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Global Economic Crisis and the Philippine Economy: A Quantitative Assessment

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Global Economic Crisis and the Philippine Economy: A Quantitative Assessment[1]

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Abstract

This study analyzes how the global crisis may have affected the Philippine economy. To the extent that the Philippines is more globally integrated through trade and labor flow channels than the financial sector, it is expected that impact of the global crisis will weigh heavily on the "real" side of the economy. To assess the likely impacts, a counterfactual "crisis" simulation analysis is undertaken by using a dynamic computable general equilibrium (CGE) model linked to a micro-simulation module in order to trace effects: from the macro-economic to the microeconomic level; from output and factor supplies and demands to commodity and factor prices; and from household incomes to levels of poverty and income distribution. Simulation results suggest that all households experience a significant reduction in real income. Both inequality and poverty increase, with urban dwellers experiencing a higher increase in poverty relative to their rural counterparts as most export-oriented industries are located in the urban areas and returns to factors intensively used by these industries fall.

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1. Introduction

The 2008-09 global economic contraction has brought additional concern towards economic security and welfare in the developing world. Although the crisis may have affected developing countries differently—owing to their heterogeneity and varying linkage to the global economy—continued fears of economic slowdown, susceptibility to greater instability and higher risk remain (Lin 2008). This is because whereas global economic activity is expected to recover by 2010, the rebound has so far been weak enough to offset the rise in unemployment and poverty levels that the global contraction has inflicted. Indeed, the International Labour Organization (ILO 2010) only projects a marginal 0.1 percentage point improvement in global unemployment rate in 2010 (from 6.6 percent in 2009 to 6.5 percent by 2010)—thereby putting severe pressure on the estimated 64 million people that fell into poverty as a result of the crisis (Chen and Ravallion 2009). More importantly, the crisis has not only slowed down the progress of achieving the Millennium Development Goals (MDGs) but also increased the cost of achieving them. For instance, Latin American countries now require an additional public spending of about 1.5 to 2 percent of their GDP per year between 2010 and 2015 in order to achieve their MDG targets (Sanchez and Vos 2009).

The Philippines like most developing countries has not been spared from the global economic contraction. In spite of limited exposure to US assets and relatively stable financial sector, its economy still suffered a dramatic slowdown in economic growth from mid 2008 until end 2009. This slowdown resulted from deceleration in exports, reduction in foreign direct investment, cutbacks in household consumption and moderate increase in unemployment (Yap et al. 2009). Nevertheless, evidence suggests that the reduction in global demand for Philippine exports, and its corresponding link to employment has been the principal channel with which the global economic contraction has affected the Philippine economy. Indeed, weak global demand resulted in the country's total export earnings falling by US$11 billion dollars in 2009 relative to 2008 (US$38,335 million in 2009 versus US$49,025 million in 2008). In particular, export earnings plunged by US$1.1 billion dollars in June 2009 alone (from US$4,527 million in 2008 versus US$3,409 million in 2009), with much of the decline attributed to electronics and semi-conductor products which posted a 26 percent reduction valued at US$683 million dollars. Over-all, the contraction in Philippine exports in June 2009 was so severe that 9 out of 10 key exports earners

suffered[3]. Consequently, this feeble export performance affected the domestic labor market, especially demand for labor in the relatively export-oriented manufacturing sector, as an estimated 250,000 plant and machine operators and assemblers were laid off (Yap 2009). Nonetheless, some of these displaced workers were absorbed by the agriculture sector, as Son and San Andres (2009) estimate manufacturing employment to be 7 percent lower in the second quarter of 2009, while the more inward-oriented agriculture sector registered a 2.6 percent employment growth in the same quarter.

Fortunately, remittances from Overseas Filipino workers (OFWs), which accounts for about 10 percent of the Gross National Product (GNP), remained strong. In spite of the crisis, remittances grew by a modest 5.6 percent in 2009, albeit twice less than the 13.7 and 13.2 percent growth recorded in 2007 and 2008 respectively. Nevertheless, findings from a 2009 Community Based Monitoring system (CMBS) household survey of 3499 households reveal that Filipino households, especially those with relatives working abroad, were not much insulated from the crisis. Reyes *et al.* (2010) discover that, out of 450 respondent households with a member working abroad: (a) 12 percent or 25 households reported having a member who was retrenched, thereby resulting in 28 returning OFWs citing retrenchment or being laid-off as reason for homecoming; (b) 9 percent reported having an OFW member who experienced wage reduction (42 people) arising from reasons such as reduced working hours, or the firm with which the OFW is working has either instituted cost-cutting activities or operating at a loss; (c) 21.6 percent confirmed not having received any remittances during the past 6 months, while an additional 8.9 percent experienced a reduction in the amount of remittances received.

In early 2009, the Philippine government embarked on a fiscal stimulus program to alleviate the impact of the global economic crisis on the Philippine economy. The program, known locally as the Economic Resiliency Plan (ERP) and valued at PHP 330 Billion, was designed to finance infrastructure projects, cut income taxes for low- to middle-income workers and corporations, and provide social protection measures. In addition, the Philippine central bank pursued an accommodative monetary policy starting in late 2008 to cushion the adverse impacts of the crisis on the economy. In December 2008, it lowered key policy interest rates for the overnight borrowing/reverse repurchase (RRP) rate and overnight lending/repurchase (RP) rate.

[3] Only 'other manufactured products' grew by 33.5 percent. http://census.gov.ph/data/pressrelease/2009/ex0906tx.html

While recent assessments on the effects of the global economic crisis on the Philippine economy have been made [see Reyes *et al.* (2010); Yap *et al.* (2009); Son and San Andres (2009)], none has so far provided an economy-wide perspective that traced the impacts on detailed economic agents. This paper therefore fills this gap by employing a dynamic computable general equilibrium (CGE) model linked to a micro-simulation module to analyze how the crisis has affected the Philippine economy. By using this combined methodology to undertake counterfactual simulation analysis, this paper identifies the important channels and mechanisms that link the global crisis and the Philippine economy: from the macro-economic to microeconomic level; from output and factor supplies and demands to commodity and factor prices; and from household incomes to levels of poverty and income distribution. Furthermore, this methodology identifies the extent to which the crisis has altered the economy's natural growth path, and at the same time quantifies the magnitude of economic deviation arising from the crisis. Hence it answers questions such as: Did the crisis alter the economy's natural growth path? What has been the impact of the crisis on production and employment? How has the crisis affected poverty and income distribution? Did the government's stimulus program help cushion the impact of the crisis on the economy?

To the extent that the Philippines is more globally integrated through trade and labor flow channels than the financial sector, it is expected that impact of the global crisis would weigh heavily on the "real" side of the economy. This paper therefore focuses on two factors in analyzing the impact of the crisis on the Philippine economy. First, particular emphasis is placed on the role that international trade played in transmitting the impact of the crisis into the Philippine economy—since evidence suggests that it mainly contributed to the deceleration in economic growth and employment. Second, the likely impact of government expenditure is assessed, to find out how it help alleviate the negative impacts of the crisis on the Philippine economy.

The remaining sections are organized as follows: Section 2 discusses the macroeconomic impact of the global crisis on the Philippine economy, while Section 3 provides an overview of the methodology and describes the model's dataset. Section 4 lays out the counterfactual "*crisis*" scenario and analyzes the simulation results arising from this scenario. Finally, section 5 concludes and provides an agenda for the road ahead.

2. Global Crisis and the Philippine Economy

Similar to many advanced and emerging markets around the world, the Philippine economy has also been affected by the recent global economic and financial turmoil. This has been evident in the deceleration of the country's economic growth that started in 2008 up to the end of 2009 (Figure 1). In 2007, the country's gross domestic product (GDP) grew by an annual rate of about 7 percent for the full year, reaching a record-high 8.3percent year-on-year (y-o-y) in the second quarter alone. However, economic growth started to slow down in 2008, with the country's GDP growth rate falling to 2.9 percent y-o-y in the fourth quarter of the year after attaining 4.6percent in the previous quarter. The sharp decline in the country's GDP growth rate in late 2008 occurred amid the worsening of the global financial crisis in light of the bankruptcy of a global investment bank—Lehman Brothers. The country's economic performance continued to weaken in 2009, expanding by less than 1 percent annually for the first three quarters of the year before reaching 1.8 percent y-o-y in the fourth quarter. However, the Philippine economy rebounded at the start of 2010, attaining a GDP growth rate of 7.3 percent in the first quarter of the year.

2.1. Growth and Merchandise Trade Performance

On the supply side, the major sectors of the Philippine economy—namely, the services and industrial sectors—have been adversely affected. Figure 2 depicts the yearly growth rates of the country's agriculture/fishery/forestry, industrial, and services sectors, for all quarters in the 2007-2009 period, as well as for the first quarter of 2010. The services sector, which comprises half of the country's real GDP, experienced decelerating y-o-y growth in 2007-2008, reaching its lowest growth rate of 1.3 percent y-o-y in fourth quarter 2008, before accelerating to 4.2 percent in fourth quarter 2009 and 6.1 percent in first quarter 2010. Moreover, the industrial sector, which is about 32 percent of the country's real GDP, contracted in the first three quarters of 2009, posting growth rates of –2.5 percent y-o-y in first quarter 2009, –1.7 percent y-o-y in second quarter 2009, and –5.0 percent y-o-y in third quarter 2009. However, the industrial sector posted a mild annual growth of 1.1 percent in fourth quarter 2009 before surging by 15.7 percent y-o-y in the first quarter of 2010.

On the demand-side, the slowdown of Philippine growth during 2008 and 2009 can be attributed to sharp declines in exports of goods and services as well as domestic investments, both of which were the hardest hit by the global economic crisis (Figure 3). Starting in the fourth quarter of 2008 total exports posted consecutive quarterly negative y-o-y growth rates of 11.5, 14.7, 18.1, 13 and 10 percent from the fourth quarter of 2008 to the first, second, third, and fourth quarters of 2009, respectively. Furthermore, gross domestic capital formation fell by 13.1 percent y-o-y in fourth quarter 2008 and continued to post negative annual growth rates of 15.1, 10.3, 12.1, and –0.8 percent in the first, second, third, and fourth quarters of 2009, respectively. At the start of 2010, however, both total exports and domestic investments rebounded sharply, with the former growing 17.9 percent y-o-y in the first quarter 2010 and the latter rising 24.3 percent y-o-y in the same period.

The precipitous decline in Philippine total exports in recent quarters is an indication of a contraction in the country's merchandise trade amid the global economic crisis. After posting a record-high US$10.3 billion for the month of July 2008, Philippine merchandise trade started to slide, falling 8.3 percent month-on-month (m-o-m) in August 2008, and continued its downward trend thereafter on a monthly basis, until it reached a record-low US$5.6 billion in February 2009 (Figure 4). In October 2008, the month where the global economic crisis worsened amid the announcement of Lehman Brother's bankruptcy, Philippine merchandise exports dropped to US$3,971 million from US$4,439 million in the previous month, a 10.5 percent m-o-m fall. This trend of a double-digit decline in merchandise exports on a monthly basis continued up to February 2009, reaching a record-low US$2,506 million for that month. Moreover, Philippine merchandise imports have started to fall earlier than exports, decreasing to US$5,042 million in August 2008 from US$5,848 million in the previous month, and continued its downward trend reaching US$3,059 million in February 2009.

The drop in Philippine merchandise exports starting in late 2008 up to the full year of 2009 is mainly attributed to weak foreign demand for domestically-produced goods amid the global economic slowdown. Table 1 presents Philippine merchandise exports to its major country destinations for selected quarters—first quarter 2008, first quarter 2009, and first quarter 2010. Indeed, the global economic crisis in 2008 has led to an immediate and substantial reduction in Philippine merchandise exports to all of its major trading partners. For example, Philippine

merchandise exports to the US plunged by 31.7 percent y-o-y to US$1,426.5 million in first quarter 2009 from its first quarter 2008 level of US$2,089.4 million; Philippine merchandise exports to Japan slipped by 38.0 percent y-o-y to US$1,237.0 million in first quarter 2009 from US$1,995.5 million in first quarter 2008; and Philippine merchandise exports to the People's Republic of China (PRC) fell by 49.7 percent y-o-y to US$734.6 million in first quarter 2009 from first quarter 2008's US$1,460.7 million. However, in the first quarter of 2010, Philippine merchandise exports to most of its major trading partners have rebounded from the same period in the previous year, as these economies have started to recover from the ill effects of the crisis.

2.2. Macroeconomic Policy Responses to the Crisis

Fiscal Policy: In early 2009, the Philippine government—through the National Economic Development Authority (NEDA)—embarked on a PHP330 billion fiscal stimulus program a.k.a., Economic Resiliency Plan (ERP), as a policy response to the global economic crisis. In general, the ERP was intended to promote the financing of infrastructure projects, cut income taxes for low- to middle-income workers and corporations, and provide social protection measures. Specifically, PHP160 billion or about 48% of the total funds served as an additional allotment in the government's budget for 2009 and was intended for the financing of small infrastructure projects located within communities and for social protection measures, which included conditional cash transfers. Thirty percent (PHP100 billion) of the fiscal stimulus program is not part of the government budget and is sourced from the government financial institutions and pension funds; this amount is planned for the financing of large infrastructure projects. The planned tax cuts on low-income and middle-income households as well as on corporate profits were set at PHP40 billion, while the remaining PHP30 billion of the program would serve as additional benefits for social security institutions. (For further details of the ERP, see Yap, Reyes, Cuenca (2009).

Accommodative Monetary Policy: The Philippine central bank—Bangko Sentral ng Pilipinas (BSP)—conducted an accommodative monetary policy starting in late 2008 to help cushion the adverse impacts of the global economic crisis on the Philippine economy. In December 2008, the BSP initiated its policy response to the crisis by lowering its key policy interest rates by 0.5 percentage point each to 5.5 percent for the overnight borrowing/reverse repurchase (RRP) rate

and to 7.5 percent for the overnight lending/repurchase (RP) rate. In January 2009, the BSP again cut the RRP and RP rates by another 50 basis points apiece to 5.0 and 7.0 percent, respectively. In March 2009, the BSP further reduced both policy rates by 0.25 percentage point each to 4.75% for the RRP rate and to 6.75 percent for the RP rate. In April 2009, another 25 basis point cut was made by the BSP, leading the RRP and RP rates to reach 4.5 and 6.5 percent respectively. In May 2009, the BSP reduced by another 25 basis points both the RRP and RP rates to 4.25 and 6.25 percent, respectively. The last policy rate cut by the BSP was made in August 2009, where the BSP reduced by another 0.25 percentage point the RRP rate to 4.0 percent and the RP rate to 6.0 percent. Since then, and as of June 2010, both policy interest rates have been maintained at their record-low levels. Overall, the BSP conducted policy rate cuts totaling 200 basis points or 2 percentage points since December 2008. (See Figure 5 for historical trend in the RRP rate.)

In addition to the policy rate cuts, the BSP also engaged in liquidity-enhancing measures to help stimulate the Philippine economy. One of these is the BSP's decision implemented in March 2009 to liberalize the Philippine peso rediscounting guidelines as well as increased its Philippine peso rediscounting budget to PHP60 billion.

3. Analytical Framework

A Dynamic CGE model linked to a micro-simulation module is employed to analyze how the global crisis may have affected the Philippine economy. The CGE model uses the year 2000 Social Accounting Matrix of the Philippines (Cororaton and Corong 2009)[4] as its principal database. Based on the SAM and exogenous information on population growth rate, interest rate and capital accumulation assumption, the dynamic model is solved to generate a baseline path (Business as Usual (BaU)) from year 2000 to 2015, with which the counterfactual "*crisis*" simulation results are then compared.

[4] See Cororaton and Corong (2009) for details on the SAM construction. The database is based on the latest available Input-Output table for the year 2000.

3.1 CGE Model

The structure of the CGE model employed in this paper is a slightly modified version of the PEP-1t standard dynamic model (Decaluwé *et al.* 2009) and uses the year 2000 Social Accounting Matrix (SAM) of the Philippines as the database. 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.

Figure 6 presents the key relationships in the model. 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 imperfect 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.

The basic production structure of the model is illustrated in Figure 7. Sectoral output is a Leontief function of intermediate inputs and value added. Value added in agriculture is a CES function of composite labor and composite capital. The composite labor is a CES aggregate of skilled labor and unskilled labor, while composite capital is also a CES function of capital and land. The value added for non-agricultural sectors follows the same structure, although no land is employed in these sectors. Capital and land are each sector specific, skilled and unskilled labor are mobile across sectors but limited within skill category, and land use is immobile 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. Foreign savings are held fixed. The nominal exchange rate is the model's numéraire. 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.

The dynamic module is activated by linking a series of static models that are linked sequentially from 2000 to 2015. Agents remain myopic and the model follows a balanced growth path (baseline or BaU path) by assuming that all exogenous variables grow at the same rate as labor supply; relative prices remain constant; and capital stock increases based on a capital accumulation equation. In particular, labor supply is assumed to grow at the population growth rate, while capital stock is equal to the stock of the preceding period less deprecation rate plus the volume of new capital investment in the preceding period. Under this structure, new capital only become operational one period after the investment has been made (see Decaluwé *et al.* 2009).

3.2 Micro-Simulation Module

The micro-simulation process[5] 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 employed 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

[5] This is a modified approach of the original version proposed by Vos (2005).

repeated 30 times[6] allowing us to derive confidence intervals on our FGT indices and Gini coefficient estimates.

3.3 Economic Structure

Table 2 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 3 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,[7] 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 diary, fruit processing, fish processing, coconut oil, sugar milling, other food, textile, leather, paper, fertilizer, other chemicals, petroleum, cement, and transportation and communication.

[6] Vos (2005) observes that 30 iterations are sufficient. Repeating this process additionally does not significantly alter the results.

[7] The export (import) intensity ratio is defined as the sector's exports (imports) divided by its output (domestic supply).

Table 3 reports the values of key elasticity parameters used in the model: the import substitution elasticity (sig_m) in the CES composite good function, the production substitution elasticity (sig_va) in the CES value added production function, and the export demand elasticity (eta) is obtained from the version of LINKAGE model used to analyze the impact of removing global agricultural distortions (van der Mensbrugghe, Valenzuela and Anderson 2010).

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 decline: they account for 25 percent of consumption in the first decile but only 8.6 percent in the tenth decile.

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 4). 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).

4. Model Simulation and Results

The model is used to run a counterfactual "*crisis*" simulation that mimics the conditions faced by the Philippine economy during the crisis. The results of this simulation are then compared with the economy's baseline path in order to find out the magnitude of economic deviation arising from the crisis.

4.1 Crisis Scenario

A "*crisis scenario*" is simulated by focusing on the role that international trade channel played in transmitting the impact of the crisis into the Philippine economy; and the effects of the government's stimulus program. This is carried out by: (a) using the variation in world import prices, export prices and export demand facing the Philippines between 2008 and 2009 (Table 6); and (b) imposing a 10 percent increase in government spending arising from the fiscal stimulus program, as shocks into the CGE model[8]. The rise in government spending is used to shock the government expenditure variable in the model. On the other hand, the changes in import prices were used to perturb the world import price by commodity in the CGE model, while actual changes in export volumes and prices by commodity are used to shock the world export demand and export price in the model. By doing this, it is assumed that the CGE model determines demand and supply behavior in response to changes in the economic environment.

The changes in export volumes were computed based on data obtained from the foreign trade statistics of the National Statistical Office (NSO) of the Philippines, while changes in export prices were taken from the International Monetary Fund's (IMF) commodity price series and the Australian Bureau of Statistics' (ABS) export price index. A caveat however is that, the commodity aggregation from these data sources do not exactly conform to those found in the SAM/CGE model. Hence, subjective concordance based on broad commodity categories is assumed. Moreover, owing to the absence of data, the changes in export prices, import prices and global export demand for services are computed based on the average economy-wide changes.

4.1 Simulation Results

The simulation results of the "*crisis*" scenario are compared with the economy's baseline path. As a consequence, all results are presented as percent change relative to their baseline. To effectively analyze the impacts, we focus our analysis during the height of the crisis, that is, for the year 2009.

[8] The government's stimulus program is roughly 3.3 percent of GDP.

The long-term impact of the global economic crisis has been to alter the Philippine economy's natural growth path, with the country's GDP in 2009 deviating substantially from its baseline (Figure 8). As a result, the GDP for the year 2009 is 22 percent lower than what it would have been in the absence of the crisis and with the stimulus program—compared to 24 percent reduction in GDP for year 2009 without the stimulus package. Nevertheless, GDP starts to bounce back by 2010, eventually moving back to its baseline path by 2012 (Figure 8).

A snapshot of the devastating impact of the crisis on major economic sectors is likewise presented in Figure 9. Although the reduction in total imports is substantial, it is also coupled with a significant reduction in exports, particularly exports for the outward-oriented manufacturing sector. While over-all agricultural exports increase, it is not enough to offset the dramatic fall in exports for manufacturing and services, as agriculture exports only account for 1.4 percent of total Philippine exports (Table 3). Similarly, total economy-wide production falls as the expansion in output for the entire services sector is enough to outweigh the significant output contraction experienced by both agriculture and manufacturing output.

Macro effects: The detailed macro-economic effects of the "crisis" are shown in Table 7. The immediate impact of falling world export prices and declining global demand for Philippine exports is a 9 percent reduction in total export volume. With this, over-all production contracts by 1.5 percent, which in turn brings about lower demand for factors as confirmed by a 0.2 percent reduction in economy-wide value added. On the other hand, total import volume decline by 10 percent in spite of falling world import prices (18.2 percent) because of two reasons. First, the contraction in output brings about lower demand for imported intermediate inputs, particularly for the relatively outward-oriented but import dependent manufacturing sector as it registers a 10.9 percent reduction in import demand volume. Secondly, total import demand falls as owing to the reduction in exports earnings, fewer foreign exchange is now available to purchase imports.

The deceleration in international trade also gives rise to a lower cost structure that translates to cheaper prices for Philippine products. Indeed, economy-wide output prices fall by an average of 22 percent, as the prices of value added and prices of imported intermediate inputs drop by 22.4 and 18.2 percent respectively. As a result, average export prices decrease by 25 percent, while prices of domestically produced commodities decline by 21.4 percent. Notably, the decline in domestic

prices is roughly 3 percentage points more than the 18.2 percent fall in over-all import prices results. With this, a price induced substitution effect emerges, with consumers substituting the relatively more expensive imports for cheaper domestic products, as verified by the 0.3 percent expansion in over-all domestic demand.

Sectoral effects: While the reduction in imports is consistent across all sectors, the changes in exports paint a different story as agricultural exports increase by 6 percent, while manufacturing and services exports decline by 9.5 and 8.1 percent respectively. Essentially, the main reason behind the expansion in agricultural exports is due to the rise in both global export demand and world export prices for sugar and fish products, as well as the increase in international price of chicken (Table 6). A second round effect also transpires, as agricultural exports are now relatively cheaper abroad because of a lower cost structure, as proven by a 24 percent fall in its price of value added. With this, export demand for raw sugar, fish and chicken products significantly increase by 72, 14 and 11 percent respectively[9] (Table 8). The same story applies for sugar milling in the manufacturing sector. A Closer examination of variation in exports volume for detailed manufacturing industries (Table 8) reveals a 9.8 and 6.6 percent reduction in export volume for electric related products and machineries. Indeed, these export reductions are substantial and has far ranging effects on the economy, as they respectively account for 45.8 and 18.3 percent of total Philippine exports (Table 3). Similarly, processed food exports also register a 7.3 percent average reduction [10].

Demand for import across all major sectors fall, particularly in manufacturing (Table 7). The greater decline in manufacturing imports (-10.9 versus -8.4 in agriculture and -7.7 in services) results from its inherent production structure as being highly dependent on imported intermediate inputs. Moreover, as suggested in the discussion of the macroeconomic effects, the reduction in imports for all sectors is directly related to price effects, as the reduction in the price of domestic importables are greater than the reduction in price of imports for these commodities (-21.4 versus -18.2 in Table 7). This is particularly true for agriculture and services sectors for which domestic

[9] Note that exports for these sectors as well as their shares to total exports are small at the base (Table 3)

[10] Simple average for meat, milk and dairy and fish processing, coconut and edible oil, rice milling and other processed food, i.e., [Average(-6.7, -8.6, -9, -7.9, -4.3, -6.6, -7.7) = 7.3%] .

price of importables fall by 23.5 and 20.3 percent respectively, relative to 22.3 and 15 percent fall in their respective price of imports.

Import volumes fall for most sub-sectors, particularly machineries and electric related products for which imports drop by 14.7 and 14.2 percent respectively (Table 8). The dramatic reduction in both sectors' imports arise from their corresponding output and export contraction effects—as they now require less imported intermediate inputs. On the other hand, sugar milling imports fall by 63 percent due to the 12 percent increase in its world import price. Nonetheless, this reduction in imports is compensated for by a 10.5 percent increase in domestic sugar milling output. Substitution towards domestically produced/milled sugar also occurs as domestic demand increases by 1.6 percent. Similarly, milled sugar exports also increase as producers take advantage of a higher global export price for milled sugar.

Let us now explore the sectoral output effects arising from the crisis which are largely dictated by a sector's relative exposure to the world market. Indeed, output contraction for the relatively inward-oriented agricultural sector is lower at 0.7 percent, while output for the relatively outward-oriented manufacturing sector falls more by 4.7 percent. However, the over-all growth of the services sector output, which expands by 1.8 percent does not stem from its exposure to the international market, but rather by the increase in government expenditure resulting from the government's stimulus package. Indeed, Table 8 reveals that only the output of public services sector expands (30 percent), while output for all other service sub-sectors contract.

The output effects for each sub-sector are shown in Table 8. The expansion in agriculture output is anchored on the output growth of sugar and fish products (9.5 and 1.1 percent) for which global export demand rises (see column 3 in Table 6). The same story applies for the 19.5 percent output expansion for sugar milling in the manufacturing sector. On the other hand, the output expansion of fertilizer and other chemicals (correspondingly 5.3 and 1.9 percent) stems from a price induced effect in both domestic and international market. Firstly, the higher reduction in both sectors' export price (-21.1 and -20.2 percent) allow them to improve their competitiveness abroad thereby resulting in an increase in their exports (2.4 and 0.5 percent). On the domestic front, the reduction in both sectors' domestic prices (-18.4 and -19 percent) are lower relative to their export

prices, inducing them to sell more locally as confirmed by a higher growth in their domestic sales (5.9 and 2 percent respectively) relative to their exports.

Factor Effects: Essentially, the changes in the price of value added and labor reallocation effects (Table 9) are largely dictated by the output effects at the detailed sub-sector level (Table 8). That is, the greater the output contraction (expansion), the greater the decrease (increase) in labor demand. Indeed, both the price for and demand for value added in agriculture and manufacturing fall due to the output contraction in both sectors. In contrast, the demand for value added increases in the expanding services sector, while its value added price falls less relative to agriculture and manufacturing. In general, skilled labor demand increases in the service sectors but falls in both agriculture and industry, while unskilled labor demand also falls in manufacturing but increases in both agriculture and services. Thus, unskilled workers relocate from manufacturing to agriculture and particularly services sectors, whereas skilled workers migrate from the agricultural and manufacturing sectors to the service sectors. The migration of workers is mainly absorbed by the public services because it requires more workers to sustain it expanding output. Note that this superior hiring capability (14.6 and 12.1 percent increase demand for unskilled and skilled labor respectively) is mainly due to the increase in government spending as a result of the stimulus program.

Similarly, closer examination of Table 9 reveals that to some extent, intra-sector changes in labor demand contribute to the variation in the labor market. For instance, agricultural laborers move towards expanding agricultural sub-sectors such as sugar and fishing while laborers in the manufacturing sectors shift towards sugar milling. Substantial movement of other service sub-sector sector workers toward public services is also observed owing to stimulus program that allows for the expansion in public service output.

Income Effects: The changes in nominal household income, nominal consumer price indices (based on household-specific consumer baskets) and real income/welfare are presented in Table 9. The crisis results in a significant reduction in nominal income and consumer prices for all households. Consumer prices fall more for lower income deciles because of the significant share of the now cheaper primary and food commodities in their expenditure consumption basket. However, the reduction in consumer prices is outweighed by a larger fall in nominal income for all household groups (except for the tenth decile). The reduction in nominal income is roughly similar from the

first to the sixth decile, but their nominal income is substantially higher when compared with those households found in the seventh to the tenth deciles. In particular, the reduction in income for households in the first decile is roughly 5 percentage points more than those in the 10^{th} decile. The net effect of the crisis is that all households particularly those found in the lower deciles, experience a much higher reduction in their real income.

In order to have an idea of the spatial impact of the crisis, we take advantage of the richness of the micro-simulation procedure, to calculate poverty indices and Gini coefficients based on location, urban-rural. Using this characteristic instead of income deciles to evaluate changes in poverty and income distribution is preferable as it allows for a better identification of the spatial impact of the crisis on the poor. As explained in the methodology section, the micro-simulation process incorporate changes in 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).

Poverty Effects: The poverty and inequality results as well as confidence intervals for these estimates are presented in Table 11. The results confirm the devastating impact of the crisis on poverty as both inequality and all poverty indices worsen. Inequality as measured by the gini coefficient increases by 1.7 percent owing to the greater fall in real income of poor households relative to richer ones (Table 9). Similarly, the national poverty headcount rate/index increases by 5 percent or 1.95 percentage points (from 33.95 to 35.9), with both national poverty gap and severity increasing more at 8.7 and 10.9 percent respectively when compared with their initial values. This pattern of higher increase in poverty gap and severity is consistent regardless of location suggesting that poorer households are more subject to abject poverty.

Poverty indices increase more in the rural areas relative to the urban areas, since most export oriented industries are located in the urban areas. To the extent the most export-oriented industries contract in the wake of falling global export demand and export prices, it is urban workers that are affected the most. Indeed, urban workers bear the burden falling returns to factors used intensively in manufacturing. On the other hand, poverty indices in the rural areas fall less because rural households take advantage of higher demand for unskilled labor in agriculture

increases; and they plausibly benefit more from the greater reduction in their consumer prices given their reliance on primary products.

5. Summary and Insights

This paper contributes to the analysis of the impact of the global economic crisis on the Philippine economy by providing an economy-wide perspective aimed at tracing the effects on detailed economic agents. By using a dynamic CGE model linked to a micro-simulation module as a combined tool to undertake counterfactual simulation analysis, this paper was able to identify the important mechanisms and channels linking the global crisis and the Philippine economy: from the macro-economic to microeconomic level; from output and factor supplies and demands to commodity and factor prices; and from household incomes to levels of poverty and income distribution.

A counterfactual "*crisis*" simulation is undertaken to mimic the conditions faced by the Philippine economy during the crisis. In this scenario, particular emphasis is placed on the impact of the crisis on the "real" side of the economy by focusing on two key variables. First, significant attention is placed on the role that international trade played in transmitting the impact of the global crisis into the Philippine economy, since evidence confirms that it mainly contributed to the deceleration in economic growth and employment in the country. Second, the impact of government's stimulus program is accounted for.

The long-term impact of the global economic crisis has been to alter the Philippine economy's natural growth path. Indeed, simulation results confirm that the country's GDP in 2009 is 22 percent lower than what it would have been in the absence of the crisis and with the stimulus program—compared to a 24 percent reduction without the stimulus package. In general, the simulation results suggest that falling world export prices and declining global demand for Philippine exports as a result of the crisis, lead to a reduction in exports profitability and a contraction in total output for the economy.

The detailed sectoral output effects are largely dictated by a sector's relative exposure to the world market, with the output for the relatively inward-oriented agricultural sector falling less compared to the relatively outward-oriented manufacturing sector. However, the over-all growth of

the services sector does not stem from its exposure to the international market, but rather by the increase in government expenditure resulting from the stimulus package.

The changes in the price of value added and labor reallocation effects are largely dictated by the output effects at the detailed sub-sector level. That is, the greater the output contraction (expansion), the greater the decrease (increase) in labor demand. With this, the price for and demand for value added in agriculture and manufacturing falls while the demand for value added increases in the expanding services sector, while its value added price falls less compared to agriculture and manufacturing. Skilled labor demand increases in the service sectors but falls in both agriculture and industry, whereas unskilled labor demand also falls in manufacturing but increases in both agriculture and services. The migration of workers is mainly absorbed by public services because it requires more workers to sustain it expanding output. Note that this superior hiring capability arises from the increase in government spending as a result of the stimulus program.

All households experience a significant reduction in real income particularly those in the lower deciles. As a result, both inequality and all poverty indices worsen with indices for both national poverty gap and severity increasing more relative to poverty headcount. This pattern of higher is consistent regardless of location suggesting that poorer households are more subject to abject poverty. Urban dwellers also experience a higher increase in poverty relative to their rural counterparts as most export oriented industries are located in the urban areas and returns to factors intensively used by these industries fall.

In conclusion, the simulation results suggest that like most developing economies, the Philippines has not been insulated from the recent global economic crisis. While the government‘s stimulus program helped alleviate the impact of the crisis, it was not enough to completely outweigh the negative effects on welfare arising from the crisis. Because of tight fiscal conditions, the increase in government spending was quite modest and focused on expanding employment in the public services sector, financing of small infrastructure projects located within communities, as well as social protection measures.

Against this backdrop, the Philippine government needs to become more proactive in finding ways to mitigate the potentially harmful effects arising from future economic and financial crises on vulnerable household groups, particularly the poor. One policy response is to improve the

existing social protection program by addressing many of its bottlenecks—such as inadequate benefits, low coverage, and poor targeting—as well as expanding the delivery of social protection. Another is for the government to spend more in improving the economy's physical infrastructure to create job opportunities, improve productivity and complement its social protection measures. Finally, the government must exert efforts to help promote intra-regional trade with other Asian economies, thus moderating its export dependence to Western economies like the United States and Europe.

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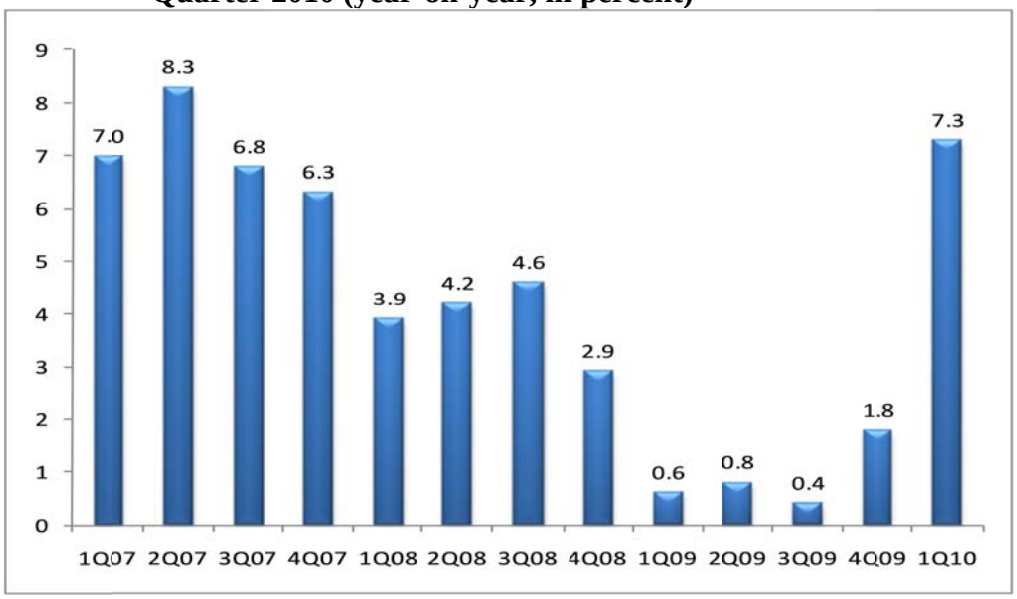
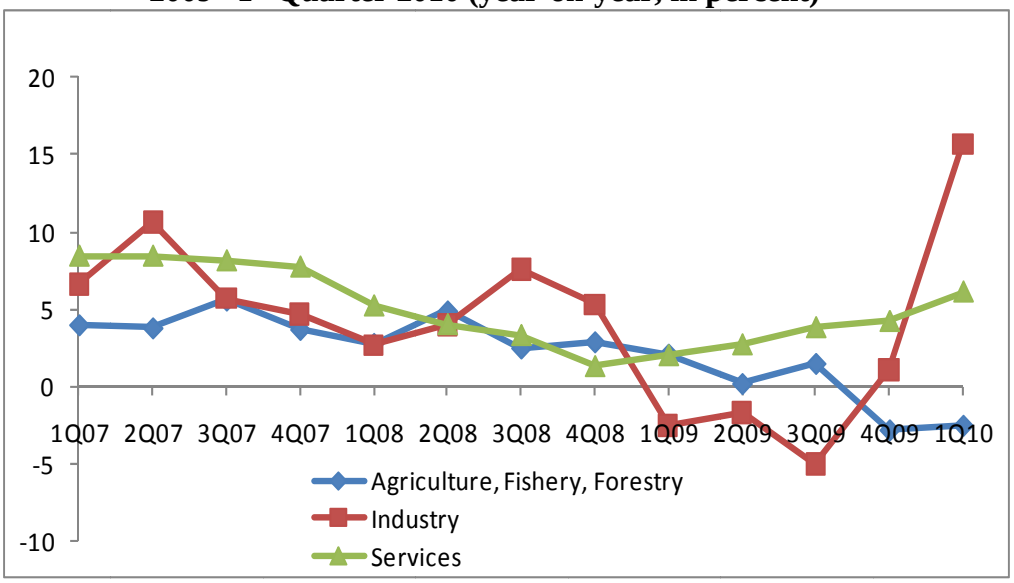
Figure 1. Quarterly GDP Growth of the Philippines, 1st Quarter 2007–1st Quarter 2010 (year-on-year, in percent)



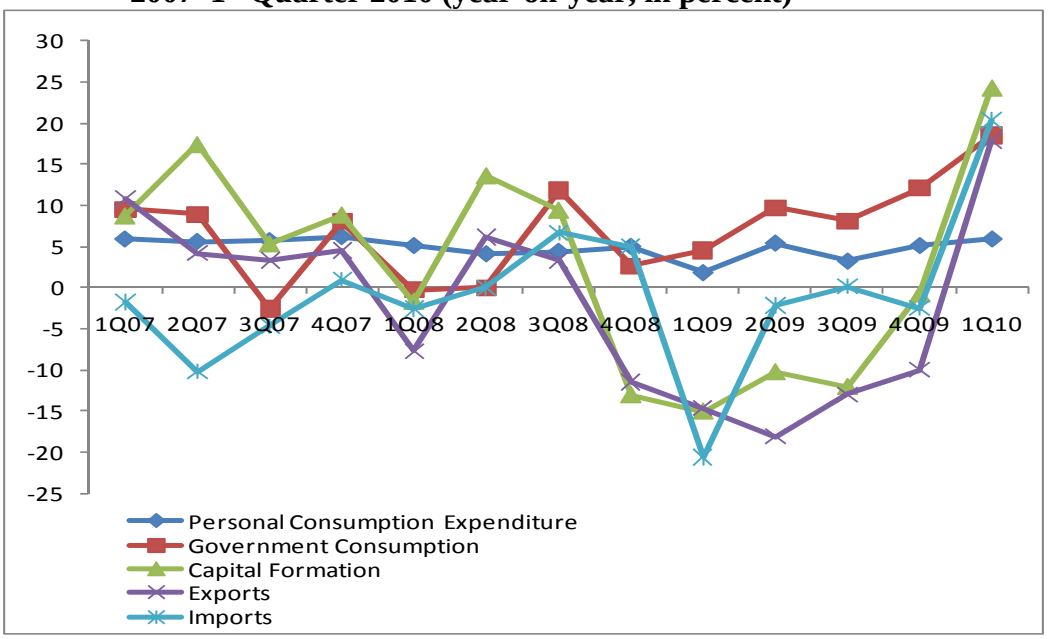
Note: Philippine GDP is based on 1985 constant prices.
Source of basic data: National Statistical Coordination Board, Republic of the Philippines.

Figure 2. Philippine Real GDP Growth by Industrial Origin, 1st Quarter 2009 –1st Quarter 2010 (year-on-year, in percent)



Note: Philippine GDP is based on 1985 constant prices.
Source of basic data: National Statistical Coordination Board, Republic of the Philippines.

Figure 3. Growth of Philippine Real GDP by Expenditure Type, 1st Quarter 2007–1st Quarter 2010 (year-on-year, in percent)



Note: Philippine GDP is based on 1985 constant prices.
Source of basic data: National Statistical Coordination Board, Republic of the Philippines.

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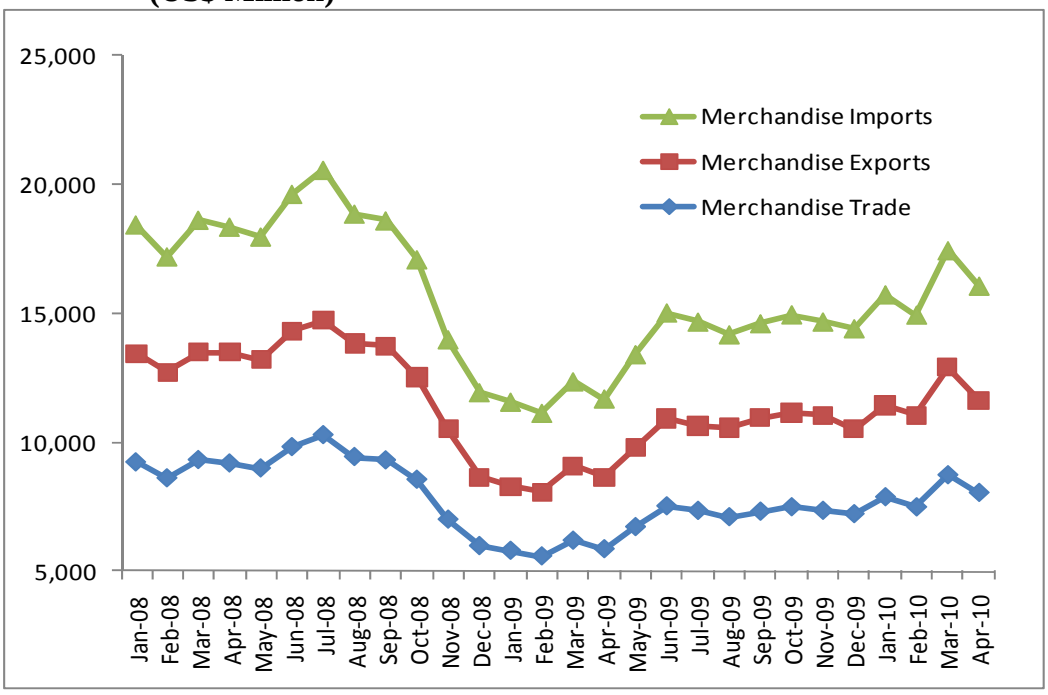

Source of basic data: National Statistical Coordination Board, Republic of the Philippines.

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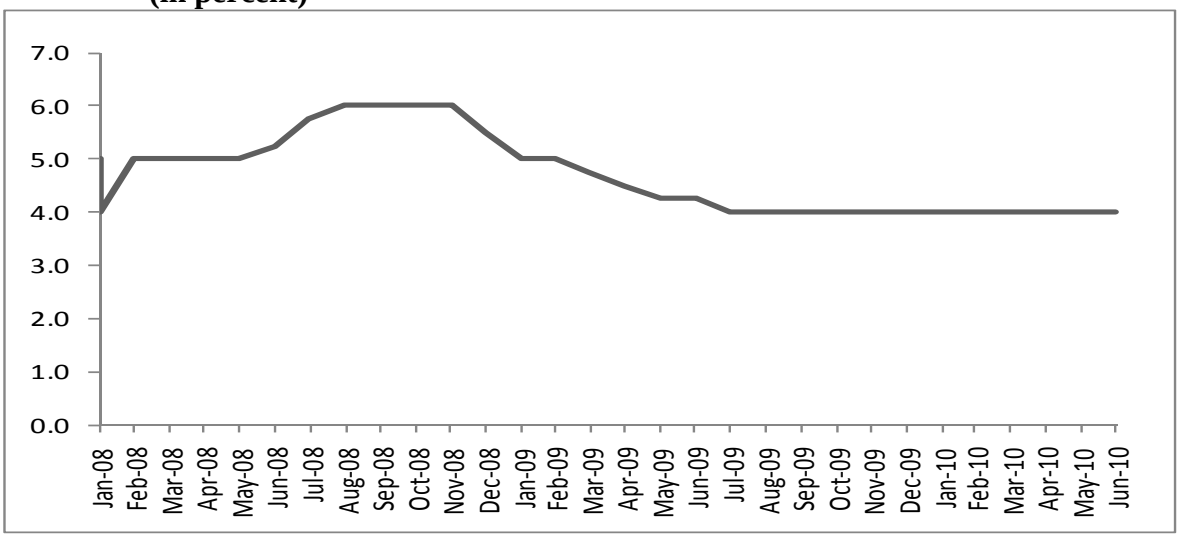


Source: Bangko Sentral ng Pilipinas (BSP)

Figure 6. Key relationships in the CGE model

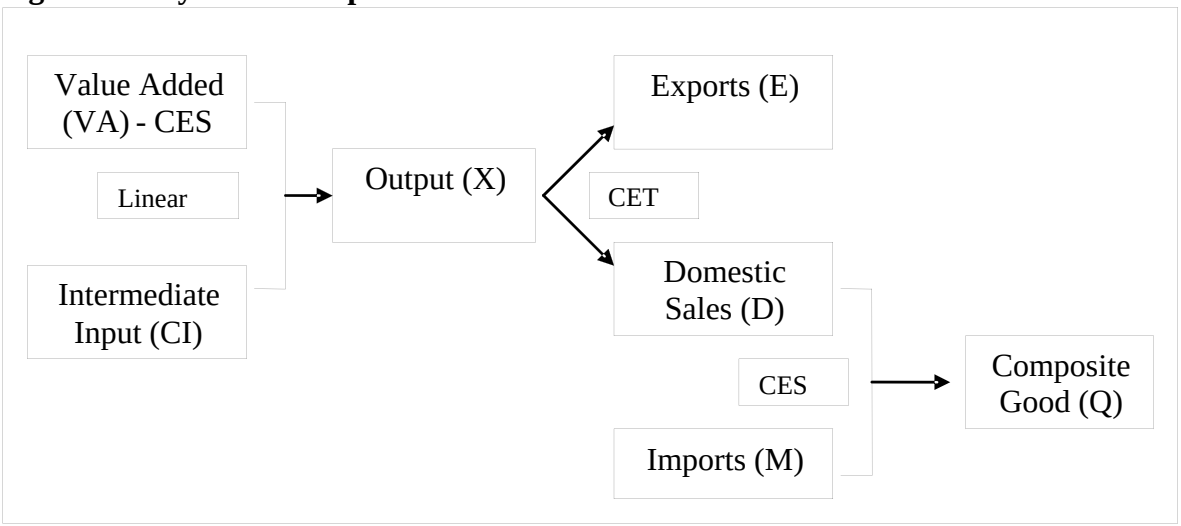


Figure 7. Output Determination

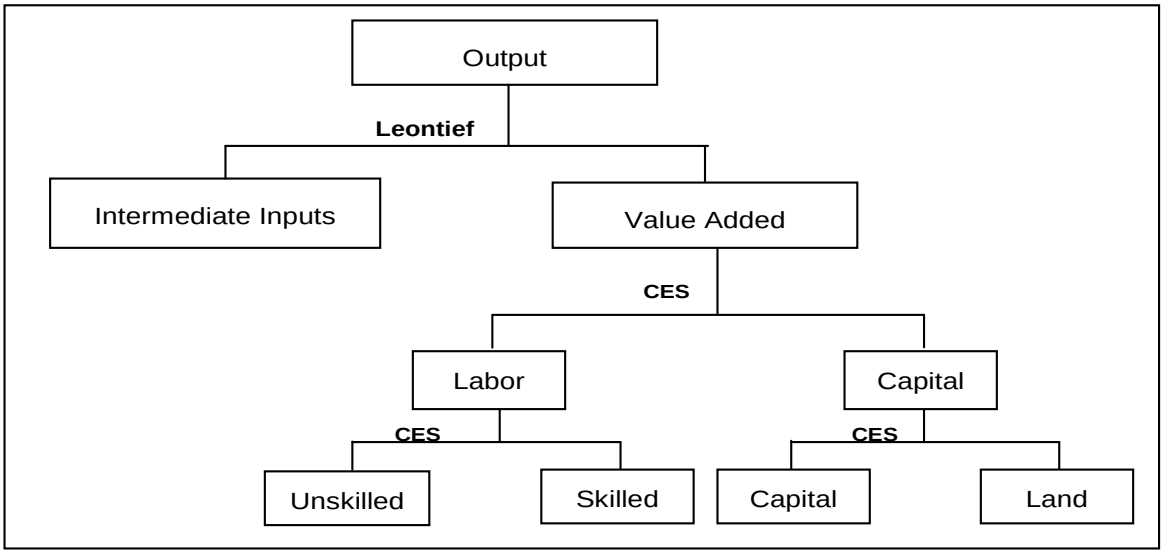
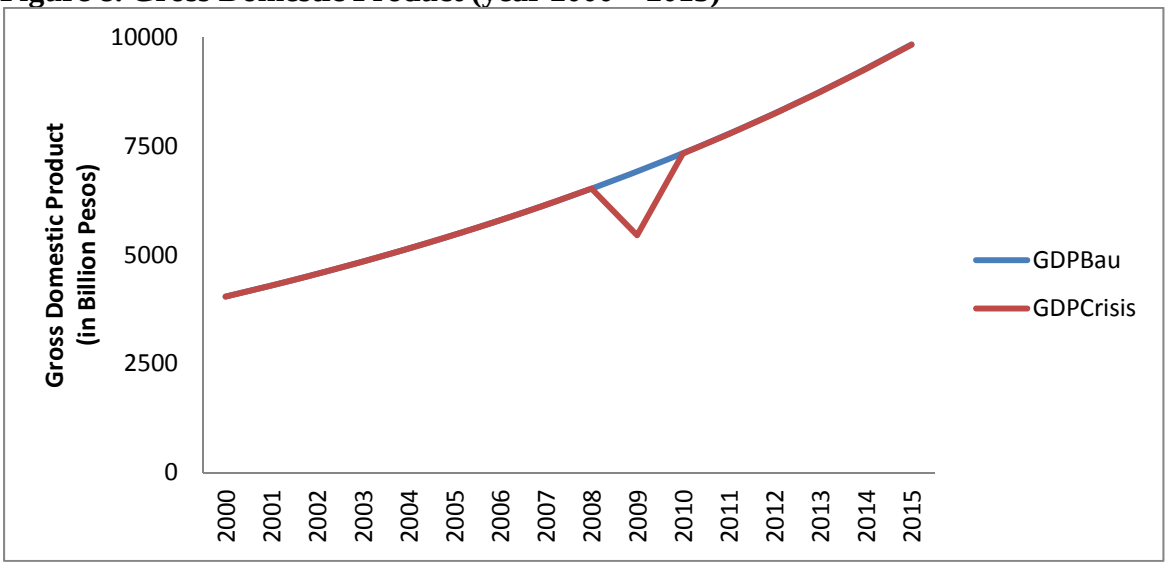


Figure 8. Gross Domestic Product (year 2000 – 2015)



Source: Authors' calculation based on simulation results

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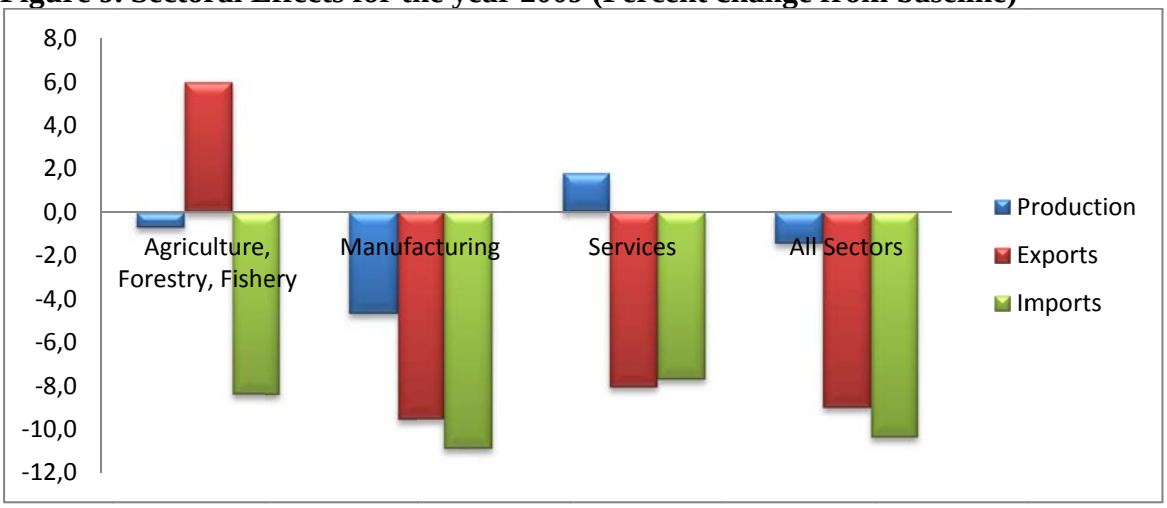

Source: Authors' calculation based on simulation results

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Table 1. Philippine Merchandise Exports by Top Country Destination, (US$ Million)

	1Q08	1Q09	1Q10
USA	2,089.4	1,426.5	1,881.5
Japan	1,995.5	1,237.0	1,889.3
PRC	1,460.7	734.6	1,080.1
Hong Kong, China	1,322.0	676.8	859.0
Singapore	692.4	359.5	1,018.8
Germany	662.5	541.3	841.6
Netherlands	962.3	700.1	700.2
Korea, Rep. of	529.6	359.6	531.1
Malaysia	541.0	256.6	343.6

Legend: PRC = People's Republic of China, USA = United States of America.
Source of basic data: National Statistical Coordination Board, Republic of the Philippines.

Table 2. Production structure, the Philippines,[a] 2000

	Value added/ output (percent)	Value added share	Output share	Employ-ment share	Capital labor ratio (percent)	Share of skilled labor	Share of unskilled labor	Land output ratio (percent)	Indirect tax rate
Agriculture									
Primary Agriculture									
Paddy	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
Lightly Processed Food									
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
Non-Agriculture									
Other primary products and Mining									
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
Highly Processed Food, and Tobacco									
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
Manufacturing									
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
Other Industry									
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
Services									
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

[a] 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 3. Trade structure and elasticity parameters, the Philippines, 2000

	Elasticities[a]			Exports (percent)		Imports (percent)	
	sig_va	sig_m	eta	share	Intensity[b]	share	Intensity[b]
Agriculture							
Primary Agriculture							
Paddy	0.8	2.2	4.5	0	0	0	0
Corn	0.8	2.5	4.9	0	0.1	0.1	8.4
Coconut	0.8	2.4	4.8	0	0.2	0	0
Fruits and vegetables	0.8	2	3.9	1.2	15.1	0.3	6.2
Sugar	0.8	3	5.9	0	0	0	0
Other crops	0.8	2	3.9	0.1	2.8	1.2	44.2
Hogs	0.8	2	3.9	0	0	0	0
Cattle	0.8	2	3.9	0	0.2	0.1	9.2
Chickens	0.8	2	3.9	0	0	0	0.4
Lightly Processed Food							
Meat processing	1.5	2	3.9	0	0	0.4	3.4
Milk and dairy	1.5	2	3.9	0	1.7	1	33.6
Coconut and edible oil	1.5	2	3.9	1.5	32.9	0.6	19
Rice and corn milling	1.5	2.2	4.5	0	0	0.8	8.8
Sugar milling	1.5	3	5.9	0.2	8.3	0.1	8.2
Non-Agriculture							
Other primary products and Mining							
Agricultural services	0.8	2.2	4.3	0	0	0	0.1
Forestry	0.8	2.2	4.3	0.1	10.3	0	0.6
Fishing	0.8	2.2	4.3	0.8	7.9	0	0.3
Mining	0.8	2.2	4.3	0.4	15.8	1.4	45.8
Crude oil and natural gas	0.8	2.2	4.3	0	0	7.5	99.6
Highly Processed Food, and Tobacco							
Fruit processing	1.5	2	3.9	0.7	24.1	0.3	13.9
Fish processing	1.5	2	3.9	0.7	22	0.2	7.4
Other processed food	1.5	2	3.9	0.6	4.8	0.9	9.3
Tobacco and alcohol	1.5	2	3.9	0.1	1.4	0.3	5.7
Manufacturing							
Textile	1.5	2.1	4.1	1.2	16.9	2.7	36.7
Garments and footwear	1.5	2.1	4.1	0.2	1.8	0.1	1.3
Leather and rubber-wear	1.5	2	4.1	1.3	26.6	2.3	45.6
Paper and wood products	1.5	2	4.1	2.3	19.7	1.8	19.3
Fertilizer	1.5	2	4.1	0.1	16.8	0.5	49.4
Other chemicals	1.5	2	4.1	0.9	7.4	5	35.4
Petroleum	1.5	2	4.1	1.6	11.8	1.8	16.6
Cement and related products	1.5	2	4.1	0.4	9.5	0.5	13.8
Metal and related products	1.5	2	4.1	2.5	17.4	4.2	31.7
Machineries and transport equipment	1.5	2	4.1	18.3	73.2	12.5	70.6
Electrical and related products	1.5	2	4.1	45.9	89	35.2	88.9
Other manufacturing	1.5	2	4.1	3.7	44.3	2	36.1
Other Industry							
Construction	1.5	1	2.1	0.3	1.5	0.3	1.9
Utilities	1.5	1	2.1	0	0	0	0
Services							
Transportation & communications	1.5	1	2.1	3.7	10.2	8.1	24.2
Wholesale trade	1.5	1	2.1	2.9	5.2	0.6	1.5
Other service	1.5	1	2.1	8.4	9.5	6.9	10

[a] 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. [b] export ÷ output; imports ÷ composite good. [c] export ÷ output; imports ÷ composite good
Source: Cororaton, Corong and Cockburn (2010)

Table 4. Structure of household expenditure, by decile, the Philippines,[a] 2000 (percent)

	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
Chickens	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
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
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 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
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

[a] There is no household consumption from "Agricultural Services" and "Crude oil and Natural Gas Mining".
Source: Cororaton, Corong and Cockburn (2010)

Table 5. Poverty incidence and food expenditure shares, the Philippines, 1997 and 2000

	Rural				Urban			
	1997		2000		1997		2000	
Poverty incidence (percent of pop'n)	50.7		48.8		21.6		18.6	
Expenditure shares	**Poor**		**Nonpoor**		**Poor**		**Nonpoor**	
(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 6. Export demand, World Export Prices and World Import Prices in year 2009 (percent change relative to year 2008)

	World Import	World Export	
	Price[a]	Price[a]	Demand[b]
Paddy rice	-25.6	-26.0	-17.5
Corn	-	-25.0	-40.6
Coconut	-17.9	-18.0	-7.0
Fruits and vegetables	-	27.0	20.0
Sugar	-24.8	-25.0	-13.6
Other crops	-24.8	-14.0	-13.6
Agricultural services	-13.9	-	-
Hogs	-14.0	-14.0	-13.6
Cattle	1.1	2.0	-13.6
Chicken	1.2	1.0	-13.0
Fishing	-37.6	-18.0	-13.0
Forestry	-24.0	-49.0	-41.2
Mining	-35.6	-	-
Crude oil and natural gas	-24.8	-25.0	-11.4
Meat processing	-24.8	-25.0	-11.4
Milk and dairy	-24.8	-25.0	-11.4
Fruit processing	-24.8	-25.0	-11.4
Fish processing	-22.0	-22.0	-11.4
Coconut and edible oil	-24.4	-24.0	-11.4
Rice and corn milling	12.0	27.0	30.0
Sugar milling	-24.8	-25.0	-11.4
Other processed food	-13.8	-14.0	-11.4
Tobacco and alcohol	-22.5	-22.0	-24.5
Textile	-22.5	-22.0	-25.4
Garments and footwear	-22.5	-22.0	-25.4
Leather and rubber wear	-22.5	-22.0	-10.7
Paper and wood products	-12.2	-12.0	-14.6
Fertilizer	-12.2	-12.0	-14.6
Other chemicals	-35.6	-36.0	-76.6
Petroleum	-12.2	-12.0	-54.6
Cement and other related products	-12.2	-12.0	-54.6
Metal and related products	-15.4	-15.0	-22.2
Machineries, transportation equipment, etc.	-15.4	-15.0	-22.2
Electrical and related products	-15.5	-15.0	-19.6
Other manufacturing	-15.0	-15.0	-19.0
Construction	-	-	-
Utilities	-15.0	-15.0	-19.0
Transportation & communications	-15.0	-15.0	-19.0
Wholesale trade	-15.0	0.0	-19.0
Other service	-25.6	-26.0	-17.5
Public services	-	-25.0	-40.6

[a] IMF commodity price series and ABS export price index; [b] Foreign trade statisticsof the National Statistical Office (NSO)

Table 7. Macroeconomic effects in 2009 (percent change from baseline)

	Agriculture	Manufacturing	Services	All
Volume Effects				
Output	-0.7	-4.7	1.8	-1.5
Domestic Demand	-1.1	-2.1	2.3	0.3
Composite Demand	-1.4	-5.8	1.5	-2.3
Exports	6.0	-9.5	-8.1	-9.0
Imports				-
	-8.4	-10.9	-7.7	10.4
Value Added	-0.7	-4.9	2.8	-0.2
Price Effects				
Output				-
	-23.3	-22.8	-20.8	22.0
Domestic Demand				-
	-23.5	-22.2	-20.3	21.4
Composite Demand				-
	-23.5	-20.8	-19.9	20.6
Exports				-
	-19.0	-24.3	-30.6	25.0
Imports				-
	-22.3	-18.7	-15.0	18.2
Value Added				-
	-24.0	-24.7	-20.7	22.4

Source: Authors' calculation from simulation results

Table 8. Sectoral Effects in 2009 (percent change from baseline)

	Price Changes					Volume Changes				
Sectors	px	pd	pq	pe	pm	x	d	q	e	m
Paddy rice	-23.6	-23.6	-23.6	0.0	0.0	-2.5	-2.5	-2.5	0.0	0.0
Corn	-23.9	-23.9	-24.0	-28.6	-25.6	-2.4	-2.4	-2.0	-9.9	3.5
Coconut	-24.2	-24.2	-24.2	-35.0	0.0	-1.6	-1.6	-1.6	-18.0	0.0
Fruits and vegetables	-23.2	-23.4	-23.1	-22.2	-17.9	-0.4	-0.6	-1.5	0.9	-15.8
Sugar	-15.8	-15.8	-15.8	14.5	0.0	9.5	9.5	9.5	72.5	0.0
Other crops	-25.7	-25.6	-25.3	-28.7	-24.8	-2.8	-2.7	-3.5	-6.6	-4.8
Agricultural services	-23.4	-23.4	-23.4	-21.4	-24.8	-0.6	-0.6	-0.6	2.2	3.5
Hogs	-24.0	-24.0	-24.0	0.0	-13.9	-2.3	-2.3	-2.4	0.0	-23.9
Cattle	-24.4	-24.4	-23.7	-22.2	-14.0	-1.8	-1.8	-3.6	1.0	-24.2
Chicken	-22.8	-22.8	-22.6	-13.4	1.1	-0.5	-0.5	-0.8	11.4	-41.9
Fishing	-22.6	-23.7	-23.6	-13.0	1.2	1.1	-0.4	-0.5	14.7	-46.4
Forestry	-27.0	-27.3	-27.4	-24.7	-37.6	-1.7	-2.1	-1.9	1.8	36.9
Agriculture, Forestry, Fishery	-23.3	-23.5	-23.5	-19.0	-22.3	-0.7	-1.1	-1.4	6.0	-8.4
Mining	-27.4	-24.2	-24.1	-50.1	-24.0	-8.5	-4.2	-4.4	-38.9	-4.7
Crude oil and natural gas	-30.5	-30.5	-35.6	0.0	-35.6	-21.7	-21.7	-7.4	0.0	-7.3
Meat processing	-22.6	-22.6	-22.6	-27.5	-24.8	-0.5	-0.5	-0.3	-6.7	5.5
Milk and dairy	-22.3	-22.3	-23.1	-26.5	-24.8	-3.5	-3.4	-1.4	-8.6	3.2
Fruit processing	-22.6	-21.4	-21.8	-26.3	-24.8	-4.5	-3.0	-2.0	-9.0	6.0
Fish processing	-23.3	-22.2	-22.3	-26.9	-24.8	-3.4	-2.0	-1.6	-7.9	5.0
Coconut and edible oil	-23.9	-23.0	-22.9	-25.8	-22.0	-1.9	-0.8	-1.2	-4.3	-3.3
Rice and corn milling	-22.8	-22.8	-23.0	-26.0	-24.4	-2.1	-2.1	-1.7	-6.6	2.5
Sugar milling	-15.7	-20.4	-19.1	16.2	12.0	10.5	1.6	-3.2	77.5	-63.5
Other processed food	-22.5	-22.2	-22.5	-27.0	-24.8	-2.2	-1.9	-1.3	-7.7	4.9
Tobacco and alcohol	-19.5	-19.5	-19.1	-19.1	-13.8	-3.0	-3.0	-3.8	-2.6	-15.3
Textile	-23.5	-22.4	-22.5	-28.8	-22.5	-5.2	-3.9	-3.8	-12.0	-3.7
Garments and footwear	-24.8	-24.7	-24.7	-29.6	-22.5	-5.0	-4.9	-5.0	-11.3	-10.4
Leather and rubber wear	-23.9	-22.1	-22.3	-29.5	-22.5	-4.3	-2.0	-1.6	-11.6	-1.1
Paper and wood products	-22.1	-21.5	-21.7	-24.4	-22.5	-2.8	-2.0	-1.6	-5.8	0.6
Fertilizer	-18.8	-18.4	-15.7	-21.1	-12.2	5.3	5.9	-0.8	2.4	-8.5
Other chemicals	-19.1	-19.0	-16.9	-20.2	-12.2	1.9	2.0	-2.9	0.5	-13.1
Petroleum	-31.8	-29.1	-30.3	-60.6	-35.6	-7.9	-4.1	-0.9	-47.4	16.1
Cement and other related products	-23.8	-22.5	-21.4	-36.5	-12.2	-5.5	-3.9	-6.6	-21.6	-25.2
Metal and related products	-22.3	-19.8	-17.7	-36.4	-12.2	-4.0	-0.9	-5.7	-21.8	-17.2
Machineries, transportation equipment, etc.	-23.0	-20.8	-17.2	-23.8	-15.4	-5.5	-2.7	-10.9	-6.6	-14.7
Electrical and related products	-21.8	-19.1	-15.9	-22.2	-15.4	-9.4	-6.2	-13.2	-9.8	-14.2
Other manufacturing	-21.5	-19.7	-18.4	-23.7	-15.5	-0.7	1.6	-1.6	-3.6	-8.3
Manufacturing	-22.8	-22.2	-20.8	-24.3	-18.7	-4.7	-2.1	-5.8	-9.5	-10.9
Construction	-22.9	-22.9	-22.7	-28.2	-15.0	-9.6	-9.5	-9.7	-12.9	-18.2
Utilities	-22.2	-22.2	-22.2	0.0	0.0	-1.6	-1.6	-1.6	0.0	0.0
Transportation & communications	-22.3	-21.2	-19.7	-34.2	-15.0	-1.3	-0.6	-2.5	-9.5	-8.1
Wholesale trade	-22.5	-22.0	-21.9	-33.0	-15.0	-3.1	-2.8	-2.9	-10.2	-11.1
Other service	-20.4	-19.6	-19.2	-28.3	-15.0	-1.3	-0.8	-1.4	-6.5	-6.4
Public services	-15.7	-15.7	-15.7	0.0	0.0	30.5	30.5	30.5	0.0	0.0
Services	-20.8	-20.3	-19.9	-30.6	-15.0	1.8	2.3	1.5	-8.1	-7.7
All Sectors	-22.0	-21.4	-20.6	-25.0	-18.2	-1.5	0.3	-2.3	-9.0	-10.4

where x=output; px=output price; d=domestic demand, pd=domestic price; q=composite good; pq=composite price; e=exports; pe=export price; m=imports,
pm=import price

Source: Authors' calculation from simulation results

Table 9. Value Added and Factor effects in 2009 (percent change from baseline)

	Value added		Factor Prices		Labor Demand	
Sectors	va	pva	r	w	Unskilled	Skilled
Paddy	-2.5	-24.8	-12.7	-12.8	0.2	-2.0
Corn	-2.4	-24.4	-14.8	-12.8	-3.3	-5.4
Coconut	-1.6	-24.8	-17.3	-12.8	-7.6	-9.6
Fruits and vegetables	-0.4	-24.1	-9.0	-12.8	6.8	4.5
Sugar	9.5	-13.8	7.4	-12.8	36.7	33.8
Other crops	-2.8	-27.3	-21.4	-12.8	-14.4	-16.3
Agricultural services	-0.6	-24.1	-12.6	-12.8	0.5	-1.7
Hogs	-2.3	-25.1	-13.7	-12.6	-1.6	-3.7
Cattle	-1.8	-25.5	-11.7	-12.7	2.0	-0.3
Chicken	-0.5	-23.7	-12.8	-12.7	0.0	-2.2
Fishing	1.1	-22.4	-9.6	-12.9	5.8	3.5
Forestry	-1.7	-27.5	-16.3	-12.3	-6.3	-8.3
Agriculture, Forestry, Fishery	-0.7	-24.0	-11.4	-12.8	1.5	-1.4
Mining	-8.5	-30.8	-32.1	-11.9	-32.0	-33.4
Crude oil and natural gas	-21.7	-48.5	-70.0	-11.9	-80.0	-80.4
Meat processing	-0.5	-20.3	-12.0	-11.9	0.5	-1.6
Milk and dairy	-3.5	-23.6	-21.9	-11.9	-16.0	-17.8
Fruit processing	-4.5	-23.6	-6.2	-11.9	10.6	8.2
Fsih processing	-3.4	-26.0	-16.9	-11.9	-7.9	-9.9
Coconut and edible oil	-1.9	-25.3	-47.6	-11.9	-53.8	-54.8
Rice and corn milling	-2.1	-21.1	-11.8	-11.9	0.9	-1.3
Sugar milling	10.5	-9.7	19.3	-11.9	58.6	55.2
Other processed food	-2.2	-21.5	-9.8	-11.9	4.2	2.0
Tobacco and alcohol	-3.0	-17.7	-6.9	-10.8	8.0	5.6
Textile	-5.2	-26.8	-21.4	-12.7	-14.5	-16.3
Garments and footwear	-5.0	-27.6	-13.9	-12.7	-1.8	-4.0
Leather and rubber wear	-4.3	-26.1	-26.9	-12.7	-23.2	-24.9
Paper and wood products	-2.8	-22.6	-18.9	-12.0	-11.0	-12.9
Fertilizer	5.3	-12.9	-76.4	-11.3	-86.2	-86.5
Other chemicals	1.9	-14.8	-15.4	-11.3	-5.9	-8.0
Petroleum	-7.9	-21.3	-20.1	-11.1	-13.9	-15.8
Cement and other related products	-5.5	-24.7	-18.2	-11.9	-9.9	-11.8
Metal and related products	-4.0	-26.1	-27.8	-12.4	-25.0	-26.6
Machineries, transportation equipment, etc.	-5.5	-30.0	-23.7	-11.8	-19.0	-20.8
Electrical and related products	-9.4	-26.6	-31.6	-11.3	-31.5	-33.0
Other manufacturing	-0.7	-23.2	-18.7	-12.6	-10.0	-12.0
Manufacturing	-4.9	-24.7	-22.9	-11.8	-15.3	-19.6
Construction	-9.6	-25.4	-13.6	-12.4	-1.7	-3.8
Utilities	-1.6	-20.0	-12.8	-11.3	-1.6	-3.7
Transportation & communications	-1.3	-22.8	-0.6	-12.3	21.1	18.5
Wholesale trade	-3.1	-23.4	-13.6	-12.0	-2.2	-4.3
Other service	-1.3	-20.3	-7.1	-11.8	8.8	6.5
Public servics	30.5	-14.2	0.0	-10.7	14.6	12.1
Services	2.8	-20.7	-8.8	-11.6	7.3	7.7
All Sectors	-0.2	-22.4	-14.4	-11.8		
Average Wage					-13.0	-9.1

Where va=value added; pva=value added price; r- return to capital; w-composite wage paid by industry for skilled and unskilled labor
Source: Authors' calculation from simulation results

Table 10. Household impact by Decile in 2009 (percent change from baseline)

Household	Nominal Income, percent	Consumer Price, percent	Difference, percent
Decile 1	-24.62	-21.68	-2.94
Decile 2	-24.57	-21.57	-3.00
Decile 3	-24.49	-21.5	-2.99
Decile 4	-24.39	-21.39	-3.00
Decile 5	-24.24	-21.27	-2.97
Decile 6	-24	-21.15	-2.85
Decile 7	-23.51	-21.02	-2.49
Decile 8	-22.61	-20.88	-1.73
Decile 9	-21.56	-20.72	-0.84
Decile 10	-19.37	-20.34	0.97

Source: Authors' calculation from simulation result

Table 11. Poverty and Inequality Impact in 2009 and Confidence Intervals (percent change from 2000 index)

	Variable	2000 Index	Change Relative to 2000 Index	Std. Err.	[95% Conf.	Interval]
All - Philippines	Gini	0.51	1.69	0.00	0.51	0.51
	P0	35.9	5.87	0.00	35.94	35.95
	P1	11.5	8.62	0.00	11.47	11.47
	P2	4.9	10.92	0.00	4.94	4.94
All - Urban	P0	20.3	9.01	0.00	20.25	20.26
	P1	5.5	10.55	0.00	5.53	5.53
	P2	2.2	12.29	0.00	2.21	
All Rural	P0	51.0	4.72	0.00	51.03	51.04
	P1	17.2	8.04	0.00	17.18	17.18
	P2	7.6	10.54	0.00	7.56	7.56

Source: Authors' calculation from simulation result

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