tax Replacement	
Household	Variable	2000 Index	Inidrect Tax	Direct Tax	Inidrect Tax	Direct Tax
All Philippines	Gini	0.51	0.0	0.0	-0.1	-0.1
	P0	33.5	-0.1	-0.1	-0.2	-0.3
	P1	10.3	0.0	-0.1	-0.5	-0.5
	P2	4.3	0.3	0.2	-0.5	-0.5
All Urban	P0	18.6	0.0	0.1	-0.1	-0.2
	P1	5.0	0.4	0.4	-0.1	-0.1
	P2	2.0	0.8	0.8	0.1	0.1
Urban-male-skilled	P0	3.2	-1.0	-1.1	-0.6	-1.0
	P1	0.7	-2.6	-3.4	-2.4	-2.4
	P2	0.2	-3.1	-4.5	-3.1	-3.0
Urban-male-unskilled	P0	23.3	0.1	0.1	0.0	-0.1
	P1	6.4	0.4	0.5	0.0	-0.1
	P2	2.5	0.9	0.9	0.2	0.1
Urban-female-skilled	P0	0.9	-0.3	-0.6	-0.3	-1.4
	P1	0.1	-2.2	-2.6	-2.8	-3.7
	P2	0.0	-3.8	-4.3	-4.8	-5.5
Urban-female-unskilled	P0	15.2	-0.2	0.0	-0.4	-0.5
	P1	3.9	0.4	0.5	-0.1	-0.2
	P2	1.6	0.8	0.9	0.1	0.1
All Rural	P0	48.7	-0.1	-0.2	-0.3	-0.3
	P1	15.9	-0.1	-0.2	-0.6	-0.6
	P2	6.8	0.1	0.0	-0.6	-0.7
Rural-male-skilled	P0	12.0	-1.6	-1.6	-2.7	-2.9
	P1	3.5	-1.6	-2.0	-2.0	-2.1
	P2	1.4	-1.8	-2.5	-2.6	-2.6
Rural-male-unskilled	P0	52.4	-0.1	-0.2	-0.3	-0.3
	P1	17.2	-0.1	-0.2	-0.6	-0.6
	P2	7.4	0.1	0.0	-0.6	-0.7
Rural-female-skilled	P0	14.7	-1.7	-1.5	-0.7	-0.9
	P1	4.1	-3.2	-3.3	-2.5	-2.5
	P2	1.4	-4.7	-4.9	-3.7	-3.8
Rural-female-unskilled	P0	34.9	0.0	0.0	-0.2	-0.3
	P1	10.8	0.0	-0.1	-0.7	-0.6
	P2	4.4	0.5	0.3	-0.7	-0.6

Gini=Gini Coefficient; P0=poverty headcount; P1=poverty gap; P2=poverty severity

COMB-ALL - Rest of the World and Philippine trade liberalization (ROW-ALL and PHIL-ALL combined)

COMB-AGR - Rest of the World and Philippine agricultural trade liberalization (ROW-AGR and PHIL-AGR combined)

5. Summary and Policy Insights

Starting the 1980s, the government shifted from taxing towards protecting agriculture relative to non-agricultural sectors. However, the two decades of protection failed to induce competitiveness and productivity growth as agriculture became inward looking and inefficient. This paper analyzed the poverty and inequality implications of removing agricultural and non-agricultural price distortions in the international markets and in the domestic markets of the Philippines.

Rest of the world liberalization (ROW) reduces poverty at the national level and favors unskilled households 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 increase in real income across households, while ROW trade liberalization in agriculture brings about progressive changes in real income benefiting 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 were 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 agriculture reform appears to be the most poverty friendly scenario. Although the national poverty headcount decreases marginally, all household groups with the exception of urban male skilled headed households share from the poverty friendliness of trade liberalization. The poorest of the poor emerge as "winners" given their reliance on agricultural production and wages from unskilled labor. Thus, taking a pro-active trade liberalization stance, that is, by fully participating in rest of the world trade liberalization efforts through its own domestic liberalization appears to be in the best interest of the Philippines. Sensitivity analysis confirms that the results are not affected by differing tax replacement assumptions as similar pattern of effects emerge regardless of an indirect or direct tax replacements.

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