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Oil Price Increase: Can Something be Done to Minimize its Effects?

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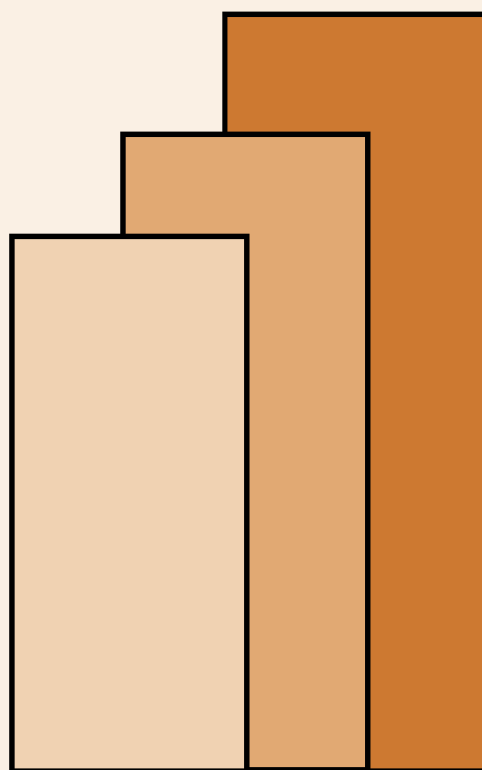
Caesar B. Cororaton

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Oil Price Increase:
Can Something be Done to Minimize its Effects?
(A Computable General Equilibrium Analysis)

Caesar B. Cororaton¹
(July 2000)

Abstract

Using a computable general equilibrium model of the Philippine economy, it is observed that the impact of an oil price change is negative. It is negative not only in terms of economic growth, but also in terms of income inequality and welfare.

Can the effect be lessened? The paper argues that there may still be one way of lessening its negative effect. Using the criteria of growth, welfare and government budget, tariff rate on imported oil may be reduced to lessen, but not totally eliminate, the adverse effect. Simulations results using the model indicate that the government realizes some "windfall profit" out of the increase in the world price of oil and the depreciation of the exchange. One policy option that may be open is for the government to use this so as lessen the burden of the oil price increase. There is one caveat, though, which may be noted. This is a policy implication derived from simulation exercise using PCGEM with all other things held constant, except for the variables analyzed. There may be other equally important concerns like the increase in foreign debt servicing as a result of the depreciation of the exchange which may also be put into consideration.

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Introduction

In the last 18 to 20 months pump prices of petroleum products were increased for quite a number of rounds. In January 1999, the average price of diesel fuel was P7.90 per liter. To date, it is averaging P12.58 per liter; an increase of 59 percent over the period. Similarly, pump price of gasoline products increased by about 46 percent. Because of the general use of petroleum products, these series of price increases translated into increases in the general price level, wages, etc.. It also triggered public debate and discussion on the merit of the present deregulated price policy on oil products in the domestic market and a number of "welga ng bayan" by public utility operators because of rising costs.

There are two major factors behind the increase: (a) the increase in the world price of crude oil in the international market; and (b) the depreciation of the foreign exchange rate. The first one is due to the cut in oil production of oil producing countries, while the second one is due to the lingering effects of the Asian financial crisis and the perception of political instability in the country.

Figure 1 shows how these variables moved since 1998. The average Brent price of crude oil was US\$15.20 per barrel in January 1998. For the whole year of 1998, crude oil prices remained stable; it even declined to US\$9.85 per barrel in December 1998. However, since the beginning of 1999, the price of crude oil in the international market crawled in an upward and steep trend. The year ended with crude oil price averaging US\$25.43 per barrel.

The increase persisted in the present year. However, there was a short lull in April, with the price dipping to US\$22.80 per barrel. But thereafter it again resumed its upward trend. As of July 18, 2000, the Brent crude oil price is US\$28.22 per barrel. This increase is further aggravated by the depreciation of the peso against the US dollar because of perception of instability in the local economy, including the Mindanao

crisis. As of July 20, 2000, the exchange rate is averaging P44.58 to a US dollar.

Given this trend in an environment of deregulated oil prices, it seems like the "light at the end of the tunnel" (or is there one?) is not in sight yet. As a result, pressure for another price increase continues to build up. Can something be done to minimize the negative effects of the oil price increase? This paper argues that there is still one channel through which the effects can be lessened (*but not totally eliminated*). Using a computable general equilibrium model² simulation results indicate that import tariff on oil products is one policy tool which can be used to lessen the effects. Lessening the effects means a number of things which include: (i) lower reduction in gross domestic product, (ii) lower increase in prices, particularly petroleum prices, (ii) lower negative implications on the government budget balance, (iv) lesser income inequality effects; and (v) lower negative welfare effects. All these are captured in the simulation analysis, and each one has a specific indicator.

The Model

The model used in the simulation exercises is called the Philippine Computable General Equilibrium Model (PCGEM). A complete description and specification of the model is very long to be discussed here, but it is available in the PIDS Discussion Paper Series. In this section, some basic features of the model, including a few relevant equations, are briefly discussed so as to highlight the mechanism through which the issues in the paper are analyzed.

PCGEM is a non-linear general equilibrium of the Philippine economy. The model has 34 production sectors, 3 factor inputs (labor, variable capital, and capital), and 10 household types in decile. Labor and variable capital are endogenous, while capital is fixed. The current account balance, or foreign savings, is fixed. The exchange rate is the numeraire, while the weighted value added price (GDP deflator) is endogenous. This therefore implies that the value added price level adjusts to clear the foreign account balance. For welfare analysis as in the present case, this is the appropriate specification. The model is static and is calibrated

²Cororaton, C.B. (2000) Philippine Computable General Equilibrium Model (PCGEM). PIDS Discussion Paper.

using the 1990 social accounting matrix and 1990 sectoral tariff revenue.

PCGEM is a medium-sized CGE model in the Philippines. It is a square model with 2,272 equations in 2,272 variables. It is coded in a software called General Algebraic Modeling System (GAMS).

Here are a few relevant equations:

- (1) Import prices

$$pm = pwm * er * (1 + tm)$$
- (2) Domestic prices

$$pd = pl * (1 + itxrdom)$$
- (3) Composite price, tradables

$$p = (pd * xxd + pm * imp) / x$$
- (4) Armington assumption

$$x = ac * [\delta * imp^{-\rho_m} + (1 - \delta) * xxd^{-\rho_m}]^{(-1/\rho_m)}$$
- (5) Demand for imports

$$imp = xxd * [pd / pm] * [\delta / (1 - \delta)]^{\sigma_m}$$
- (6) Government tariff revenue

$$tm_rev = \sum_i tm_i * imp_i * pwm_i * er;$$
- (7) Government indirect tax revenue

$$itx_rev = \sum_i itxrdom_i * pl_i * xxd_i;$$
- (8) Government direct income tax revenue

$$dtax_rev = \sum_{inst} dtaxr_{inst} * pri_inc_{inst};$$

where:

pm	domestic price of imports for tradables
pwm	world price
er	exchange rate
tm	tariff rate
p	composite prices
pd	domestic prices
itxrdom	indirect tax rate
dtaxr	direct tax rate
pl	domestic prices without domestic indirect taxes
x	composite commodities
xxd	domestic production less exports
imp	imports

tm_rev government revenue from tariff duties
itx_rev government revenue from domestic indirect tax
dtx_rev government revenue from direct income tax
pri_inc income of institutions except government
inst institutions
sigma_m & rho_m are parameters

Equation (1) converts world prices of commodities into local prices of imports. Note that import prices in local currency are affected by the world price of the commodity, the exchange rate, and the tariff rate.

Equation (2) is the domestic price of commodities after being imposed indirect taxes. Equation (3) is the market price of the commodities; included here are the effects of tariff duties and indirect taxes. In terms of oil prices, this the pump price of petroleum products which the consumers see in the market.

Equation (4) is a standard CGE treatment of imports. It simply states that imported goods are not perfect substitutes of local goods, or vice versa. That is, they are different. There is some degree of substitutability which is captured by the parameter sigma_m in Equation (5), which is the demand for imports, derived as the first order condition of cost minimization.

Equations (6), (7) and (8) the are major components of government revenue, namely: tariff revenue, indirect (excise) tax revenue, and direct tax revenue.

Simulation Results

(a) Inputs into the Simulation

The simulation results were generated using the calibrated PCGEM. Import prices of oil products were changed as shown in the table below. Within the period covered, world prices of crude oil increased 148.8 percent, while the exchange rate depreciated by 4.8 percent. Combining the two will results in an increase of 160.7 percent in the local price of oil.

Table 1: Oil Price and Exchange Rate Change

	January 1999	May 2000	% Change
Brent Oil Price (US\$/barrel)	11.06	27.52	148.8%
Peso-Dollar Exchange Rate	39.9	41.8	4.8%
Computed Domestic Price (P) of Imported Oil	441.29	1,150.34	160.7%

(b) Simulation Results

Discussed in this section are the simulation results concerning the economic and welfare effects of the actual change in the world oil price and the depreciation in the exchange rate over the period shown in the table. This exercise is called **Scenario 1**. The results are compared with the values in the base run, where the base run is the equilibrium solution of the model without changes in the exogenous variables. The results are shown in Tables 1 to 7.

Macroeconomic Effects. Table 2 presents the macroeconomic effects. As a result of the change in oil prices, real GDP declines by -2.265 percent.³ However, the balance of trade improves. This is because of the reduction in imports, largely due to the reduction in the importation of oil products as we shall see later (Table 8). On the other hand, exports increase, and the mechanism involved is the following: Since the current account balance (or the foreign savings) is fixed and the exchange rate is the numeraire, the reduction in imports results in the lowering of the value added price or the GDP deflator, which in turn leads to an improvement in the relative price of exports. Improvement in the relative price pushes up exports slightly.

Interesting results are reflected in the government balance. The government balance improves; from a deficit in the base run to a positive in the present scenario. This is due to the decline in government expenditure and the general improvement in revenue. Government expenditure declines because of the slowdown in the economy, as reflected in the negative growth in real GDP. Similarly, because of the economic slowdown, direct tax government revenue declines. Equation (8) states that tariff revenue is a function of import volume, world price of commodities, tariff rate, and the exchange rate. The reduction in the import volume of oil product is more than offset by the huge 148.8 percent increase in the world price of oil. Added to this is the depreciation of the peso. Thus, even if tariff rate stays the same, tariff revenue increases by almost 20 percent. This is the government revenue "windfall profit", largely due to the increase in the world price of oil. No wonder that the Bureau of Customs is overperforming at present relative to targets, while the Bureau of Internal Revenue is underperforming.

³Note that this is the effect of the world oil price change, while all other things held constant.

Income. The results on income are shown in Table 3.a. One can observe that as a result of the slowdown, income of the people declines. It is worth highlighting that the impact is regressive. The decline in poorer segments of the population, like the hhl, is much higher than the decline in the upper segments, hhl0. The inequality effects are emphasized in the results of the Gini coefficient shown in Table 3.b. An increase in the coefficient shows a deterioration in income inequality. The Gini coefficient increases from 0.43992 to 0.44048.

Welfare Effects. There are two indicators of welfare change. These are: (1) Hicksian compensating variations (CV) and the Hicksian equivalent variations (EV). CV takes the new equilibrium prices and incomes (i.e. after the world price change is introduced), and asks how much income must be taken away or added in order to return the households to their pre-change utility level. EV, on the other hand, takes the old equilibrium incomes and prices and computes the change needed to achieve new equilibrium utilities.⁴

Computationally, these measures are given by the following formula:

(8) Compensating Variations

$$CV = [(U^n - U^0)/U^n] * I^n$$

(9) Equivalent Variations

$$EV = [(U^n - U^0)/U^0] * I^0$$

Where U^n , U^0 , I^n , I^0 denote the new and old levels of utility and income, respectively⁵

The results on these welfare indicators are shown in Table 4. One can observe that for both indicators the results show that the increase in the world price of oil is welfare decreasing. However, the decline in welfare is much bigger in the higher income brackets than in the lower income brackets (see Figure 2). This is understandable because richer households use huge amounts of everything than the poorer ones.

⁴Shoven and Whalley, 1984. "Applied General-Equilibrium Models of Taxation and International Trade: An Introduction and Survey" Journal of Economic Literature.

⁵In PCGEM, utility functions are specified as Cobb-Douglas.

Sectoral Results. Results on the different sectors are shown in Table 5 to 8. The results are on sectoral output, prices, and factor inputs. The impact on the different sectors varies, but the effect on the petroleum industry is overwhelmingly positive. Its output increases by 5.053 percent, while its prices increases by 15.870 percent. Because of this, it draws in a lot of labor. To reiterate, one should note that these are the effects of the oil price change, while holding all other exogenous factors (exogenous to the PCGEM) constant. This implies that this may not be the actual effects because in reality, all things do change indeed.

Policy Options

Can something be done to minimize these negative effects? The paper argues that the government can still do something to lessen the effects, but not totally eliminate them. This statement was derived from the results of the scenario analysis that was conducted using PCGEM.

Seven scenarios were analyzed, including Scenario 1 above. These scenarios are listed in the following Table.

Table 9: Scenarios

Scenario 1	Actual change in world oil prices and exchange rate depreciation from January 1999 to May 2000
Scenario 2	Scenario + 10% reduction in indirect tax on petroleum products
Scenario 3	Scenario + 20% reduction in indirect tax on petroleum products
Scenario 4	Scenario + 10% reduction in import tariff on petroleum products
Scenario 5	Scenario + 20% reduction in import tariff on petroleum products
Scenario 6	Scenario + 10% reduction in indirect tax and import tariff on petroleum products
Scenario 7	Scenario + 20% reduction in indirect tax and import tariff on petroleum products

The results of the scenario analysis are shown in Table 10. The choice of which scenario is best among the 7 depends on 6 criteria, namely: (a) real GDP growth; (b) government budget balance; (c) government revenue implications; (d) import growth of oil; (e) composite price of oil products; (f) income inequality, as indicated by the Gini coefficient; and (h) the overall welfare, as indicated by the EV indicator.

In terms of economic impact, the best choice should have been Scenario 7 because it implies lower reduction in GDP, a slightly lower income inequality, lower reduction in welfare, and lower increase in pump price of petroleum products. However, because of a cash-strapped administration (due to other crises, famous of which is the Mindanao crisis) this scenario may not be viable because it results in a reduction in the indirect tax revenue. The other option is Scenario 5. This scenario involves a higher reduction in the tariff rate on petroleum products⁶.

As discussed above, as a result of the huge increase in the world price of oil and the exchange rate depreciation, the government realizes a "windfall profit". This is reflected in Table 8 under the column "Change in Budget Balance" and in "Tariff Revenue". The paper argues that the government may use this "windfall profit" to lessen the impact of the increase in world prices of oil. Temporarily reducing the current 3 percent tariff rate on oil products may be one direct way of

⁶Note that better results can be attained with much higher tariff rate reduction.

doing this policy option. In this case importation of oil may not drop as much as the drop in the other scenarios, including Scenario 7. Also, the results indicate that even if with reduced tariff rates on oil products, the government may still end up with positive revenue from tariff. This is mainly driven by the increase in the world price of oil and the exchange rate depreciation.⁷

⁷Caveat: Note that this is a simulation exercise using the model with all other things held constant, except for the variables analyzed. There may be other equally important concerns like the increase in foreign debt servicing as a result of the depreciation of the exchange which may also be put into consideration.

Figure 1: Crude Oil Price and Peso-Dollar Rate

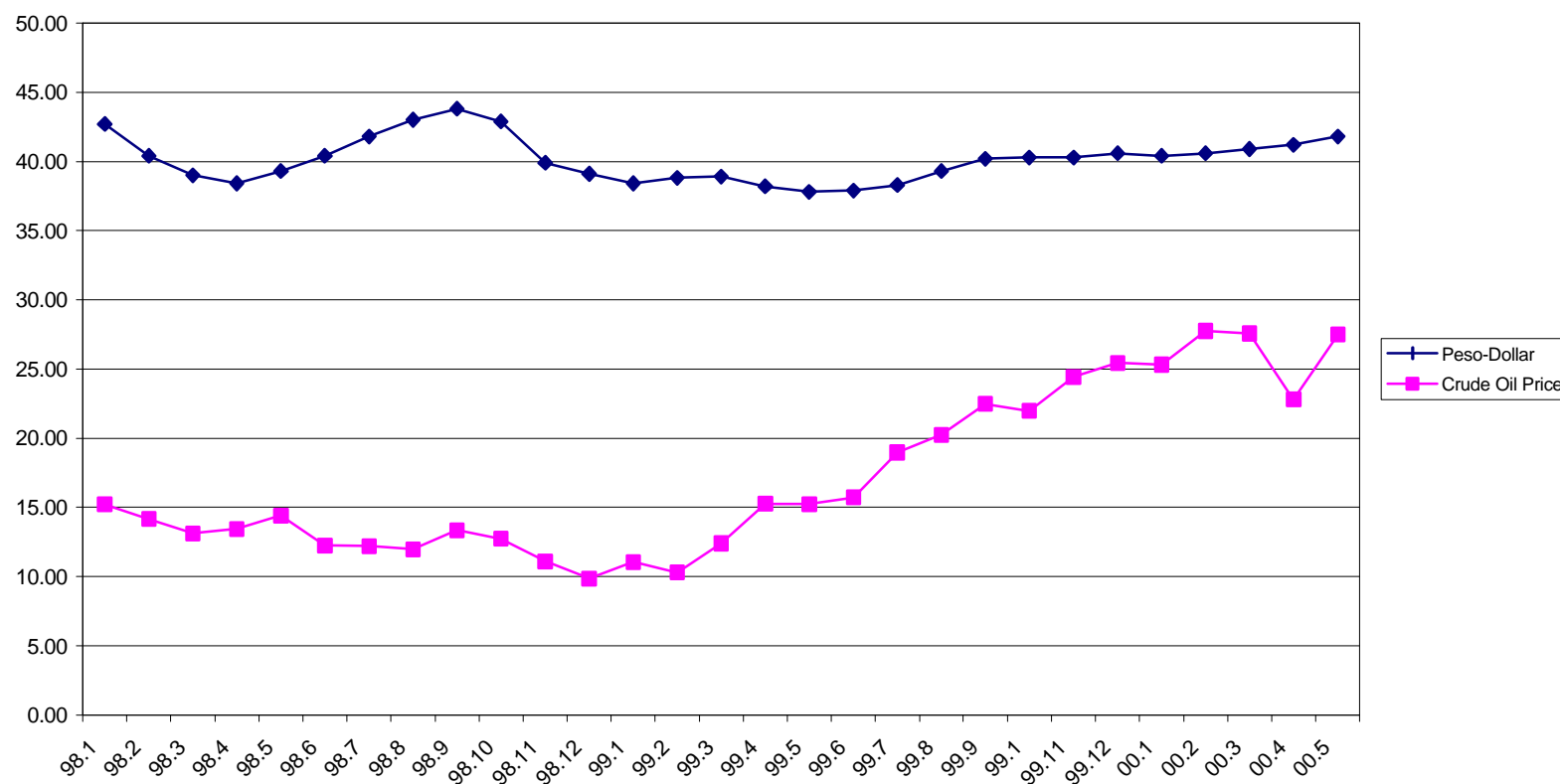


Table 2: Macroeconomic Analysis

Base run vs Scenario 1			
	Base run	Scenario 1	Change
Real GDP	989,341	966,930	-2.265%
Balance of Trade	(59,650)	(55,102)	4,548
Exports	298,933	301,057	0.711%
Imports	358,583	356,159	-0.676%
Budget Deficit	(7,564)	(5,049)	2,514.80
Total Expenditure	233,252	231,935	-0.564%
Consumption Expenditure*	108,835	108,835	0.000%
Revenue	225,688	226,886	0.531%
of which:			
Tariff	25,532	28,060	9.898%
Direct Tax	77,299	75,970	-1.720%
Indirect Tax	62,341	62,612	0.436%
Oil Price in Local Market	1.00000	1.30850	30.850%
Average Wage Rate	1.00000	0.97190	-2.810%
Average Return to Variable Capital	1.00000	0.96670	-3.330%

*Exogeneously fixed

Table 3.a: Income Analysis

Base run vs Scenario 1			
	Base run	Scenario 1	% Change
hh1	18,171	17,701	-2.5849
Hh2	30,481	29,699	-2.5652
Hh3	38,720	37,733	-2.5488
Hh4	47,844	46,620	-2.5592
Hh5	56,516	55,092	-2.5182
hh6	69,164	67,438	-2.4952
hh7	83,314	81,327	-2.3852
hh8	106,159	103,760	-2.2597
hh9	145,824	142,543	-2.2498
hh10	330,962	323,378	-2.2916

where hh1 is household decline 1, ...hh10 decline 10

Table 3.b: Gini Coefficient

Base run	Scenario 1
0.43992	0.44048

Table 4: Welfare Analysis (million pesos in 1990 incomes)

Base run vs Scenario 1						
	U^n	I^n	U^0	I^0	CV*	EV**
hh1	1,580	17,701	1,598	18,171	(203.0)	(206.0)
hh2	2,291	29,699	2,317	30,481	(335.7)	(340.7)
hh3	2,854	37,733	2,886	38,720	(429.9)	(436.2)
hh4	3,342	46,620	3,380	47,844	(535.6)	(543.4)
hh5	3,941	55,092	3,985	56,516	(613.8)	(622.7)
hh6	4,752	67,438	4,805	69,164	(751.7)	(762.4)
hh7	5,758	81,327	5,817	83,314	(827.3)	(839.0)
hh8	7,330	103,760	7,397	106,159	(952.9)	(966.1)
hh9	9,867	142,543	9,960	145,824	(1,344.5)	(1,362.6)
hh10	19,991	323,378	20,204	330,962	(3,448.1)	(3,491.7)
Total	61,706	905,291	62,350	927,154	(9,442.5)	(9,570.8)

* CV is compensating variations

**EV is equivalent variations

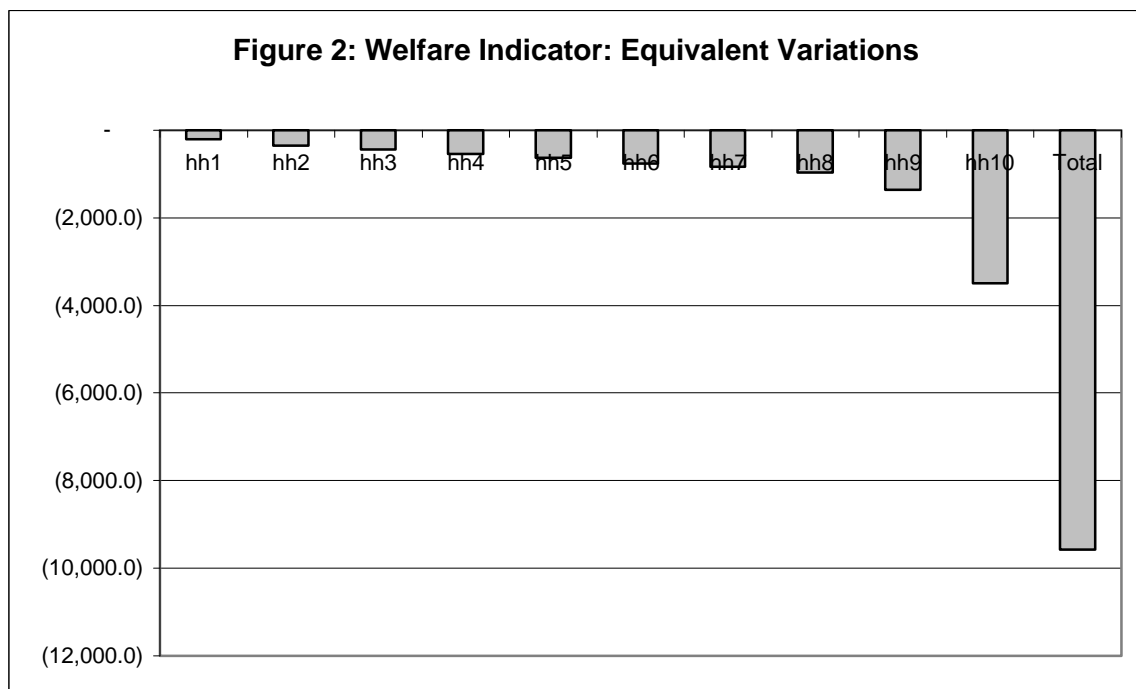


Table 5.a: Sectoral Output: Major Sectors

Base run vs Scenario 1			
Sectors	Base Run	Scenario 1	% Change
Agriculture	306,352	306,541	0.062%
Mining	24,330	24,680	1.439%
Manufacturing	811,517	814,846	0.410%
Food Manufacturing	348,532	348,220	-0.090%
Other Manufacturing	462,985	466,627	0.787%
Construction	140,711	140,481	-0.163%
Utilities	44,061	43,498	-1.278%
Services	703,086	701,507	-0.225%

Table 5.b: Sectoral Output

Base run vs Scenario 1			
Sectors	Base Run	Scenario 1	% Change
Palay and Corn	66,889	67,194	0.456%
Fruits and Vegetables	59,112	59,638	0.891%
Coconut & Sugar	20,326	20,316	-0.048%
Livestock & Poultry	70,737	70,933	0.277%
Fishing	50,509	49,696	-1.609%
Other Agriculture	25,931	26,006	0.288%
Forestry	12,848	12,757	-0.707%
Mining	24,330	24,680	1.439%
Rice & Corn Milling	89,213	89,430	0.243%
Milled Sugar	22,853	22,759	-0.410%
Meat Manufacturing	88,640	88,611	-0.033%
Fish Manufacturing	15,870	15,847	-0.149%
Beverage & Tobacco	26,775	26,675	-0.373%
Other Food Manufacturing	105,181	104,897	-0.270%
Textile manufacturing	35,028	35,874	2.415%
Garments & Leather	52,838	54,946	3.990%
Wood Manufacturing	25,755	25,420	-1.302%
Paper & Paper Products	19,398	19,385	-0.068%
Chemical Manufacturing	55,067	54,909	-0.288%
Petroleum Refining	61,764	64,885	5.053%
Non-metal manufacturing	39,903	39,219	-1.713%
Metal Manufacturing	49,431	49,126	-0.617%
Electrical Equipment Manufacturing	46,734	46,097	-1.363%
Transport & Other Machinery Manufacturing	35,010	34,395	-1.757%
Other Manufacturing	42,058	42,372	0.748%
Construction	140,711	140,481	-0.163%
Electricity, Gas and Water	44,061	43,498	-1.278%
Financial Sector	50,377	50,360	-0.033%
Private Education	16,626	16,479	-0.884%
Private Health	18,806	18,693	-0.601%
Public Education	28,147	28,147	-0.001%
Public Health	7,637	7,632	-0.065%
General Government	73,738	74,093	0.481%
Other Services	507,755	506,104	-0.325%

Table 6: Sectoral Price

Base run vs Scenario 1			
Sectors	Base Run	Scenario 1	% Change
Palay and Corn	1.000000	0.97360	-2.640%
Fruits and Vegetables	1.000000	0.97420	-2.580%
Coconut & Sugar	1.000000	0.97620	-2.380%
Livestock & Poultry	1.000000	0.97500	-2.500%
Fishing	1.000000	0.99650	-0.350%
Other Agriculture	1.000000	0.98370	-1.630%
Forestry	1.000000	0.98850	-1.150%
Mining	1.000000	1.00730	0.730%
Rice & Corn Milling	1.000000	0.97600	-2.400%
Milled Sugar	1.000000	0.99410	-0.590%
Meat Manufacturing	1.000000	0.97650	-2.350%
Fish Manufacturing	1.000000	0.98520	-1.480%
Beverage & Tobacco	1.000000	0.98190	-1.810%
Other Food Manufacturing	1.000000	0.98070	-1.930%
Textile manufacturing	1.000000	0.99730	-0.270%
Garments & Leather	1.000000	0.99390	-0.610%
Wood Manufacturing	1.000000	1.00220	0.220%
Paper & Paper Products	1.000000	0.99360	-0.640%
Chemical Manufcturing	1.000000	0.99990	-0.010%
Petroleum Refining	1.000000	1.15870	15.870%
Non-metal manufacturing	1.000000	1.02060	2.060%
Metal Manufacturing	1.000000	1.00440	0.440%
Electrical Equipment Manufacturing	1.000000	1.00010	0.010%
Transport & Other Machinery Manufacturing	1.000000	1.00640	0.640%
Other Manufacturing	1.000000	0.99540	-0.460%
Construction	1.000000	0.99580	-0.420%
Electricity, Gas and Water	1.000000	1.02670	2.670%
Financial Sector	1.000000	0.98190	-1.810%
Private Education	1.000000	0.98540	-1.460%
Private Health	1.000000	0.98330	-1.670%
Public Education	1.000000	0.97720	-2.280%
Public Health	1.000000	0.99280	-0.720%
General Government	1.000000	0.98670	-1.330%
Other Services	1.000000	0.98890	-1.110%

Table 7.a: Sectoral Labor Factor Analysis: Major Sectors

Base run vs Scenario 1			
Sectors	Base Run	Scenario 1	% Change
Agriculture	37,676	37,539	-0.364%
Mining	6,533	6,727	2.968%
Manufacturing	48,793	49,476	1.400%
Food Manufacturing	20,331	20,163	-0.828%
Other Manufacturing	28,462	29,313	2.991%
Construction	34,398	34,280	-0.344%
Utilities	4,998	4,724	-5.480%
Services	147,445	147,098	-0.235%

Table 7.b: Sectoral Labor Factor Analysis

Base run vs Scenario 1			
Sectors	Base Run	Scenario 1	% Change
Palay and Corn	2,651	2,650	-0.05%
Fruits and Vegetables	8,474	8,518	0.52%
Coconut & Sugar	6,762	6,743	-0.28%
Livestock & Poultry	6,289	6,278	-0.17%
Fishing	4,716	4,599	-2.47%
Other Agriculture	6,940	6,952	0.18%
Forestry	1,844	1,798	-2.50%
Mining	6,533	6,727	2.97%
Rice & Corn Milling	2,608	2,615	0.26%
Milled Sugar	1,691	1,660	-1.86%
Meat Manufacturing	4,620	4,605	-0.33%
Fish Manufacturing	987	981	-0.65%
Beverage & Tobacco	2,909	2,861	-1.64%
Other Food Manufacturing	7,516	7,442	-0.99%
Textile manufacturing	2,765	2,854	3.22%
Garments & Leather	4,523	4,748	4.97%
Wood Manufacturing	2,377	2,318	-2.47%
Paper & Paper Products	1,608	1,603	-0.33%
Chemical Manufacturing	3,725	3,687	-1.01%
Petroleum Refining	1,099	2,022	83.97%
Non-metal manufacturing	2,688	2,599	-3.30%
Metal Manufacturing	2,758	2,721	-1.34%
Electrical Equipment Manufacturing	3,906	3,810	-2.46%
Transport & Other Machinery Manufacturing	2,211	2,138	-3.30%
Other Manufacturing	802	813	1.33%
Construction	34,398	34,280	-0.34%
Electricity, Gas and Water	4,998	4,724	-5.48%
Financial Sector	12,773	12,758	-0.12%
Private Education	6,243	6,168	-1.20%
Private Health	2,373	2,348	-1.07%
Public Education	23,434	23,434	0.00%
Public Health	4,029	4,026	-0.07%
General Government	46,791	47,026	0.50%
Other Services	51,802	51,338	-0.89%

Table 8.a: Sectoral Variable Capital Factor Analysis: Major Sectors

Base run vs Scenario 1			
Sectors	Base Run	Scenario 1	% Change
Agriculture	158,659	158,921	0.165%
Mining	1,098	1,137	3.525%
Manufacturing	38,779	39,068	0.745%
Food Manufacturing	21,091	21,103	0.056%
Other Manufacturing	17,688	17,965	1.566%
Construction	6,914	6,928	0.197%
Utilities	-	-	
Services	165,608	165,005	-0.364%

Table 8.b: Sectoral Variable Capital Factor Analysis

Base run vs Scenario 1			
Sectors	Base Run	Scenario 1	% Change
Palay and Corn	48,722	48,961	0.49%
Fruits and Vegetables	35,788	36,169	1.06%
Coconut & Sugar	3,850	3,860	0.26%
Livestock & Poultry	36,579	36,715	0.37%
Fishing	27,243	26,713	-1.95%
Other Agriculture	5,725	5,766	0.72%
Forestry	752	737	-1.97%
Mining	1,098	1,137	3.52%
Rice & Corn Milling	6,035	6,084	0.80%
Milled Sugar	-	-	
Meat Manufacturing	3,999	4,007	0.21%
Fish Manufacturing	2,957	2,954	-0.11%
Beverage & Tobacco	811	802	-1.11%
Other Food Manufacturing	7,289	7,256	-0.45%
Textile manufacturing	1,308	1,358	3.78%
Garments & Leather	6,196	6,540	5.54%
Wood Manufacturing	3,213	3,151	-1.94%
Paper & Paper Products	943	945	0.21%
Chemical Manufacturing	1,194	1,188	-0.48%
Petroleum Refining	-	-	
Non-metal manufacturing	2,156	2,096	-2.78%
Metal Manufacturing	1,508	1,496	-0.80%
Electrical Equipment Manufacturing	-	-	
Transport & Other Machinery Manufacturing	-	-	
Other Manufacturing	1,170	1,192	1.89%
Construction	6,914	6,928	0.20%
Electricity, Gas and Water	-	-	
Financial Sector	646	649	0.43%
Private Education	2,111	2,097	-0.66%
Private Health	5,779	5,748	-0.53%
Public Education	-	-	
Public Health	-	-	
General Government	-	-	
Other Services	157,072	156,511	-0.36%

Table 10: Effects of Oil Price Change

	% Change in GDP	Change in Budget Balance (Pm)	Gini Coefficient	Welfare Indicator (EV)*	Government Revenue Implications (% change)		Oil Products (% Change)	
					Tariff Rev.	Indirect Tax Rev.	Imports	Composite Price**
Base			0.43992					
Scenario 1	-2.265	+2,514.8	0.44048	-9,570.8	9.90%	0.44%	-34.63%	30.85%
Scenario 2	-2.196	+2,204.3	0.44045	-9,222.7	9.85%	0.43%	-34.79%	30.28%
Scenario 3	-2.127	+1,892.1	0.44042	-8,872.5	9.80%	-1.31%	-34.94%	29.72%
Scenario 4	-2.173	+2,130.2	0.44043	-8,990.5	7.85%	0.37%	-33.31%	28.80%
Scenario 5	-2.080	+1,733.8	0.44039	-8,399.0	5.74%	0.30%	-31.89%	26.71%
Scenario 6	-2.105	+1,823.9	0.44040	-8,646.4	7.81%	-0.49%	-33.47%	28.23%
Scenario 7	-1.944	+1,128.1	0.44033	-7,717.1	5.66%	-1.40%	-32.23%	25.59%

Where:

Scenario 1: Actual change in crude oil price (Brent) and foreign exchange rate from January 1999 to May 2000

Scenario 2: Scenario 1 + 10% reduction in indirect tax on petroleum products

Scenario 3: Scenario 1 + 20% reduction in indirect tax on petroleum products

Scenario 4: Scenario 1 + 10% reduction in import tariff on petroleum products

Scenario 5: Scenario 1 + 20% reduction in import tariff on petroleum products

Scenario 6: Scenario 1 + 10% reduction in indirect and import tariff on petroleum products

Scenario 7: Scenario 1 + 20% reduction in indirect and import tariff on petroleum products

* Equivalent Variation

** Composite of local import price and domestic price