The Report of the Independent Oil Price Review Committee (2012)

August 2012

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Report of the Independent Oil Price Review Committee

1. Introduction

Public clamor for greater transparency in the pricing of fuel and public perception of excessive profits by oil companies intensified in 2011 as a response to seemingly continuous increases in gasoline and diesel prices the previous two years. From 2009 to 2011, unleaded gasoline prices in Metro Manila increased from ₱36.16 per liter to ₱54.29 per liter, while diesel prices rose from ₱28.23 to ₱44.32.

To address this clamor and to give oil companies the chance to air their side, in early 2012 the DOE organized a multi-sectoral independent review committee (Independent Oil Price Review Committee - IOPRC) to look into the issue.[1] The IOPRC is composed of one representative each from the following sectors: academe; business community; consumers; economists, accountants, and public transport.[2] The inaugural meeting of the IOPRC was on 30 January 2012 and Department Order No. DO2012-03-0004 creating the IOPRC was issued on 1 March 2012.[3]

The main task of the IOPRC as delineated in its terms of reference is to determine if oil companies accumulated 'excessive profits' and if they were guilty of unfair pricing to the detriment of the public. Because there is no clear and legal definition of what constitute 'excessive profits', the IOPRC focuses instead on examining whether oil prices and the profits of oil companies can be deemed "unreasonable" The report approaches this question of reasonableness of oil prices and oil company profits in three ways.

First, regression analysis is used to check the extent to which local pump prices (more specifically unleaded gasoline 93 octane and diesel) in Metro Manila track world oil prices. In addition, the IOPRC checked how the movement of local pump prices compared to that of Thailand. Here, pump prices could be deemed "unreasonable" if they do not closely match the movement of world oil prices and if the movement of local prices are extraordinary compared to a closely situated country (i.e. Thailand). Second, the financial information of oil companies (both publicly available and those requested directly from them) were collected and project finance modelling was used to determine their rates of return.[4] These were then compared to the returns in other industries as well as government bond rates. In this case, unreasonableness of profits will show in much

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[1] This is the third review committee on oil prices formed since after deregulation. See Box 2.
[2] The IOPRC is moderated by Benjamin Diokno, PhD, and is comprised of Victor Abola, PhD and CPA (for the economists), Rene Azurin, DBA (for the academe), Raul Concepcion (for the consumer group), Jesus Estanislao, PhD (for the business community), Atty. Vigor Mendoza II (for the public transport), and Dexter Ortega, CPA (for the accountants). The members of the Technical Working Group are Marcial Ocampo, BSChE and MSChE, Jennalyn Vicencio, CPA, Jekell Salosagcol, CPA, Leandro Tan, MSIE, Atty. Donald Diaz, CPA, and Geoffrey Ducanes, PhD.
[3] Department Order No. DO2012-03-0004 is known as "Creating an Independent Committee to Review the Records of Oil Companies".
[4] The Philippine Institute of Petroleum (PIP), comprising of Chevron (Philippines) Inc., Liquigaz Philippines Corp., Petron Corporation, PTT Philippines Corp., Pilipinas Shell Petroleum Corp., and Total (Philippines) Corp. in a media release before the creation of the IOPRC announced they were willing "to open their books" to the review committee.

higher returns for oil companies compared to returns in other industries and government bond rates. Third, an Excel-based predictive model named the Oil Pump Price Calculation Model (OPPC Model) of unleaded gasoline and diesel was created containing a step-by-step calculation of gasoline and diesel prices using MOPS and information on various fees and taxes on oil products. Unreasonable prices here will be manifested in much higher actual prices than those predicted by the OPPC Model.

2. Policy Questions

The domestic oil industry has undergone major changes in the past two decades leading to the current deregulated regime.[5] This review aims to shed light on the following policy questions:

- What has been the impact of the deregulation of the oil industry on oil prices and the profits of oil companies? Should deregulation be continued?

- Should the government revert to subsidizing fuel consumption? What will be the impact of a return to fuel subsidies?

- What drives differences in prices of gasoline and diesel across localities and what can be done to lower prices overall?

- What can the Department of Energy (DOE) do to improve its monitoring of oil companies and oil prices? Should it impose additional reportorial requirement on oil companies?

- What can the DOE do to improve the public's understanding of the oil industry, including its ability to predict reasonable changes in fuel prices resulting from changes in world prices and the foreign exchange rate (FOREX)?

3. Findings

3.1. Testing the Relationship Between Local and World Prices

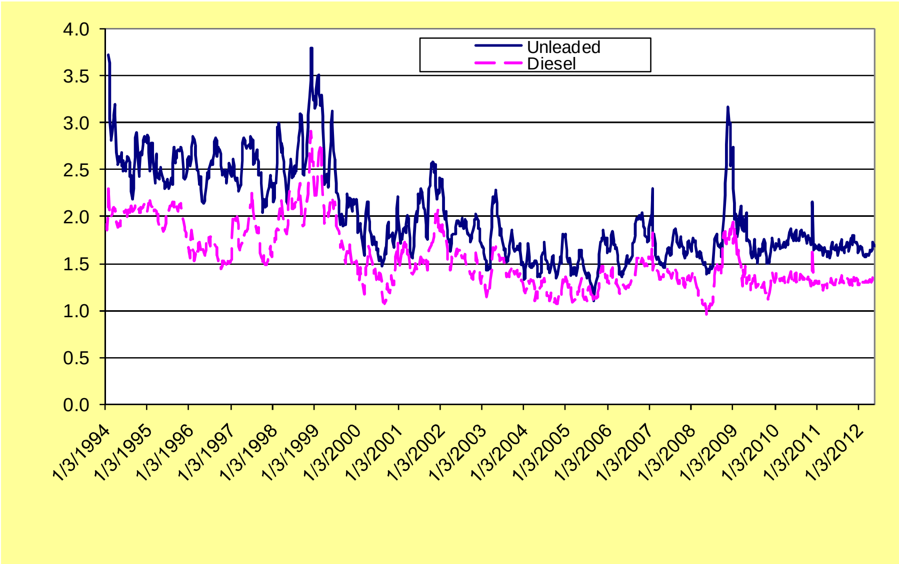
- Deregulation has resulted in increased responsiveness of local pump prices (represented by Metro Manila prices) to world oil prices (as represented by MOPS). Local pump prices are more responsive to world oil prices now than at any period since regulation. This holds whether one looks at the time it takes for local pump prices to respond to changes in world prices or the amount of variation in local pump prices explained by changes in world oil prices.

- The ratio of local pump prices to world oil prices is lower and less volatile now than at any previous period, taking into account differences in tax regimes on fuel over time. The ratio of unleaded gasoline pump price to MOPS gasoline has been quite

[5] See Box 2 for various oil industry regimes leading to the Oil Deregulation Law.

steady at 1.7 over the past two years. The ratio of diesel pump price to MOPS diesel has been quite steady at 1.3 over the past two years.

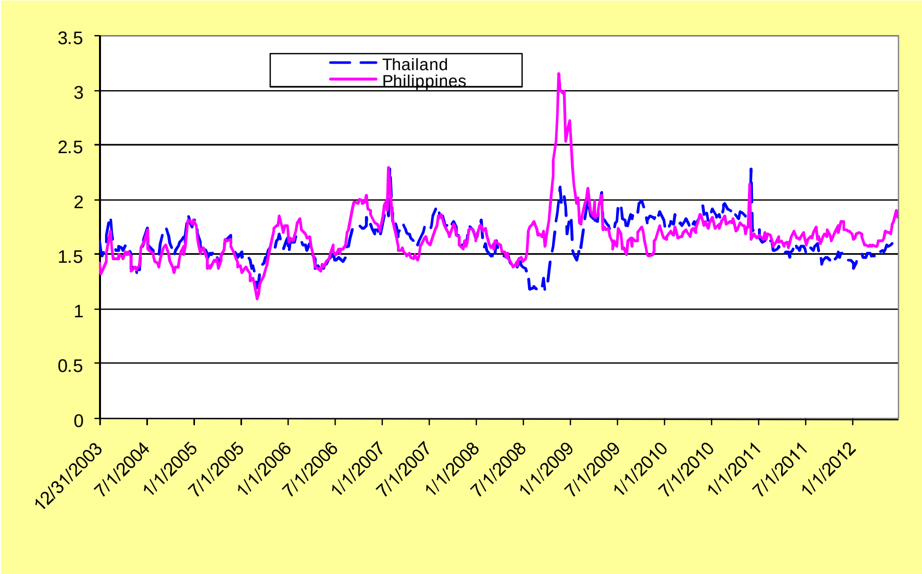
Ratio of Pump Price to MOPS in the Philippines, 1994 to 2012



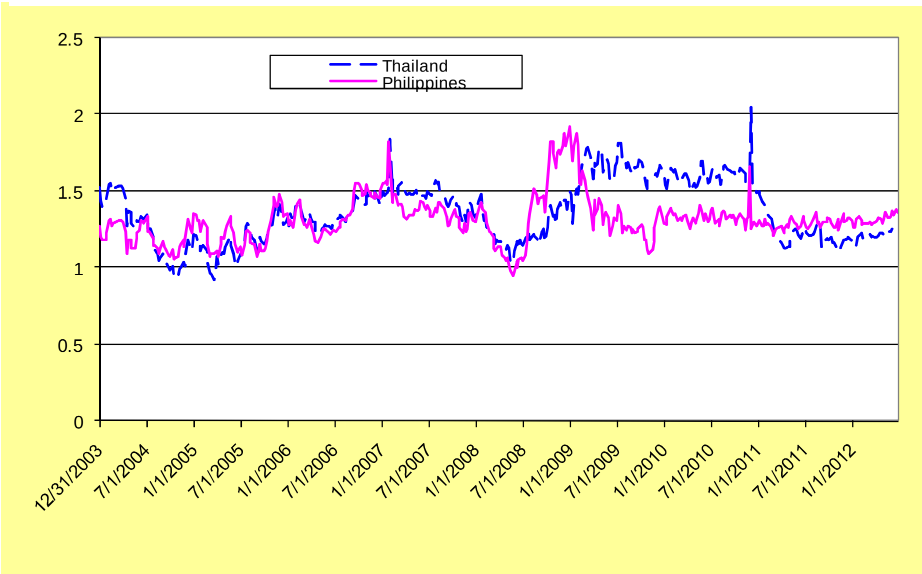
- There is nothing extraordinary about the movements of local pump prices in the country. For periods with no price subsidies in effect, the relationship between local pump prices and world oil prices is generally the same for the Philippines and Thailand.

- Diesel prices in the Philippines are in fact lower than in Thailand until end-2010 even with the latter's heavy fuel subsidy. Unleaded gasoline prices are higher in the Philippines, however, compared to Thailand in recent years because of the subsidy. It is estimated that fuel subsidies (including for electricity) in Thailand have cost as much as 2.7% of GDP per year in the past two years.

Ratio of Unleaded Pump Price to MOPS Mogas, 2004 to 2012



Ratio of Diesel Pump Price to MOPS Diesel, 2004 to 2012



- Generally pump price responses to changes in world oil prices have been symmetrical. But for some periods, in particular the most recent one, there is statistical evidence of asymmetric responses to world oil price change wherein firms changed prices by slightly less during episodes of world price decreases, on average, compared to episodes of world price increases, controlling for the magnitude of change in world prices.

3.2. Gravity Model Explaining Provincial Differences in Pump Prices

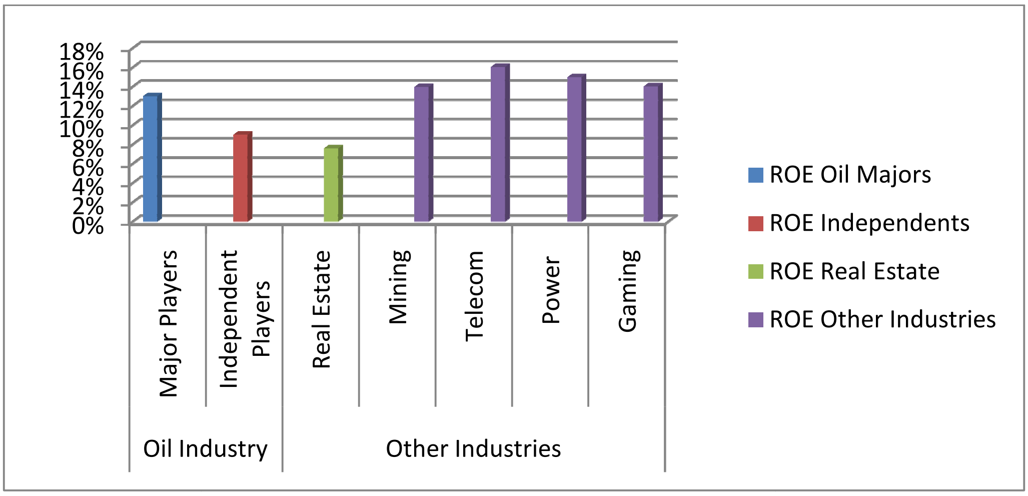
- Based on the gravity model, distance is an important factor in explaining regional pump price differences, at least for unleaded gasoline. Transport and handling costs play an important role in this, and the overall efficiency of the logistics sector is vital here. The government should, therefore, foster this efficiency by investing in the necessary infrastructure.

- Based on theory and the testimony of market players and DOE, the results show that greater competition leads to lower prices. Pump prices are lower where there are more retail stations. This is a very important empirical finding because it means that promotion of more competition is essential to keep prices relatively low and fair. DOE should, therefore, make a deeper study on the different means to foster competition (e.g., funding common terminal depots, etc.) while exercising regulatory oversight on quantity and quality standards.

- The negative signs in some of the regional dummy variables lead us to be wary about maintenance of quality standards and correct quantities delivered to customers and possible smuggling. This will involve the Department of Finance (for the Bureau of Customs and the Bureau of Internal Revenue) for addressing smuggling, and the DOE for setting and ensuring quality standards. The municipal/city governments should ensure that correct quantity of products are dispensed through regular calibration of dispensing pumps..

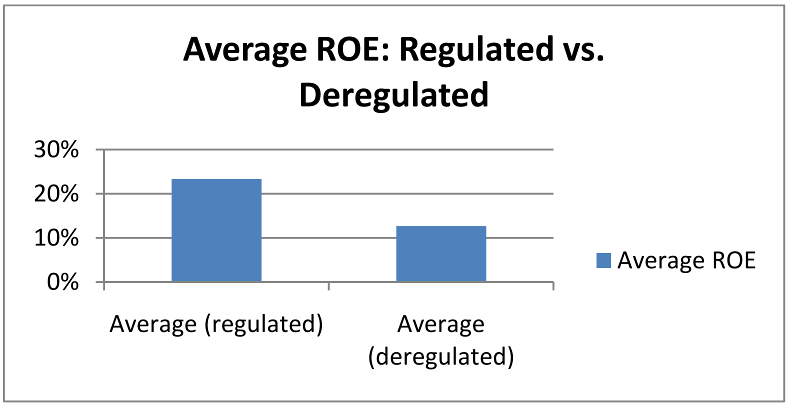
3.3. Assessing the Profitability of the Local Oil Industry

- The IOPRC finds that oil companies' profits are reasonable. This conclusion is based on the results of its analysis of the ROE and IRR of oil companies and relating the same to the comparative ratio in other industries and risk-free government securities.



- Despite the relatively lower rate of return for the oil industry compared to other industries, it is still attractive to enter into the oil business because of the long term, steady return on invested capital in the industry. This is because any risk associated with oil prices and foreign exchange rate is ultimately passed on to consumers. Moreover, the demand for oil products is expected to rise continuously, thus providing opportunities for higher return on capital investment.

- Oil deregulation resulted in a lower average ROE of the three major oil companies as shown in the graph below. The average ROE estimated at 23.3% during the regulated regime (limited to 1994 to 1996) was much higher than the average ROE at 13% under the deregulated regime (1998 to 2011).

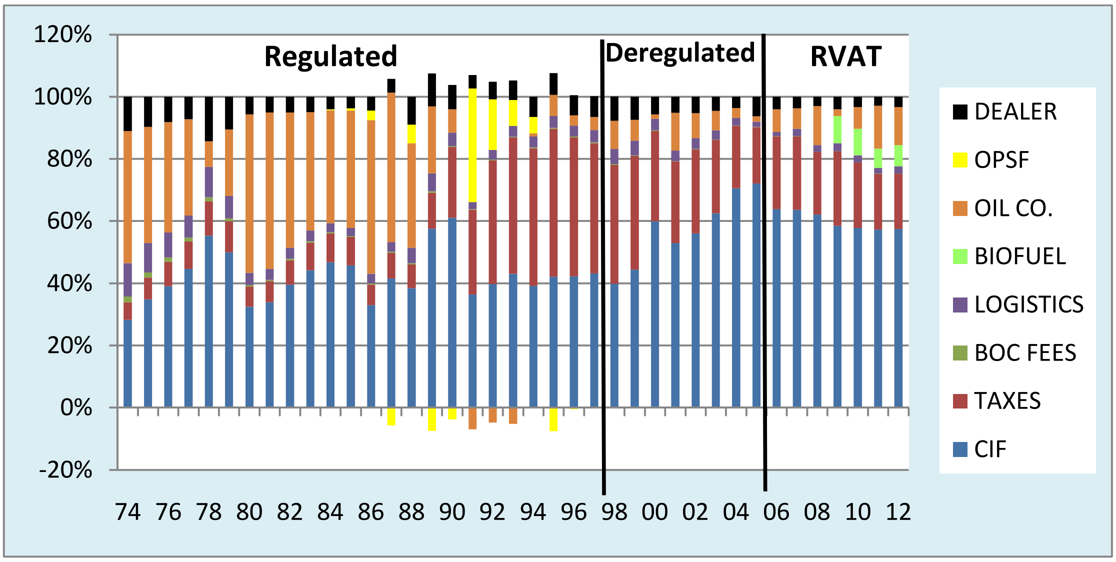


3.4. Comparing Actual and Predicted Oil Prices using Own Build Up Model

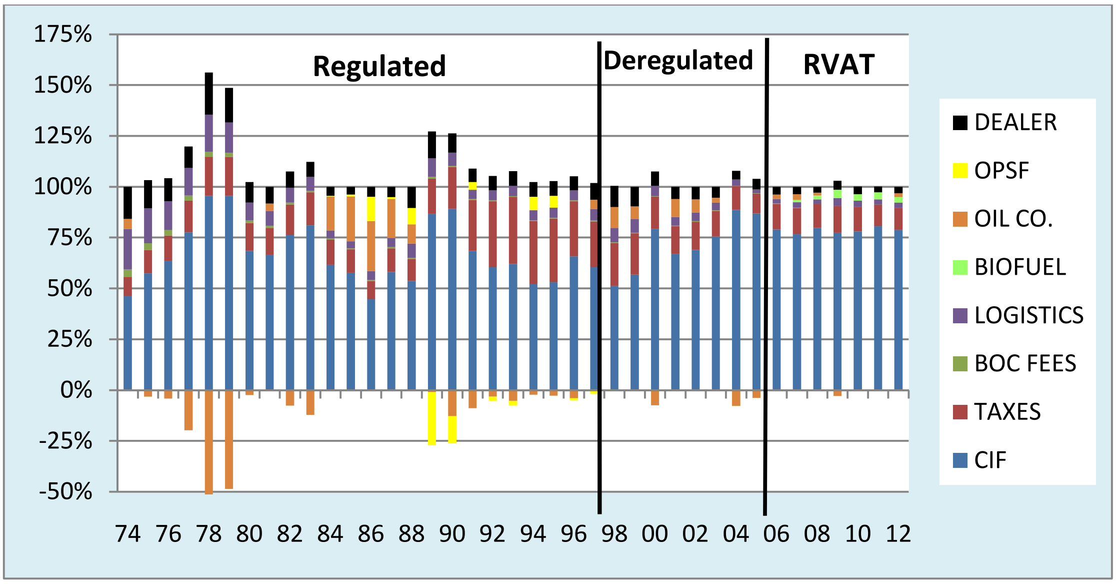
- Using the OPPC model developed by the Committee – wherein the retail prices of gasoline and diesel are built up from import costs to transport and distribution including all taxes – no evidence was found of overpricing of some P8 per liter for diesel and P16 per liter for unleaded gasoline, as claimed by some consumer groups.

  As of June 2012, the average oil company gross margin was estimated at 16.96% of Tax Paid Landed Cost (TPLC) for gasoline and 2.17% of TPLC for diesel.

Gasoline Price Breakdown (1974-2012) in % of Pump Price



Diesel Price Breakdown (1974-2012) in % of Pump Price



- In June 2012, the average oil company gross margin as percentage of pump price is 12.3% (6.86 pesos per liter) for unleaded gasoline and 1.9% (0.88 pesos per liter) for diesel. This gives a weighted average of 5.4% (2.88 pesos per liter), assuming that sales proportion is in the order of one-third unleaded gasoline sales to two-thirds diesel sales.

- The oil company gross margin for gasoline during the regulated periods was much larger than that during the deregulated period, indicating the level of competition arising from the Downstream Oil Industry Deregulation Acto fo 1998 (the "Act").

- On the other hand, the oil company gross margin for diesel during the regulated period, as well as during the deregulated period, were consistently lower compared to unleaded gasoline. This suggests that oil companies are cross-subsidizing diesel from their higher gasoline margins to sustain their operations.

- Based on the three approaches the IOPRC applied, whose results converge, we find that the Oil Deregulation Law's goal of increased competition, and thus fair price (lower price than in an oligopoly), is being achieved. This is validated by data from the DOE which shows that the market share of independent oil companies has increased from 0% in 1998 to 25.7% in 2011. The number of retail stations has grown from around 3,500, of which 270 were operated by independent oil companies, as of 2000 to 4,459 as of end-2011, of which around 800 or 18% of the total are operated by independent oil companies.

4. Recommendations and Implications for Policy

- The government should continue to support the oil deregulated regime on the premise that greater responsiveness of local pump prices to world oil prices and that a lower and less volatile ratio of local pump prices to world oil prices are desirable goals.

- In keeping with the spirit of transparency and fiscal responsibility, the government should resist any temptation to subsidize fuel and electricity consumption. If, as in Thailand, subsidizing fuel prices and power consumption will add 2.7 percent of GDP to the budget deficit, this will have dire consequences on the country's prospects for future credit upgrades, and may even lead to credit downgrades. It will certainly crowd out resources that would otherwise go to better alternative uses (infrastructure, education, health, etc.).

- The government should seriously consider the possible deregulation of the land transport sector since the regulated regime of the transport sector prevents it from adjusting fares to immediately compensate for rising fuel prices. This can be done through the creation of an automatic, monthly, fare-setting mechanism that can respond to fuel price increases (or decreases) and current adjustments so as not to disadvantage the public transport sector by making them absorb the full impact of fuel price increases.

- The DOE should continue actively monitoring oil companies and ensure they effect reasonable and fair changes in pump prices in response to changes in their input prices. Oil companies generally change prices symmetrically in response to changes in world oil prices, but there is statistical evidence that there are periods, in particular the most recent period (July 2010 to June 2012), when this is not the case. The DOE should examine this issue further.

- The DOE should step up its task of monitoring the quality of petroleum products. The quality of petroleum product is sometimes sacrificed by some irresponsible oil industry players in order to meet their target return/profit. Improved monitoring of the quality of petroleum products sold in the market may require expanding the current DOE staff involved in monitoring product quality, and providing them the necessary equipment and other resources to do their task more effectively.

- The DOE should establish stricter and more industry-specific reporting guidelines. Correspondingly, the DOE should build a staff of industry financial experts.

- The DOE should post in its website an annual analysis of oil industry performance, including findings and issues encountered by the DOE-DOJ Task Force.

- The DOE should conduct a deeper study on the different means to foster competition (e.g., funding common terminal depots, etc.) while exercising regulatory oversight on quantity and quality standards. The results of the study support the argument that the promotion of more competition is essential to keep prices relatively low and fair.

- The DOE should adopt the OPPC Model for calculating the TPLC and the pump price to consider accurately the effect of biofuels addition and other logistical costs.

- The DOE should make available through its website the OPPC Model for TPLC and Pump Prices to regulators, the academe, and other interested parties.

Box 1. Findings of Previous Independent Review Committees

There have been two previous independent review committees that have looked into the issue of deregulation and possible unreasonable pricing by oil companies.

In 2004-5, an independent review committee was formed to review the Downstream Oil Industry Deregulation Act of 1998 through 2004.[1] The review relied primarily on an analysis of market shares and number of players in the industry, the comparison of cost breakdown of fuel for pre-deregulated versus deregulated periods, as well as an examination of the financial statements of Pilipinas Shell Petroleum Corporation and Petron Corporation (for the period 1998 to 2004). The committee concluded that oil product price increases observed since deregulation were primarily due to the depreciation of the peso and the increase in world oil prices, and thus that deregulation was not the culprit. The committee recommended that the DOE not support any proposed change in RA 8479 (Oil Deregulation Act) but that it continue to closely and regularly monitor oil prices and inform the public regularly about the results of the monitoring

In 2008, another review group comprising of SGV and UA&P assessed the reasonableness of the prices of Petron and Shell. The review relied primarily on analyzing historical trends of local and world oil prices, the comparison of cost breakdown of fuel for pre-deregulated versus deregulated periods, and analysis of financial data from Petron and Shell for the period 2002 to 2007. The committee concluded that local prices have not actually gone up as fast as world oil prices, that oil companies' margins have probably shrunk since deregulation, that return on equity figures for Petron and Shell appeared reasonable compared to benchmark interest rates, and that the stock price of Petron did not reflect extraordinary profits by the company.

BOX 2

Various Oil Industry Regimes Leading to the Oil Deregulation Law

1. Unregulated regime prior to the first global oil crisis. In the period before to the first world global crisis, the Philippine oil industry was unregulated. The industry consisted of four refiners (Bataan Refining, Filoil, Caltex, and Shell) and six marketing firms (Esso, Filoil, Caltex, Mobil and Shell). Industry players set their own prices without prior government approval.

2. Regulated regime in response to the world oil crisis. The government's response to the oil crisis was the passage of the Oil Industry Commission Act and price regulation was introduced.

3. Regulated regime with OPSF mechanism. In 1984, the Oil Price Stabilization Fund (OPSF) was created as a buffer fund to minimize oil price fluctuations. Oil companies contributed to the OPSF when world oil prices were lower than the corresponding fixed pump prices, and drew from the OPSF in the opposite event. Later, the Energy Regulatory Board (ERB) was created and was given the responsibility of setting oil product prices. Below are the features of the regime:

   Oil product prices were fixed by the government and players were assured of full cost recovery plus an acceptable rate of return

   Oil product prices were set at a uniform rate for the same area. Overpricing and underpricing were not allowed. Adjustments in the prices of petroleum products were made only after due notice (published) and hearings.

   Domestic price adjustments were few and far apart (i.e. once or twice a year) with the OPSF absorbing fluctuations in world oil prices and peso exchange rates.

   Oil companies were required to submit under oath information used by ERB to set prices, including actual crude oil importations/costs and sales on a monthly basis.

   Every two months, the ERB calculated the adjustment in oil product prices based on the actual cost of crude purchases of the oil companies for the preceding two months. The average adjustment due to crude cost was translated into adjustment per product type by aligning with the Singapore parity of each product type. Any increase in price was charged to (withdrawn from) the OPSF while any decrease was credited to (contributed to) the OPSF. The OPSF was also used to cross-subsidize between and among products --gasoline and jet fuel subsidized diesel, kerosene, bunker fuel and LPG.

As a buffer fund, the OPSF works in a regime where oil prices go up and down, not when prices are rising continuously. In the case of the later, continuing oil price increases means continued drawdown from the OPSF. And with large spikes in crude oil prices in the world market owing to political conflicts in the Middle East, particularly the Iraqi invasion of Kuwait, the OPSF was depleted. Despite the negative position of the Fund, oil product prices were kept low in response to strong political clamor against oil price hikes. As a result, in 1996, the government has to provide a subsidy amounting to P15 billion to augment the depleted OPSF.

BOX 2 (cont'd)
Various Oil Industry Regimes Leading to the Oil Deregulation Law

4. Transition to Oil Price Deregulation. On March 28, 1996, RA 8180 otherwise known as "An Act Deregulating the Downstream Oil Industry," was passed. It took effect on April 2, 1996. Under the law, oil firms may freely set their own prices after a six-month transition period. During the transition phase, from August 1996 to January 1997, the ERB put in place an Automatic Pricing Mechanism (APM) which adjusted the wholesale posted prices of petroleum products monthly using Singapore Posted Prices (SPP) as price basis.

In 1997, as an aftermath of the Asian financial crisis, the peso depreciated from P28/$1 to P40/$1. In response, the oil companies increased pump prices. On the back of strong public disapproval of the soaring petroleum pump prices, some lawmakers filed a suit with the Supreme Court questioning the legality of RA 8180. On November 5, 1997, the Supreme Court decided to nullify RA 8180 due to three provisions deemed barriers to entry and thus unconstitutional: tariff differential between the raw material crude oil and the refined finished products, minimum inventory requirement, and predatory pricing definition.

Congress acted quickly to repair RA 8180. It passed on February 10, 1998, RA 8479, otherwise known as the "Downstream Oil Industry Deregulation Act of 1998."

5. Deregulated Oil Industry. The implementing rules and regulations for RA 8479 was signed on March 14, 1998. On July 13, 1998, full deregulation of all oil products took effect. But in the brief transition, transition pricing was still set for three socially sensitive products -- LPG, kerosene and regular gasoline. Deregulating the downstream oil industry means:

    - Removing barriers to entry to encourage more investors to enter the industry. With deregulation, the country should expect greater competition as industry players will no longer be confined to Petron, Shell and Caltex. To stress this, a uniform duty of 3% for crude and finished products was provided.
    - Removing government's control over the pricing of fuel and instead allowing market forces to dictate prices. This removes costly government subsidies and was meant to free oil pricing from political pressures.
    - No longer issuing a cost plus formula as basis for pricing, as practised during the regulated era and which assured players of margins, but instead making competition the basis of price setting.

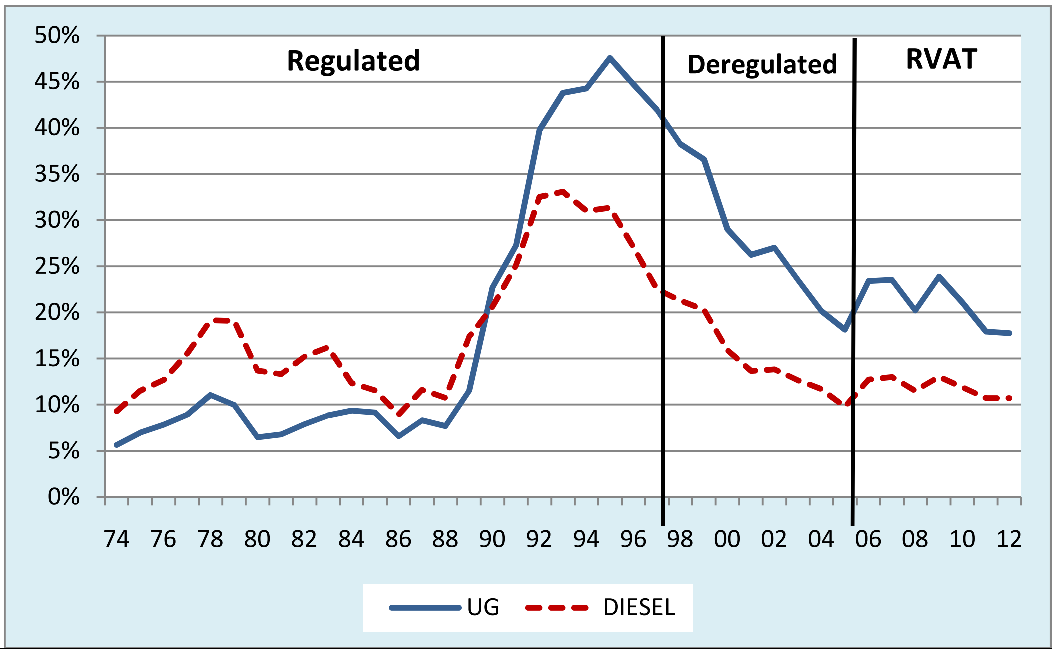
BOX 3

Short History of Oil Tax Regimes

The present level of tax rates on oil products in the Philippines has drawn considerable attention from lawmakers and special interest groups interested in providing price relief to consumers following the wake of historical high fuel prices brought about by the global oil price crisis in 2008 and the typhoon-induced flooding in 2009. Some proposals have called for the temporary reduction, if not the outright removal, of the present P4.35 excise tax on unleaded gasoline and the 12% VAT rate – which is the only tax left on diesel products after the excise tax on diesel was reduced to zero with the introduction of the Reformed VAT on oil products in late 2005. Resolving the debate requires in part obtaining a historical perspective on the taxation of oil products in the Philippines using the OPPC Model developed by the IOPRC after consultations with industry players and relevant government agencies.

During the early years of the regulated era, the taxation on oil products centered on the use of customs tariffs on the imported oil. As such the percentage share of tax on pump prices depended on how the pump prices followed the movements of the imported oil prices and peso-dollar rate. In the mid-1970s, import costs as well as the attendant tariffs increased by 30% per year which clearly outpaced the annual 15% increase in pump prices resulting in a higher tax take on pump prices. The high point for the time period was in 1978 when import costs increased by 25% even as pump prices were virtually left unchanged from the previous year resulting in a period high tax take of 19% for premium gasoline and 11% for diesel. In later years, subsequent hikes in pump prices led to lower tax takes as global oil prices stabilized in the early 1980s.

Figure 1. Historical Taxation on Oil Products (as % of Pump Price)



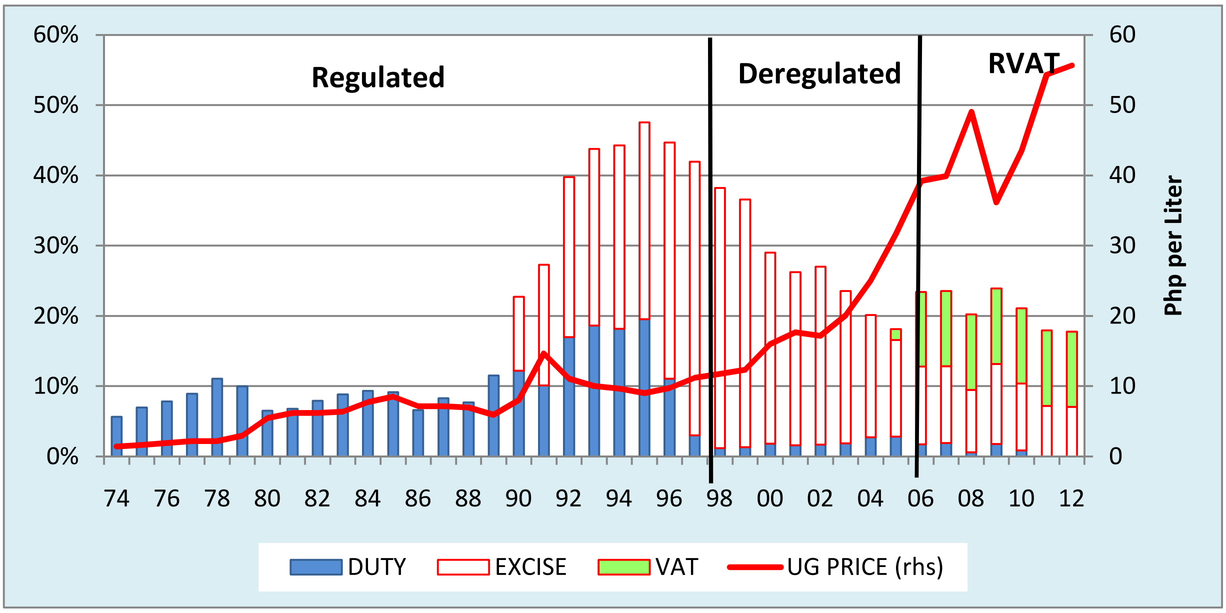
BOX 3 (cont'd)

Short History of the Oil Tax Regimes

The situation changed significantly when global oil prices entered into a new era of volatility in the mid-1980s. The cost of imported oil fell by 40% in 1986, rose by 26% in 1987 and dropped anew by 10% in 1988 but only to increase again by 28% in 1989. Partly in response to the wide fluctuations in cost prices, the government imposed special fixed duty of P1 per liter in 1991 and later raised to P2/liter in 1993 to raise new tax revenues. This ushered in a new tax regime centered on specific taxes with fixed peso rates decoupled from changing import prices. The policy shift did lead to the historic highs in the tax take – up to 45% for premium gasoline (now renamed unleaded gasoline) and 33% for diesel in mid-1990s.

With the full implementation of the Act in 1998, the specific duties were retained as excise taxes on oil products. However this new tax policy coincided with the gradual reduction of tariff rates following global and international free trade agreements starting in the 1990s. The drastic drop in oil tariffs from 7% in 1996 to only 2% in 2006 in addition to rising import and pump prices – that were now *not* linked to taxes – led to the reduction of the tax take to below 20% for unleaded gasoline and under 10% for diesel in 2005.

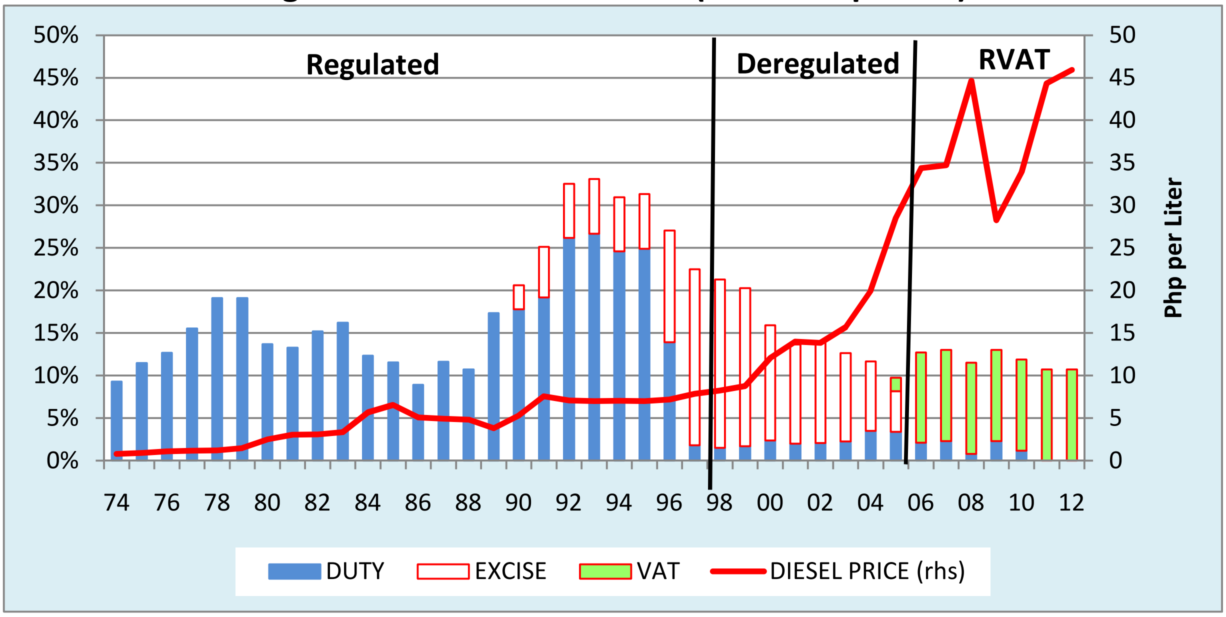
Figure 2. Tax Take on Unleaded Gasoline (% of Pump Price)



BOX 3 (cont'd)
Short History of the Oil Tax Regimes

The situation was partly addressed with the imposition of the Reformed VAT on oil products in late 2005 that re-established the tax link with import values and pump prices. Since 2006, the total tax take on unleaded gasoline has been hovering around 20% which fell to 18% upon the phase-out of tariffs in 2011. For diesel products, the tax take recovered to 13% despite the removal of excise taxes that was replaced by the RVAT, but has since decreased to 11% due to the zero-tariffs starting in 2011.

Figure 3. Tax Take on Diesel (% of Pump Price)



In summary, the oil tax regime has progressed from tariffs based on changing import values to specific taxes with fixed peso rates on volumes, and finally to a VAT rate on importation and consumption of oil products. It is in the present case where the tax take as a percentage of pump prices has been fairly constant despite wide swings in pump prices as affected by varying fluctuations in the foreign exchange rates and the prices of imported oil. The historical data also shows that the current tax take on unleaded gasoline and diesel products is about *half* of the highs experienced during the regulated period.

II. Technical Papers

A. Testing the Relationship Between Local and World Oil Prices

In this section, we examine the strength of the link between domestic pump prices (of unleaded gasoline and diesel) in Metro Manila and Mean of Platts Singapore (MOPS) product price. Based on consultations with oil firms and the examination of one actual contract, contracts of oil firms with suppliers are based on MOPS. We examine the question historically, and compare the link between domestic pump prices and MOPS prices across different time periods, beginning from the regulated period to the current deregulated period.

Essentially, we attempt to answer the following questions:

- Do domestic pump price movements mainly reflect international oil price movements?
- How has this relationship changed over time? Have local pump prices become *more* or *less* responsive to changes in international prices?
- Is the relationship between domestic pump price and international oil price in the Philippines different compared to the relationship between the two variables in other countries?
- Is there basis to the claim that there is asymmetry as to how local oil companies respond to increases and decreases in international prices? Specifically, we examine the typical claim that local oil companies respond slower and change prices by a smaller amount in response to declines in international oil prices.

We use average weekly data in Metro Manila based on DOE's monitoring from 1994 to 2012 and divided these into 5 mutually exclusive time periods. The different time periods we use are the following: (a) the regulated period from 1994 to 1996; (b) the early deregulated period from 1999 to 2004[6]; (c) the period covered by the previous review committee, which was from 2005 to 2007; (d) the recent period before the new administration, which was from 2008 to June 2010; and (e) the period under the new administration.

A.1. Link between Domestic Pump Prices and MOPS

The link between domestic pump price and MOPS price movements can be analyzed using either their levels or their changes (from week to week). When relating levels, one can view it as estimating the long run relationship between the two variables, whereas when relating changes, one can view it as estimating the short run relationship between the two variables.[7] Because prices are typically nonstationary, roughly meaning, in this case, that they tend to trend upwards, there is a high chance of getting a spurious relationship when estimating their link simply using levels.[8] It is thus just as informative, if

[6] We skip the transition years from regulated to deregulated, which were from 1997 to 1998.
[7] The two can also be combined in an equilibrium correction model, which we also present here.
[8] More formally, nonstationarity of a variable means its probability distribution is changing over time, such as when its mean or variance is changing over time.

not more so, to look at the relationship between changes as it is to look at the relationship between levels.

First, we seek to answer the question of whether local pump prices have become more or less responsive to international oil prices over time.

Unleaded gasoline level

Table 1 gives the results of various regressions relating the local pump price of unleaded gasoline against the MOPS of Mogas and variables for the different taxes imposed on gasoline for the different time periods. The pump price is regressed against *different lags* of MOPS, with *Lag 0* meaning MOPS of the same week, *Lag 1* meaning MOPS of the previous week, and so on. Table A.1, in effect, shows the results of 25 different regressions. The table only shows the coefficient of the MOPS variable and what is called the R-squared of the regression. The R-squared (also known as the coefficient of variation) is simply the proportion of the variation in the dependent variable (pump price of unleaded gasoline) explained by the variation in the explanatory variables (MOPS and tax regimes). The higher the R-squared the better the model is at predicting the value of the dependent variable. The full regression results are in the Annex.

First, looking at responsiveness in terms of time reaction, the table shows that in the most recent period (column labeled Recent new admin), the highest R-squared among the different lags is *Lag* 1 or the previous week's MOPS. Compare this to other periods when the highest R-squared where for longer lags. In the regulated period, though the highest R-squared is with contemporaneous MOPS, the relationship is very much weaker.
Looking at responsiveness in terms of variation explained, the table clearly shows, from the way the R-squared has been changing over time, that the pump price of unleaded gasoline has become more responsive to MOPS and taxes over time. In fact, in the most recent period the R-squared of the regression has reached 97 percent. Compare this, for instance with the previous period (Recent before new admin) when the R-squared was 95% or more starkly with the regulated period, when the R-squared was only a measly 36%.

Table A.1. Unleaded Gasoline Pump Price = f(MOPS Mogas 95, taxes, fees), different periods

MOPS Mogas	Recent new admin July 2010 to May 2012	Recent before new admin 2008 to June 2010	Period covered by previous review 2005 to 2007	Early deregulated 1999 to 2004	Regulated 1994 to 1996
Lag 0	0.9316	0.5820	0.4442	1.0267	**0.2178**

r^2	*0.949*	*0.916*	*0.851*	*0.889*	***0.364***
Lag 1	**1.0283**	0.6779	0.5195	1.0338	0.1141
r^2	***0.969***	*0.941*	*0.865*	*0.905*	*0.353*
Lag 2	0.9971	0.7507	0.5884	1.0406	0.0298
r^2	*0.948*	*0.952*	*0.880*	*0.919*	*0.348*
Lag 3	0.9032	**0.8075**	0.6432	1.0460	-0.0478
r^2	*0.918*	***0.952***	*0.895*	*0.931*	*0.347*
Lag 4	0.7894	0.8523	**0.6824**	**1.0491**	-0.1220
r^2	*0.886*	*0.943*	***0.906***	***0.940***	*0.346*

Note: Number in black is the coefficient of MOPS and number in red is r-squared of model, including tax variables.
See Annex A.1 for full regression results.

Unleaded gasoline change

In terms of change, the increased responsiveness of unleaded gasoline to MOPS is just as clear (Table A.2). In the two most recent periods, the change in unleaded gasoline pump price is most highly correlated with the change in MOPS of the previous week, compared to three or four weeks previous in the period 1999 to 2007. In the regulated period, there was no significant relationship between the change in MOPS and the change in pump price, as expected. This increased responsiveness is also manifested in the much higher R-squared in the most recent period (44%) compared to previous periods (33% in immediately preceding period and much lower in other periods).

Table A.2. Δ Unleaded Gasoline Pump Price = f(Δ in MOPS Mogas 95, Δ in taxes, Δ in fees), different periods

Change in MOPS Mogas	Recent new admin July 2010 to May 2012	Recent before new admin 2008 to June 2010	Period covered by previous review 2005 to 2007	Early deregulated 1999 to 2004	Regulated 1994 to 1996
Lag 0	0.1785	0.2595	0.0466	-0.0136	-0.0446
r^2	*0.065*	*0.102*	*0.027*	*0.001*	*0.010*
Lag 1	**0.4640**	**0.4908**	0.0706	0.0383	-0.0846
r^2	***0.435***	***0.328***	*0.077*	*0.012*	*0.007*
Lag 2	0.1294	0.3371	0.1245	0.0654	-0.0226
r^2	*0.037*	*0.158*	*0.129*	*0.034*	*0.001*
Lag 3	0.0555	0.2685	0.1158	**0.0913**	-0.0165
r^2	*0.011*	*0.128*	*0.097*	***0.066***	*0.005*

Lag 4	0.0026	0.2260	**0.1491**	0.0923	0.0187
r^2	*0.007*	*0.172*	***0.138***	*0.063*	*0.008*

Note: Number in black is the coefficient of Δ in MOPS and number in red is r-squared of model, including Δ in tax variables.
See Annex A.2 for full regression results.

Diesel level

The results for diesel are fairly similar to those for unleaded gasoline, as Table A.3 clearly shows. For the most recent period, unleaded gasoline was most highly correlated with the previous week's MOPS, compared to the other periods, when the highest correlation was with the MOPS of four weeks (or a month) ago. The R-squared was also higher in the most recent period (98%) compared to other periods (51 to 9%). In short, in terms of level, diesel pump price has become more responsive to international prices.

Table A.3. Diesel Pump Price = f(MOPS Diesel Price, taxes, fees), different periods

MOPS Diesel	Recent new admin July 2010 to May 2012	Recent before new admin 2008 to June 2010	Period covered by previous review 2005 to 2007	Early deregulated 1999 to 2004	Regulated 1994 to 1996
Lag 0	1.1569	0.3701	0.4536	0.8778	0.2040
r^2	*0.948*	*0.861*	*0.919*	*0.909*	*0.443*
Lag 1	**1.1618**	0.4762	0.5295	0.8841	0.2113
r^2	***0.976***	*0.893*	*0.930*	*0.920*	*0.466*
Lag 2	1.1377	0.5626	0.5954	0.8915	0.2118
r^2	*0.952*	*0.921*	*0.940*	*0.929*	*0.486*
Lag 3	1.1040	0.6346	0.6447	0.8978	0.1862
r^2	*0.915*	*0.942*	*0.948*	*0.936*	*0.492*
Lag 4	1.0667	**0.6960**	**0.6742**	**0.9018**	**0.1638**
r^2	*0.877*	***0.956***	***0.953***	***0.941***	***0.506***

Note: Number in black is the coefficient of MOPS and number in red is r-squared of model, including tax variables.
See Annex A.3 for full regression results.

Diesel change

In terms of change, as with unleaded gasoline, the change in diesel prices in the most recent period is most highly correlated with the change in MOPS diesel of the previous week (Table A.4). In the period 1999 to 2007, the highest correlation was with the change in MOPS diesel of three or four weeks previous ago. In the regulated period, there was only a very weak relationship between the change in MOPS and the change in pump price, as expected. This increased responsiveness is also manifested in the much higher R-squared in the most recent period (44%) compared to previous periods (25% in immediately preceding period and much lower in other periods).

Table A.4. Δ Diesel Pump Price = f(Δ in MOPS Diesel Price, Δ in taxes, Δ in fees), different periods

Change in MOPS Diesel	Recent new admin July 2010 to May 2012	Recent before new admin 2008 to June 2010	Period covered by previous review 2005 to 2007	Early deregulated 1999 to 2004	Regulated 1994 to 1996
Lag 0	0.1731	0.2288	0.0295	0.0229	0.0432
r^2	*0.064*	*0.098*	*0.051*	*0.005*	*0.001*
Lag 1	**0.4528**	0.3994	0.0499	0.0584	0.0567
r^2	***0.441***	*0.248*	*0.101*	*0.029*	*0.002*
Lag 2	0.1255	0.3424	0.0999	0.0614	**0.2144**
r^2	*0.034*	*0.189*	*0.172*	*0.031*	***0.024***
Lag 3	0.0240	0.3036	0.1003	**0.0918**	-0.0084
r^2	*0.001*	*0.155*	*0.145*	***0.069***	*0.000*
Lag 4	0.0076	**0.2532**	**0.1202**	0.0866	-0.0085
r^2	*0.000*	***0.273***	***0.176***	*0.058*	*0.000*

Note: Number in black is the coefficient of Δ in MOPS and number in red is r-squared of model, including Δ in tax variables.
See Annex A.4 for full regression results.

A slightly fancier way of analyzing the changes in responsiveness over time is to estimate what are called equilibrium correction models (ECMs), which combines the long run (levels) and the short run (changes) in one equation. ECMs are particularly useful for estimating the amount of time it takes for the dependent variable to adjust fully to changes in the explanatory variables. A summary of the results of estimating ECMs for the different periods are in Table A.5 and shows that the amount of time it takes for the local pump prices to adjust fully to changes in MOPS has been declining over time. For instance, in the case of unleaded gasoline from 1999 to 2004, the time it took for full price adjustment was 16 weeks. This has gone down to less than 5 weeks in the most recent period. For diesel, full adjustment took 20 weeks in the 1999 to 2004 period, but now takes less than 3 weeks. In the regulated period, there was no long run relationship between pump price and MOPS.

Table A.5. Equilibrium Correction Models: Δ Pump Price = f(Δ in MOPS, Δ in taxes, Pump Price (-1), MOPS (-1))

	Unleaded Gasoline		Diesel	
Period	ECM Coefficient	# of weeks till full adjustment	ECM Coefficient	# of weeks till full adjustment
July 2010 to June 2012	-0.219	4.6	-0.388	2.6
2008 to June 2010	-0.126	7.9	-0.126	7.9
2005 to 2007	-0.042	23.7	-0.027	36.8
1999 to 2004	-0.063	16.0	-0.049	20.3
1994 to 1996	-	-	-	-

See Annex A.5 for full regression results.

In summary, based on the regressions performed above, there is evidence that local pump prices have become more responsive over time to movements in international prices. Moreover, the results also indicate that domestic pump price movements, for the most part, mainly reflect international oil price movements. This point is also well-illustrated by Figure A.1 below. It shows the ratios of the domestic pump price of unleaded gasoline and diesel to their MOPS counterparts. The figure clearly shows that the variation in these ratios has been declining over time, but especially in the most recent period, and that in general, the mean has also become significantly lower. The mean and standard deviations of the ratios of pump price to MOPS are summarized by period in Table A.6. As can be seen from the table, the standard deviation of the ratio is lowest in the most recent period for both unleaded gasoline and diesel. In the case of the mean, except for the period 2005 to 2007 for unleaded gasoline, the mean is also lowest in the most recent period. The lower mean for the 2005 to 2007 period is partly explained by the lower tax regime for the period. [9]

[9] VAT on unleaded gasoline and diesel were only imposed starting November 2005 and was only at 10% prior to February 2006.

Figure A.1. Philippine Ratio of Pump Price to MOPS, 1994 to 2012

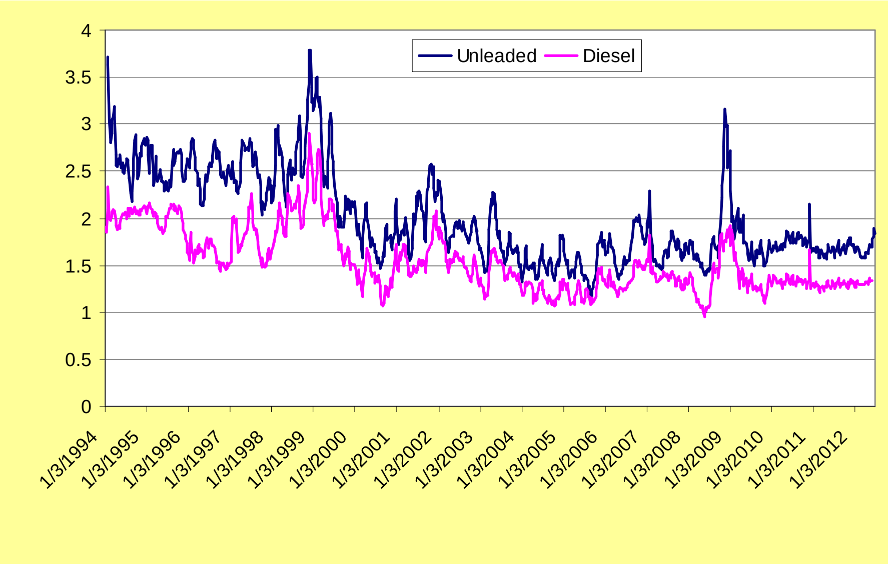


Table A.6. Ratio of pump price to MOPS for both unleaded gasoline and diesel, 1994 to 2012

Period	Ratio of Pump Price to MOPS			
	Unleaded Gasoline		Diesel	
	Mean	Std. Deviation	Mean	Std. Deviation
1994 to 1996	2.58	0.232	1.89	0.219
1999 to 2004	1.91	0.408	1.51	0.301
2005 to 2007	1.62	0.199	1.32	0.128
2008 June 2010	1.78	0.335	1.36	0.215
July 2010 to June 2012	1.69	0.087	1.31	0.050
Total	1.93	0.447	1.50	0.304

A.2. Comparison with Thailand

Tables A.7 to A.10 give the equivalent for Thailand of Tables A.1 toA.4 presented earlier for the Philippines. In contrast to the Philippines, Thailand has been subsidizing fuel consumption using state funds in recent years. This is reflected in the tables, which shows that generally Thailand pump prices are less responsive to MOPS in terms of the variation in pump price explained by MOPS.

This is clear in the most recent period where, for example, in the case of change in pump price of unleaded gasoline, the variation explained by change in MOPS was only 20% in the case of Thailand (see Table A.8) compared to 40% in the case of the Philippines (see Table A.2). Or even more starkly, the change in pump price of diesel, where the variation explained by MOPS was only 4% for Thailand compared to 43% for the Philippines (see Table A.4).

Table A.7. Unleaded Gasoline Pump Price = f(MOPS Mogas 95), different periods

MOPS Mogas	July 2010 to June 2012	2008 to June 2010	2005 to 2007	2004
Lag 0	0.6960	**0.9597**	0.9575	1.1466
r^2	*0.771*	***0.702***	*0.545*	*0.587*
Lag 1	**0.6966**	0.9368	0.9724	1.2217
r^2	***0.790***	*0.668*	*0.579*	*0.663*
Lag 2	0.6806	0.8938	**0.9641**	1.2515
r^2	*0.768*	*0.607*	***0.583***	*0.697*
Lag 3	0.6615	0.8413	0.9408	**1.2497**
r^2	*0.736*	*0.535*	*0.570*	***0.703***
Lag 4	0.6369	0.7808	0.9060	1.2244
r^2	*0.696*	*0.458*	*0.543*	*0.682*

Note: Number in black is the coefficient of MOPS and number in red is r-squared of model.
See Annex A.6 for full regression results.

Table A.8. Δ Unleaded Gasoline Pump Price = f(Δ in MOPS Mogas 95), different periods

Change in MOPS Mogas	July 2010 to June 2012	2008 to June 2010	2005 to 2007	2004
Lag 0	0.2246	0.4811	0.1703	0.0929
r^2	*0.106*	*0.244*	*0.115*	*0.031*
Lag 1	**0.3106**	**0.6475**	**0.2867**	**0.2048**
r^2	***0.204***	***0.441***	***0.327***	***0.148***
Lag 2	0.0663	0.3408	0.2048	0.1394
r^2	*0.009*	*0.125*	*0.165*	*0.072*
Lag 3	0.0758	0.2670	0.1660	0.1323
r^2	*0.012*	*0.077*	*0.108*	*0.065*

Lag 4	-0.1128	0.1173	0.1171	0.1555
r^2	*0.026*	*0.015*	*0.056*	*0.074*

Note: Number in black is the coefficient of Δ in MOPS and number in red is r-squared of model.
See Annex A.7 for full regression results.

Table A.9. Diesel Pump Price = f(MOPS Diesel Price), different periods

MOPS Diesel	July 2010 to June 2012	2008 to June 2010	2005 to 2007	2004
Lag 0	0.2156	**0.7623**	1.1162	0.0026
r^2	*0.335*	***0.852***	*0.502*	*0.032*
Lag 1	**0.2155**	0.7623	1.1391	0.0004
r^2	***0.343***	*0.851*	*0.538*	*0.024*
Lag 2	0.2109	0.7477	1.1515	0.0000
r^2	*0.334*	*0.817*	*0.553*	.
Lag 3	0.2049	0.7240	**1.1492**	0.0000
r^2	*0.321*	*0.767*	***0.558***	.
Lag 4	0.1932	0.6955	1.1354	0.0000
r^2	*0.291*	*0.708*	*0.558*	.

Note: Number in black is the coefficient of MOPS and number in red is r-squared of model.
See Annex A.8 for full regression results.

Table A.10. Δ Diesel Pump Price = f(Δ in MOPS Diesel Price), different periods

Change in MOPS Diesel	July 2010 to June 2012	2008 to June 2010	2004 to 2005	2004
Lag 0	0.0204	0.4615	0.1253	0.0033
r^2	*0.001*	*0.282*	*0.061*	*0.006*
Lag 1	0.0994	**0.6719**	0.1865	0.0007
r^2	*0.034*	***0.595***	***0.138***	*0.003*
Lag 2	0.0274	0.4049	0.1416	0.0000
r^2	*0.003*	*0.217*	*0.079*	.
Lag 3	**0.1047**	0.2513	0.1101	0.0000
r^2	***0.038***	*0.084*	*0.048*	.
Lag 4	-0.0210	0.1408	0.1214	0.0000

r^2	0.002	0.027	0.059	.

Note: Number in black is the coefficient of Δ in MOPS and number in red is r-squared of model. See Annex A.9 for full regression results.

Figures A.2 and A.3 show comparisons of the ratio of pump price to MOPS for the Philippines and Thailand. It shows that for most of the entire period, the ratios for the two countries tracked each other reasonably well. The two figures also show the relative stability of the ratios for the Philippines, at least beginning around 2009. In contrast, there was a sharp decline in the ratios for Thailand beginning around 2011 as a result of the subsidies.

Tables A.11 and A.12 give the mean and standard deviation of the ratios for the Philippines and Thailand for the different periods defined earlier. It shows that for the most recent period, the ratio of pump price to MOPS has been much more volatile for Thailand compared to the Philippines (standard deviation of 0.172 for Thailand compared to 0.084 for the Philippines for unleaded gasoline; standard deviation of 0.194 for Thailand compared to 0.049 for the Philippines for diesel). In terms of means, the ratios are lower for Thailand in the case of unleaded gasoline for the two most recent periods. But for diesel, the mean ratio has been lower for the Philippines for all periods for which comparable data are available and even during the most recent period of heavy fuel subsidies provided by Thailand.

In summary, these comparisons suggest that the relationship between domestic pump prices and international oil prices is no different for the Philippines compared to Thailand, apart from the fuel consumption subsidies provided by the latter. Thailand has managed to lower the ratio of pump price to MOPS for both unleaded gasoline and diesel since 2011 but only by heavily subsidizing fuel consumption. It is estimated that total fuel subsidies by Thailand in 2010 amounted to $8.47 billion, equivalent to 2.7% of its GDP (Institute for Energy Research, 2011).[10] Such a large addition to the deficit, if incurred by the Philippines will have dire consequences on the country's prospects for future credit upgrades, will likely even lead to credit downgrades, and is certain to eat up resources that otherwise would have other uses (infrastructure, education, health, etc.)

[10] This includes subsidies to oil, natural gas, coal, and electricity. See http://www.instituteforenergyresearch.org/2011/11/23/iea-review-shows-many-developing-countries-subsidize-fossil-fuel-consumption-creating-artificially-lower-prices/

Figure A.2. Ratio of Unleaded Gasoline Pump Price to MOPS Mogas, 2004 to 2012

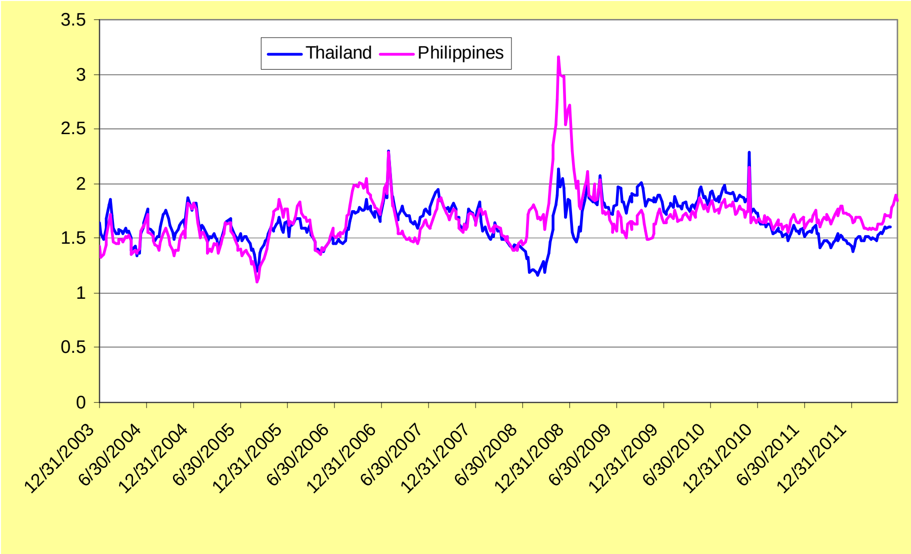


Figure A.3. Ratio of Diesel Pump Price to MOPS Diesel, 2004 to 2012

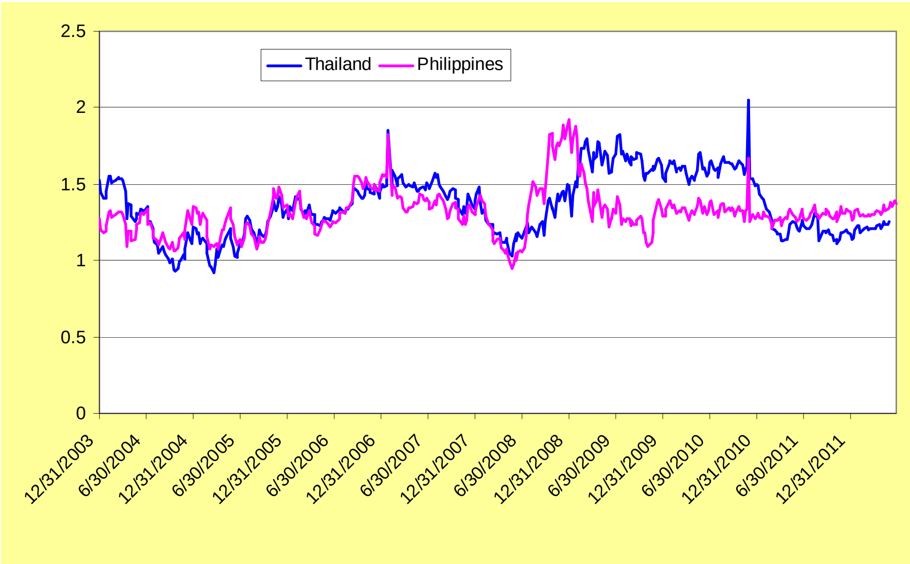


Table A.11. Ratio of pump price to MOPS for unleaded gasoline, Philippines and Thailand

Period	Ratio of Unleaded Pump Price to MOPS			
	Philippines		Thailand	
	Mean	Std. Deviation	Mean	Std. Deviation
1994 to 1996	2.58	0.232		
1999 to 2004	1.91	0.408	1.60	0.122
2005 to 2007	1.62	0.199	1.63	0.155
2008 June 2010	1.78	0.335	1.70	0.228
July 2010 to June 2012	1.69	0.087	1.62	0.171
Total	1.93	0.447	1.65	0.183

Table A.12. Ratio of pump price to MOPS for diesel, Philippines and Thailand

Period	Ratio of Diesel Pump Price to MOPS			
	Philippines		Thailand	
	Mean	Std. Deviation	Mean	Std. Deviation
1994 to 1996	1.89	0.219		
1999 to 2004	1.51	0.301	1.25	0.198
2005 to 2007	1.32	0.128	1.33	0.156
2008 June 2010	1.36	0.215	1.48	0.211
July 2010 to June 2012	1.31	0.050	1.32	0.194
Total	1.50	0.304	1.36	0.203

A.3. Symmetry of Response to Changes in MOPS

MOPS product prices change from day to day. A frequent complaint is that domestic oil companies respond asymmetrically to increases and decreases in world oil prices, the charge being that oil companies change prices by less and more slowly as a response to world oil price decreases compared to world oil price increases. Previous studies have had conflicting findings. For instance, Salas (2002), using data from January 1999 to

February 2002, reported finding evidence that retail prices respond more quickly and fully to an increase in crude prices rather than to a similar decrease.[11] Meanwhile, Kim (2012), using weekly data from October 2005 to September 2010, found timing asymmetry in unleaded gasoline retail prices but not in diesel when compared to crude oil prices, but then found amount asymmetry in diesel but not in unleaded gasoline.[12] Using monthly MOPS instead, Kim (2012) found no asymmetry in the timing and amount responsiveness of both unleaded gasoline and diesel. Comparing pattern asymmetry (a combination of timing and amount asymmetry), Kim (2012) concludes that though there is a time gap, retail unleaded gasoline prices eventually move symmetrically with increases and decreases.[13]

Here we examine, to a limited extent, the claims about the asymmetric response of oil companies. Table A.13 gives a summary of the episodes of price increases and price decreases in MOPS for the different periods under consideration. It shows, for instance, that for the period July 2010 to June 2012 there were 54 episodes (week-to-week changes) of price increases and 46 episodes of price decreases in MOPS Mogas. For the period 2008 to June 2010 there were 66 episodes of price increases and 64 episodes of price decreases, and so on for the other periods. The table also shows the average change in MOPS Mogas in the events of increases and decreases. For instance, for the period July 2010 to June 2012, the average increase in MOPS Mogas – averaged only over the periods of increases – was ₱ 0.72, whereas the average decrease in MOPS Mogas was ₱ 0.69. Together with the average change in MOPS, the table shows the average change in unleaded gasoline pump prices for both episodes of increases and decreases. So, for the period July 2010 to June 2012, the pump price of unleaded gasoline increased an average of ₱0.60 in episodes of increases, and decreased average ₱0.50 in episodes of decreases.

Finally, the last column of the table shows the results of statistically testing whether there is a significant difference in the magnitude of pump price increases of unleaded gasoline as a result of MOPS Mogas increases compared to pump price decreases as a result of MOPS Mogas decreases. Statistical testing is done by regressing change in pump price against change in MOPS plus a dummy variable for episodes of price increases. If the dummy variable is significant in the regression, then it means that a significant difference exists, and if the coefficient of the dummy variable for increase is positive, that means pump prices respond by more to upward movements in MOPS, on average. The full regression results are in Annex 10.

[11] See Salas, J.M.I. 2002. Asymmetric price adjustments in a deregulated gasoline market. *The Philippine Review of Economics* Vol. XXXIX No. 1 pp. 38-71. [It should be noted that it is possible to question whether his econometric results are sufficient to merit this conclusion. For instance, he relied heavily on fitting moving average error terms in his regressions, thus rendering his results not easily interpretable.]

[12] Kim, J. 2012. Behavior of Retail Gasoline Prices in the Philippines to Changes in Crude Oil Prices: Is it Symmetric or Asymmetric?. *Philippine Management Review* Vol. 19 pp. 11-22.

[13] An obvious limitation of Kim (2012) is that there was no attempt to control for other factors that would obviously influence pricing, such as changes in the tax structure and other fees over the time period studied.

The first thing to note about Table A.13 is that it reinforces the point made earlier that local pump prices have become more responsive to international oil prices, as one can see when comparing the ratio of the average change in unleaded gasoline pump price to the average change in MOPS Mogas over time (for price increases ₱0.60/₱0.72 in most recent period; ₱0.50/₱0.91 in previous period; and so on). But then the table also shows that, at least for the most recent period, there is an observed statistically significant difference in the response of unleaded gasoline pump prices to changes in MOPS. The sign of the coefficient (see Annex 10) indicates that for this period pump prices have been less responsive to price decreases in terms of magnitude compared to price increases.

Table A.14 undertakes a similar analysis but this time looking at diesel prices. The results are similar and show a statistically significant difference in the response of diesel pump prices to increases and decreases in MOPS diesel for two periods: the most recent period and the period 2005 to 2007. As with unleaded gasoline, diesel pump prices have been less responsive to price decreases in terms of magnitude compared to price increases in these two periods.

In summary, the results of this subsection indicates that generally oil companies respond symmetrically to increases and decreases in world oil prices, except for select periods (most recent period for unleaded gasoline and most recent period and 2005 to 2007 for diesel). Most sellers, not just oil companies, are likely naturally more reluctant to decrease prices immediately (and by the same magnitude) than they are to increase prices as a response to changes in the cost of inputs, not only because of profit opportunities but also because of the greater difficulty in raising prices again should the downward movement in input costs prove temporary. This merits further examination.

Table A.13. Unleaded Gasoline: Asymmetry Between Price Increases and Price Decreases

	Price increase episodes			Price decrease episodes			
Period	Δ Unleaded Pump price	Δ MOPS mogas	Freq.	Δ Unleaded Pump price	Δ MOPS mogas	Freq.	Sig. diff bet inc. and dec.?*
July 2010 to June 2012	0.60	0.72	54	-0.50	-0.69	46	Yes
2008 to June 2010	0.50	0.91	66	-0.52	-0.97	64	No
2005 to 2007	0.23	0.81	76	-0.01	-0.67	81	No
1999 to 2004	0.08	0.37	176	0.02	-0.38	137	No
1994 to 1996	0.03	0.02	81	-0.02	-0.001	76	No

See Annex A.10 for regressions checking for significant difference in responses to MOPS increases and decreases.

Table A.14. Diesel: Asymmetry Between Price Increases and Price Decreases

Period	Price increase episodes			Price decrease episodes			Sig. diff bet inc. and dec.?
	∆ Diesel Pump price	∆ MOPS diesel	Freq.	∆ Diesel Pump price	∆ MOPS diesel	Freq.	
July 2010 to June 2012	0.49	0.56	54	-0.38	-0.50	46	Yes
2008 to June 2010	0.38	0.79	66	-0.45	-0.87	64	No
2005 to 2007	0.19	0.61	76	0.00	-0.46	81	Yes
1999 to 2004	0.06	0.24	176	0.03	-0.21	137	No
1994 to 1996	0.03	0.02	81	-0.02	-0.001	76	No

See Annex A.10 for regressions checking for significant difference in responses to MOPS increases and decreases.

ANNEX A

1. Unleaded Gasoline Pump Price = f(MOPS Mogas 95, taxes), different periods

A. *Period July 2010 to June 2012

i. Lag 0

```
. reg unleaded_wk mops_mog_php_b ug_trf ug_spduty ug_extax ug_vat bioeth_rq

Linear regression                                      Number of obs =     104
                                                       F(  2,    101) =  909.55
                                                       Prob > F      =  0.0000
                                                       R-squared     =  0.9489
                                                       Root MSE      =    1.25

------------------------------------------------------------------------------
             |               Robust
 unleaded_wk |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
mops_mog_p~b |     .93157   .0636399    14.64   0.000     .8053255    1.057814
   bioeth_rt |   71.47117   10.97065     6.51   0.000     49.70835    93.23399
       _cons |    16.9846   1.270876    13.36   0.000     14.46353    19.50568
------------------------------------------------------------------------------
```

ii. Lag 1

```
. reg unleaded_wk mops_mog_php_b_1 ug_trf_1 ug_spduty_1 ug_extax_1 ug_vat_1 bioeth_rq_1
bioeth_rt_1 if year>=2010 & week>=1958, robust

Linear regression                                      Number of obs =     104
                                                       F(  2,    101) =  974.17
                                                       Prob > F      =  0.0000
                                                       R-squared     =  0.9695
                                                       Root MSE      =   .9658

------------------------------------------------------------------------------
             |               Robust
 unleaded_wk |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
mops_mog_p~1 |    1.02828   .0637335    16.13   0.000     .9018496     1.15471
bioeth_rt_1 |   51.21218   8.632025    5.93   0.000     34.08856    68.33579
       _cons |    15.8216   1.425912    11.10   0.000     12.99297    18.65022
------------------------------------------------------------------------------
```

iii. Lag 2

```
. reg unleaded_wk mops_mog_php_b_2 ug_trf_2 ug_spduty_2 ug_extax_2 ug_vat_2 bioeth_rq_2
bioeth_rt_2 if year>=2010 & week>=1958, robust

Linear regression                                      Number of obs =     104
                                                       F(  2,    101) =  604.02
                                                       Prob > F      =  0.0000
                                                       R-squared     =  0.9483
                                                       Root MSE      =  1.2572

------------------------------------------------------------------------------
             |               Robust
 unleaded_wk |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
mops_mog_p~2 |   .9971429   .0860514    11.59   0.000     .8264402    1.167846
bioeth_rt_2  |   52.41514   12.54965     4.18   0.000     27.52002    77.31026
       _cons |   16.71827   1.819012     9.19   0.000     13.10984     20.3267
------------------------------------------------------------------------------
```

iv. Lag 3

```
. reg unleaded_wk mops_mog_php_b_3 ug_trf_3 ug_spduty_3 ug_extax_3 ug_vat_3 bioeth_rq_3
bioeth_rt_3 if year>=2010 & week> =1958, robust

Linear regression                                      Number of obs =     104
                                                       F(  2,    101) =  432.22
                                                       Prob > F      =  0.0000
                                                       R-squared     =  0.9176
                                                       Root MSE      =  1.5865

------------------------------------------------------------------------------
             |               Robust
 unleaded_wk |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
mops_mog_p~3 |   .9031646   .1041352     8.67   0.000     .6965885    1.109741
bioeth_rt_3  |   64.83339   17.29211     3.75   0.000     30.53049    99.13629
       _cons |   18.59855   2.012389     9.24   0.000     14.60652    22.59059
------------------------------------------------------------------------------
```

v. Lag 4

```
. reg unleaded_wk mops_mog_php_b_4 ug_trf_4 ug_spduty_4 ug_extax_4 ug_vat_4 bioeth_rq_4
bioeth_rt_4  if year>=2010 & week>=1958, robust

Linear regression                                      Number of obs =     104
                                                       F(  2,    101) =  328.71
                                                       Prob > F      =  0.0000
                                                       R-squared     =  0.8864
                                                       Root MSE      =   1.863

------------------------------------------------------------------------------
             |               Robust
 unleaded_wk |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
mops_mog_p~4 |   .7894447   .1181988     6.68   0.000       .55497    1.023919
bioeth_rt_4  |   80.25315    21.0099     3.82   0.000     38.57516    121.9311
       _cons |    20.8499   2.166138     9.63   0.000     16.55286    25.14693
------------------------------------------------------------------------------
```

B. *Period 2008 to June 2010

i. Lag 0

```
. reg unleaded_wk mops_mog_php_b ug_trf ug_spduty ug_extax ug_vat bioeth_rq bioeth_rt  if
year>=2008 & week<1958, robust

Linear regression                                      Number of obs =     130
                                                       F(  3,    126) =  356.37
                                                       Prob > F      =  0.0000
                                                       R-squared     =  0.9161
                                                       Root MSE      =  2.1585

------------------------------------------------------------------------------
             |               Robust
 unleaded_wk |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
mops_mog_p~b |   .5819846   .0474025    12.28   0.000     .4881764    .6757928
      ug_trf |  -173.6078   12.56398   -13.82   0.000    -198.4716   -148.7441
   bioeth_rq |  -5.089344   .5318629    -9.57   0.000    -6.141885   -4.036803
       _cons |   34.19269   1.565986    21.83   0.000     31.09365    37.29173
------------------------------------------------------------------------------
```

ii. Lag 1

```
. reg unleaded_wk mops_mog_php_b_1 ug_trf_1 ug_spduty_1 ug_extax_1 ug_vat_1 bioeth_rq_1
bioeth_rt_1  if year>=2008 & week<1958, robust

Linear regression                                      Number of obs =     130
                                                       F(  3,    126) =  521.72
                                                       Prob > F      =  0.0000
                                                       R-squared     =  0.9408
                                                       Root MSE      =  1.8139

------------------------------------------------------------------------------
             |               Robust
 unleaded_wk |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
mops_mog_p~1 |   .6779156    .038018    17.83   0.000      .602679    .7531522
    ug_trf_1 |  -150.8135   10.78705   -13.98   0.000    -172.1608   -129.4663
bioeth_rq_1  |   -4.34757   .4340454   -10.02   0.000    -5.206533   -3.488607
       _cons |   30.96537   1.268287    24.42   0.000     28.45547    33.47527
------------------------------------------------------------------------------
```

iii. Lag 2

```
. reg unleaded_wk mops_mog_php_b_2 ug_trf_2 ug_spduty_2 ug_extax_2 ug_vat_2 bioeth_rq_2
bioeth_rt_2  if year>=2008 & week<1958, robust

Linear regression                                      Number of obs =     130
                                                       F(  3,    126) =  756.68
                                                       Prob > F      =  0.0000
                                                       R-squared     =  0.9519
                                                       Root MSE      =   1.635

------------------------------------------------------------------------------
             |               Robust
 unleaded_wk |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
mops_mog_p~2 |     .75074     .02939    25.54   0.000      .692578    .8089021
    ug_trf_2 |  -131.0035   11.23189   -11.66   0.000     -153.231   -108.7759
bioeth_rq_2 |  -3.709257   .3380164   -10.97   0.000    -4.378182   -3.040333
      _cons |   28.42705    .999112    28.45   0.000     26.44984    30.40426
------------------------------------------------------------------------------
```

iv. Lag 3

```
. reg unleaded_wk mops_mog_php_b_3 ug_trf_3 ug_spduty_3 ug_extax_3 ug_vat_3 bioeth_rq_3
bioeth_rt_3  if year>=2008 & week <1958, robust

Linear regression                                      Number of obs =     130
                                                       F(  3,    126) =  925.71
                                                       Prob > F      =  0.0000
                                                       R-squared     =  0.9523
                                                       Root MSE      =  1.6282

------------------------------------------------------------------------------
             |               Robust
 unleaded_wk |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
mops_mog_p~3 |   .8074838   .0256921    31.43   0.000     .7566399    .8583278
    ug_trf_3 |  -112.4162   12.61728    -8.91   0.000    -137.3854   -87.44693
bioeth_rq_3  |  -3.172843   .2800707   -11.33   0.000    -3.727095   -2.618591
       _cons |   26.37423   .8794321    29.99   0.000     24.63386     28.1146
------------------------------------------------------------------------------
```

v. Lag 4

```
. reg unleaded_wk mops_mog_php_b_4 ug_trf_4 ug_spduty_4 ug_extax_4 ug_vat_4 bioeth_rq_4
bioeth_rt_4 if year>=2008 & week<1958, robust

Linear regression                                      Number of obs =     130
                                                       F(  3,    126) =  734.06
                                                       Prob > F      =  0.0000
                                                       R-squared     =  0.9430
                                                       Root MSE      =  1.7788
```

```
------------------------------------------------------------------------------
             |               Robust
 unleaded_wk |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
mops_mog_p~4 |   .8522533   .0294339    28.95   0.000     .7940044    .9105022
    ug_trf_4 |  -92.28337    14.3088    -6.45   0.000    -120.6001   -63.96668
bioeth_rq_4  |  -2.782869   .2943112    -9.46   0.000    -3.365303   -2.200436
       _cons |   24.66814   .9801189    25.17   0.000     22.72851    26.60776
------------------------------------------------------------------------------
```

C. *Period 2005 to 2007

i. Lag 1

```
. reg unleaded_wk mops_mog_php_b ug_trf ug_spduty ug_extax ug_vat if year>=2005 &
year<=2007, robust

Linear regression                                      Number of obs =     157
                                                       F(  3,   153) =  455.32
                                                       Prob > F      =  0.0000
                                                       R-squared     =  0.8484
                                                       Root MSE      =  1.8433

------------------------------------------------------------------------------
             |               Robust
 unleaded_wk |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
mops_mog_p~b |   .4667245   .0527331     8.85   0.000     .3625454    .5709036
      ug_trf |  -116.6497   28.98374    -4.02   0.000    -173.9097   -59.38973
      ug_vat |   52.51933   4.613626    11.38   0.000     43.40469    61.63396
       _cons |   25.51607   2.179953    11.70   0.000     21.20938    29.82277
------------------------------------------------------------------------------
```

ii. Lag 2

```
. reg unleaded_wk mops_mog_php_b_1 ug_trf_1 ug_spduty_1 ug_extax_1 ug_vat_1 if year>=2005
& year<=2007, robust

Linear regression                                      Number of obs =     157
                                                       F(  3,   153) =  628.97
                                                       Prob > F      =  0.0000
                                                       R-squared     =  0.8624
                                                       Root MSE      =  1.7561

------------------------------------------------------------------------------
             |               Robust
 unleaded_wk |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
mops_mog_p~1 |   .5379931   .0480089    11.21   0.000     .4431472    .6328389
    ug_trf_1 |  -99.97891   26.67952    -3.75   0.000    -152.6867   -47.27112
    ug_vat_1 |   51.70851   4.585443    11.28   0.000     42.64955    60.76746
       _cons |    23.4849   1.964815    11.95   0.000     19.60324    27.36657
------------------------------------------------------------------------------
```

iii. Lag 3

```
. reg unleaded_wk mops_mog_php_b_2 ug_trf_2 ug_spduty_2 ug_extax_2 ug_vat_2 if year>=2005
& year<=2007, robust

Linear regression                                      Number of obs =     157
                                                       F(  3,   153) =  948.75
                                                       Prob > F      =  0.0000
                                                       R-squared     =  0.8788
                                                       Root MSE      =   1.648

------------------------------------------------------------------------------
             |               Robust
 unleaded_wk |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
mops_mog_p~2 |   .6019829   .0441626    13.63   0.000     .5147357    .6892301
```

```
     ug_trf_2 |  -81.29335   23.32948    -3.48   0.001    -127.3828   -35.20386
     ug_vat_2 |    51.3122   4.358759    11.77   0.000     42.70107    59.92332
        _cons |   21.52606   1.691774    12.72   0.000     18.18381    24.86831
------------------------------------------------------------------------------
```

iv. Lag 4

```
. reg unleaded_wk mops_mog_php_b_3 ug_trf_3 ug_spduty_3 ug_extax_3 ug_vat_3 if year>=2005
& year<=2007, robust

Linear regression                                      Number of obs =     157
                                                       F(  3,   153) = 1259.83
                                                       Prob > F      =  0.0000
                                                       R-squared     =  0.8940
                                                       Root MSE      =  1.5418

------------------------------------------------------------------------------
             |               Robust
 unleaded_wk |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
mops_mog_p~3 |   .6524774   .0410367    15.90   0.000     .5714058     .733549
     ug_trf_3 |  -61.98523   19.93303    -3.11   0.002    -101.3647   -22.60572
     ug_vat_3 |   51.21698   4.023512    12.73   0.000     43.26817    59.16579
        _cons |   19.83553   1.420604    13.96   0.000       17.029    22.64206
------------------------------------------------------------------------------
```

v. Lag 5

```
. reg unleaded_wk mops_mog_php_b_4 ug_trf_4 ug_spduty_4 ug_extax_4 ug_vat_4  if
year>=2005 & year<=2007, robust

Linear regression                                      Number of obs =     157
                                                       F(  3,   153) = 1198.94
                                                       Prob > F      =  0.0000
                                                       R-squared     =  0.9056
                                                       Root MSE      =  1.4544

------------------------------------------------------------------------------
             |               Robust
 unleaded_wk |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
mops_mog_p~4 |   .6887842   .0380644    18.10   0.000     .6135846    .7639839
     ug_trf_4 |  -43.97515   17.41375    -2.53   0.013    -78.37759   -9.572718
     ug_vat_4 |   51.23016   3.684253    13.91   0.000     43.95159    58.50874
        _cons |   18.50751   1.198135    15.45   0.000     16.14049    20.87454
------------------------------------------------------------------------------
```

D. *Period 1999 to 2004

i. Lag 1

```
. reg unleaded_wk mops_mog_php_b ug_trf ug_spduty ug_extax ug_vat if year>=1999 &
year<=2004, robust

Linear regression                                      Number of obs =     313
                                                       F(  1,   311) = 2488.12
                                                       Prob > F      =  0.0000
                                                       R-squared     =  0.8890
                                                       Root MSE      =  1.3586

------------------------------------------------------------------------------
             |               Robust
 unleaded_wk |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
mops_mog_p~b |   1.026725   .0205835    49.88   0.000     .9862242    1.067225
        _cons |   7.686199   .2064984    37.22   0.000     7.279888    8.092509
------------------------------------------------------------------------------
```

ii. Lag 2

```
. reg unleaded_wk mops_mog_php_b_1 ug_trf_1 ug_spduty_1 ug_extax_1 ug_vat_1 if year>=1999
& year<=2004, robust

Linear regression                                      Number of obs =     313
                                                       F(  1,    311) = 3077.93
                                                       Prob > F      =  0.0000
                                                       R-squared     =  0.9050
                                                       Root MSE      =  1.2572

------------------------------------------------------------------------------
             |               Robust
 unleaded_wk |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
mops_mog_p~1 |   1.033821   .0186344    55.48   0.000     .9971554    1.070486
       _cons |   7.653249   .1890629    40.48   0.000     7.281244    8.025253
------------------------------------------------------------------------------
```

iii. Lag 3

```
. reg unleaded_wk mops_mog_php_b_2 ug_trf_2 ug_spduty_2 ug_extax_2 ug_vat_2 if year>=1999
& year<=2004, robust

Linear regression                                      Number of obs =     313
                                                       F(  1,    311) = 3888.61
                                                       Prob > F      =  0.0000
                                                       R-squared     =  0.9189
                                                       Root MSE      =  1.1617

------------------------------------------------------------------------------
             |               Robust
 unleaded_wk |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
mops_mog_p~2 |   1.040561   .0166867    62.36   0.000     1.007728    1.073394
       _cons |   7.625942   .1711163    44.57   0.000      7.28925    7.962634
------------------------------------------------------------------------------
```

iv. Lag 4

```
. reg unleaded_wk mops_mog_php_b_3 ug_trf_3 ug_spduty_3 ug_extax_3 ug_vat_3 if year>=1999
& year<=2004, robust

Linear regression                                      Number of obs =     313
                                                       F(  1,    311) = 5082.13
                                                       Prob > F      =  0.0000
                                                       R-squared     =  0.9308
                                                       Root MSE      =  1.0733

------------------------------------------------------------------------------
             |               Robust
 unleaded_wk |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
mops_mog_p~3 |   1.045991   .0146725    71.29   0.000     1.017121    1.074861
       _cons |   7.612277   .1529927    49.76   0.000     7.311245    7.913308
------------------------------------------------------------------------------
```

v. Lag 5

```
. reg unleaded_wk mops_mog_php_b_4 ug_trf_4 ug_spduty_4 ug_extax_4 ug_vat_4  if
year>=1999 & year<=2004, robust

Linear regression                                      Number of obs =     313
                                                       F(  1,    311) = 6485.96
                                                       Prob > F      =  0.0000
                                                       R-squared     =  0.9398
                                                       Root MSE      =  1.0009

------------------------------------------------------------------------------
             |               Robust
 unleaded_wk |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
mops_mog_p~4 |   1.049129   .0130269    80.54   0.000     1.023497    1.074761
```

```
       _cons |   7.622601   .1380586    55.21   0.000     7.350954    7.894248
------------------------------------------------------------------------------
```

E. *Period 1994 to 1996

i. Lag 1

```
. reg unleaded_wk mops_mog_php_b ug_trf ug_spduty ug_extax ug_vat if year>=1994 &
year<=1996, robust

Linear regression                                      Number of obs =     154
                                                       F(  3,   150) =   93.90
                                                       Prob > F      =  0.0000
                                                       R-squared     =  0.3637
                                                       Root MSE      =  .45503

------------------------------------------------------------------------------
             |               Robust
 unleaded_wk |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
mops_mog_p~b |    .217759   .1733063     1.26   0.211    -.1246779    .5601959
      ug_trf |  -.9204321   .5673669    -1.62   0.107    -2.041495    .2006312
    ug_extax |   42.82872   2.986705    14.34   0.000     36.92727    48.73017
       _cons |   7.640073   .7080986    10.79   0.000     6.240937    9.039209
------------------------------------------------------------------------------
```

ii. Lag 2

```
. reg unleaded_wk mops_mog_php_b_1 ug_trf_1 ug_spduty_1 ug_extax_1 ug_vat_1 if year>=1994
& year<=1996, robust

Linear regression                                      Number of obs =     154
                                                       F(  3,   150) =   83.48
                                                       Prob > F      =  0.0000
                                                       R-squared     =  0.3528
                                                       Root MSE      =   .4589

------------------------------------------------------------------------------
             |               Robust
 unleaded_wk |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
mops_mog_p~1 |    .114121   .1723453     0.66   0.509     -.226417    .4546589
    ug_trf_1 |  -1.400541   .6045459    -2.32   0.022    -2.595066   -.2060153
  ug_extax_1 |   42.96433   3.317237    12.95   0.000     36.40978    49.51887
       _cons |   8.105958   .7177993    11.29   0.000     6.687654    9.524261
------------------------------------------------------------------------------
```

iii. Lag 3

```
. reg unleaded_wk mops_mog_php_b_2 ug_trf_2 ug_spduty_2 ug_extax_2 ug_vat_2 if year>=1994
& year<=1996, robust

Linear regression                                      Number of obs =     154
                                                       F(  3,   150) =   78.70
                                                       Prob > F      =  0.0000
                                                       R-squared     =  0.3478
                                                       Root MSE      =  .46068

------------------------------------------------------------------------------
             |               Robust
 unleaded_wk |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
mops_mog_p~2 |   .0297573   .1688352     0.18   0.860    -.3038451    .3633597
    ug_trf_2 |  -1.828886   .6259389    -2.92   0.004    -3.065682   -.5920897
  ug_extax_2 |   42.95123   3.568638    12.04   0.000     35.89994    50.00252
       _cons |   8.495587   .7134678    11.91   0.000     7.085842    9.905331
------------------------------------------------------------------------------
```

iv. Lag 4

```
. reg unleaded_wk mops_mog_php_b_3 ug_trf_3 ug_spduty_3 ug_extax_3 ug_vat_3 if year>=1994
& year<=1996, robust
note: ug_spduty_3 omitted because of collinearity
note: ug_vat_3 omitted because of collinearity

Linear regression                                      Number of obs =     154
                                                       F(  3,   150) =   77.63
                                                       Prob > F      =  0.0000
                                                       R-squared     =  0.3467
                                                       Root MSE      =  .46106

------------------------------------------------------------------------------
             |               Robust
 unleaded_wk |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
mops_mog_p~3 |  -.0477485   .1714012    -0.28   0.781     -.386421     .290924
    ug_trf_3 |   -2.24171   .6385098    -3.51   0.001    -3.503345   -.9800754
  ug_extax_3 |   42.93028   3.756313    11.43   0.000     35.50816     50.3524
       _cons |    8.85715   .7291413    12.15   0.000     7.416436    10.29786
------------------------------------------------------------------------------
```

v. Lag 5

```
. reg unleaded_wk mops_mog_php_b_4 ug_trf_4 ug_spduty_4 ug_extax_4 ug_vat_4  if
year>=1994 & year<=1996, robust

Linear regression                                      Number of obs =     154
                                                       F(  3,   150) =   73.31
                                                       Prob > F      =  0.0000
                                                       R-squared     =  0.3458
                                                       Root MSE      =  .46138

------------------------------------------------------------------------------
             |               Robust
 unleaded_wk |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
mops_mog_p~4 |  -.1220389   .1725943    -0.71   0.481    -.4630689     .218991
    ug_trf_4 |  -2.690814   .6583283    -4.09   0.000    -3.991609    -1.39002
  ug_extax_4 |   42.25415    4.06001    10.41   0.000     34.23195    50.27634
       _cons |    9.23038    .742146    12.44   0.000      7.76397    10.69679
------------------------------------------------------------------------------
```

2. Δ Unleaded Gasoline Pump Price = f(Δ in MOPS Mogas 95, Δ in taxes), different periods

A. *Period July 2010 to May 2012

i. Lag 0

```
. reg Dunleaded_wk Dmops_mog_php_b Dug_trf Dug_spduty Dug_extax Dug_vat Dbioeth_rq
Dbioeth_rt if year>=2010 & week>=1958,  robust

Linear regression                                      Number of obs =     104
                                                       F(  1,    101) =       .
                                                       Prob > F      =       .
                                                       R-squared     =  0.0649
                                                       Root MSE      =  .80466

------------------------------------------------------------------------------
             |               Robust
Dunleaded_wk |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
Dmops_mog_~b |   .1784498   .0532398     3.35   0.001     .0728363    .2840632
  Dbioeth_rt |   4.706082   1.588131     2.96   0.004     1.555658    7.856507
       _cons |   .0350698   .0797737     0.44   0.661    -.1231797    .1933193
------------------------------------------------------------------------------
```

ii. Lag 1

```
. reg Dunleaded_wk Dmops_mog_php_b_1 Dug_trf_1 Dug_spduty_1 Dug_extax_1 Dug_vat_1
Dbioeth_rq_1 Dbioeth_rt_1 if year>=2010 & week>=1958, robust

Linear regression                                      Number of obs =     104
                                                       F(  1,    101) =       .
                                                       Prob > F      =       .
                                                       R-squared     =  0.4352
                                                       Root MSE      =  .62533

------------------------------------------------------------------------------
             |               Robust
Dunleaded_wk |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
Dmops_mog_~1 |   .4639865   .1647475     2.82   0.006     .1371718    .7908012
Dbioeth_rt_1 |   7.184789   1.208523     5.95   0.000     4.787405    9.582173
       _cons |   .0294468     .06257     0.47   0.639    -.0946753    .1535688
------------------------------------------------------------------------------
```

iii. Lag 2

```
. reg Dunleaded_wk Dmops_mog_php_b_2 Dug_trf_2 Dug_spduty_2 Dug_extax_2 Dug_vat_2
Dbioeth_rq_2 Dbioeth_rt_2 if year>=2010 & week>=1958, robust

Linear regression                                      Number of obs =     104
                                                       F(  1,    101) =       .
                                                       Prob > F      =       .
                                                       R-squared     =  0.0373
                                                       Root MSE      =  .81642

------------------------------------------------------------------------------
             |               Robust
Dunleaded_wk |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
Dmops_mog_~2 |   .1293708   .0921009     1.40   0.163    -.0533326    .3120741
Dbioeth_rt_2 |   11.29999   1.593653     7.09   0.000     8.138612    14.46137
       _cons |   .0310233   .0817132     0.38   0.705    -.1310737    .1931204
------------------------------------------------------------------------------
```

iv. Lag 3

```
. reg Dunleaded_wk Dmops_mog_php_b_3 Dug_trf_3 Dug_spduty_3 Dug_extax_3 Dug_vat_3
Dbioeth_rq_3 Dbioeth_rt_3 if year>=2010 & week>=1958, robust

Linear regression                                      Number of obs =     104
                                                       F(  1,    101) =       .
```

```
                                                       Prob > F      =       .
                                                       R-squared     =  0.0112
                                                       Root MSE      =  .82742

------------------------------------------------------------------------------
             |               Robust
Dunleaded_wk |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
Dmops_mog_~3 |   .0554568   .0541488     1.02   0.308    -.0519599    .1628735
Dbioeth_rt_3 |   12.12133   1.630883     7.43   0.000       8.8861    15.35657
       _cons |    .032023   .0826429     0.39   0.699    -.1319182    .1959642
------------------------------------------------------------------------------
```

v. Lag 4

```
. reg Dunleaded_wk Dmops_mog_php_b_4 Dug_trf_4 Dug_spduty_4 Dug_extax_4 Dug_vat_4
Dbioeth_rq_4 Dbioeth_rt_4 if year>=2010 & week>=1958, robust

Linear regression                                      Number of obs =     104
                                                       F(  1,   101) =       .
                                                       Prob > F      =       .
                                                       R-squared     =  0.0075
                                                       Root MSE      =  .82898

------------------------------------------------------------------------------
             |               Robust
Dunleaded_wk |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
Dmops_mog_~4 |     .00262   .0536431     0.05   0.961    -.1037934    .1090334
Dbioeth_rt_4 |  -14.52907   1.639889    -8.86   0.000    -17.78216   -11.27597
       _cons |   .0476583   .0826623     0.58   0.566    -.1163215    .2116382
------------------------------------------------------------------------------
```

B. *Period 2008 to June 2010

i. Lag 0

```
. reg Dunleaded_wk Dmops_mog_php_b Dug_trf Dug_spduty Dug_extax Dug_vat Dbioeth_rq
Dbioeth_rt if year>=2008 & week<1958, robust

Linear regression                                      Number of obs =     130
                                                       F(  2,   126) =       .
                                                       Prob > F      =       .
                                                       R-squared     =  0.1016
                                                       Root MSE      =  .97563

------------------------------------------------------------------------------
             |               Robust
Dunleaded_wk |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
Dmops_mog_~b |    .259512   .0794231     3.27   0.001      .102336     .416688
     Dug_trf |  -19.75729   11.09707    -1.78   0.077    -41.71806    2.203474
  Dbioeth_rq |  -.5805435   .2008944    -2.89   0.005    -.9781076   -.1829793
       _cons |    .002926   .0865029     0.03   0.973    -.1682606    .1741126
------------------------------------------------------------------------------
```

ii. Lag 1

```
. reg Dunleaded_wk Dmops_mog_php_b_1 Dug_trf_1 Dug_spduty_1 Dug_extax_1 Dug_vat_1
Dbioeth_rq_1 Dbioeth_rt_1 if year>=2008 & week<1958, robust

Linear regression                                      Number of obs =     130
                                                       F(  2,   126) =       .
                                                       Prob > F      =       .
                                                       R-squared     =  0.3280
                                                       Root MSE      =  .84381

------------------------------------------------------------------------------
             |               Robust
Dunleaded_wk |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
```

```
-------------+----------------------------------------------------------------
Dmops_mog_~1 |   .4908197   .0710204     6.91   0.000     .3502725     .631367
   Dug_trf_1 |  -11.66288   9.122969    -1.28   0.203    -29.71697    6.391207
Dbioeth_rq_1 |  -1.606942   .1869642    -8.59   0.000    -1.976939   -1.236946
       _cons |   .0144839   .0752077     0.19   0.848      -.13435    .1633178
------------------------------------------------------------------------------
```

iii. Lag 2

```
. reg Dunleaded_wk Dmops_mog_php_b_2 Dug_trf_2 Dug_spduty_2 Dug_extax_2 Dug_vat_2
Dbioeth_rq_2 Dbioeth_rt_2 if year>=2008 & week<1958, robust

Linear regression                                      Number of obs =     130
                                                       F(  2,   126) =       .
                                                       Prob > F      =       .
                                                       R-squared     =  0.1582
                                                       Root MSE      =  .94437

------------------------------------------------------------------------------
             |               Robust
Dunleaded_wk |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
Dmops_mog_~2 |    .337079   .0740001     4.56   0.000     .1906349    .4835231
   Dug_trf_2 |  -12.43461   11.32499    -1.10   0.274    -34.84643    9.977206
Dbioeth_rq_2 |  -.6084793   .1924666    -3.16   0.002     -.989365   -.2275935
       _cons |    .001071   .0838788     0.01   0.990    -.1649226    .1670647
------------------------------------------------------------------------------
```

iv. Lag 3

```
. reg Dunleaded_wk Dmops_mog_php_b_3 Dug_trf_3 Dug_spduty_3 Dug_extax_3 Dug_vat_3
Dbioeth_rq_3 Dbioeth_rt_3 if year>=2008 & week<1958, robust

Linear regression                                      Number of obs =     130
                                                       F(  2,   126) =       .
                                                       Prob > F      =       .
                                                       R-squared     =  0.1283
                                                       Root MSE      =  .96101

------------------------------------------------------------------------------
             |               Robust
Dunleaded_wk |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
Dmops_mog_~3 |   .2685222   .0763084     3.52   0.001     .1175101    .4195344
   Dug_trf_3 |  -21.88374   26.51432    -0.83   0.411     -74.3548    30.58732
Dbioeth_rq_3 |   .9500042   .1893449     5.02   0.000     .5752962    1.324712
       _cons |  -.0119633   .0852589    -0.14   0.889    -.1806882    .1567616
```

v. Lag 4

```
. reg Dunleaded_wk Dmops_mog_php_b_4 Dug_trf_4 Dug_spduty_4 Dug_extax_4 Dug_vat_4
Dbioeth_rq_4 Dbioeth_rt_4 if year>=2008 & week<1958, robust

Linear regression                                      Number of obs =     130
                                                       F(  2,   126) =       .
                                                       Prob > F      =       .
                                                       R-squared     =  0.1719
                                                       Root MSE      =  .93665

------------------------------------------------------------------------------
             |               Robust
Dunleaded_wk |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
Dmops_mog_~4 |   .2259904   .0661242     3.42   0.001     .0951325    .3568483
   Dug_trf_4 |  -42.48033   31.68553    -1.34   0.182    -105.1851    20.22442
Dbioeth_rq_4 |  -3.407571   .1633967   -20.85   0.000    -3.730929   -3.084214
       _cons |   .0159969   .0835815     0.19   0.849    -.1494085    .1814023
------------------------------------------------------------------------------
```

C. *Period 2005 to 2007

i. Lag 0

```
. reg Dunleaded_wk Dmops_mog_php_b Dug_trf Dug_spduty Dug_extax Dug_vat if year>=2005 &
year<=2007, robust

Linear regression                                      Number of obs =     157
                                                       F(  3,   153) =    7.35
                                                       Prob > F      =  0.0001
                                                       R-squared     =  0.0224
                                                       Root MSE      =  .39582

------------------------------------------------------------------------------
             |               Robust
Dunleaded_wk |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
Dmops_mog_~b |   .0447871   .0308168     1.45   0.148    -.0160943    .1056684
     Dug_trf |   -8.87416   5.560779    -1.60   0.113    -19.85998    2.111661
     Dug_vat |  -3.647189   1.025763    -3.56   0.001    -5.673677   -1.620702
       _cons |   .1062833   .0329038     3.23   0.002     .0412789    .1712876
------------------------------------------------------------------------------
```

ii. Lag 1

```
. reg Dunleaded_wk Dmops_mog_php_b_1 Dug_trf_1 Dug_spduty_1 Dug_extax_1 Dug_vat_1 if
year>=2005 & year<=2007, robust

Linear regression                                      Number of obs =     157
                                                       F(  3,   153) =   17.17
                                                       Prob > F      =  0.0000
                                                       R-squared     =  0.0676
                                                       Root MSE      =  .38656

------------------------------------------------------------------------------
             |               Robust
Dunleaded_wk |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
Dmops_mog_~1 |   .0680852   .0387689     1.76   0.081    -.0085064    .1446767
   Dug_trf_1 |  -15.53637   6.640137    -2.34   0.021    -28.65456   -2.418177
   Dug_vat_1 |   -7.71153   1.350042    -5.71   0.000    -10.37866   -5.044401
       _cons |   .1081294   .0326457     3.31   0.001     .0436349     .172624
------------------------------------------------------------------------------
```

iii. Lag 2

```
. reg Dunleaded_wk Dmops_mog_php_b_2 Dug_trf_2 Dug_spduty_2 Dug_extax_2 Dug_vat_2 if
year>=2005 & year<=2007, robust

Linear regression                                      Number of obs =     157
                                                       F(  3,   153) =  174.60
                                                       Prob > F      =  0.0000
                                                       R-squared     =  0.1286
                                                       Root MSE      =  .37369

------------------------------------------------------------------------------
             |               Robust
Dunleaded_wk |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
Dmops_mog_~2 |   .1245659    .038094     3.27   0.001     .0493078     .199824
   Dug_trf_2 |  -17.89637   7.170455    -2.50   0.014    -32.06225   -3.730487
   Dug_vat_2 |  -6.226394   .5004806   -12.44   0.000    -7.215138   -5.237649
       _cons |   .1037252   .0310979     3.34   0.001     .0422885    .1651618
------------------------------------------------------------------------------
```

iv. Lag 3

```
. reg Dunleaded_wk Dmops_mog_php_b_3 Dug_trf_3 Dug_spduty_3 Dug_extax_3 Dug_vat_3 if
year>=2005 & year<=2007, robust

Linear regression                                      Number of obs =     157
                                                       F(  3,   153) =   12.36
                                                       Prob > F      =  0.0000
```

```
                                                       R-squared     =  0.0929
                                                       Root MSE      =  .38127

------------------------------------------------------------------------------
             |               Robust
Dunleaded_wk |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
Dmops_mog_~3 |   .1174244   .0350348     3.35   0.001     .0482099    .1866389
   Dug_trf_3 |  -9.619264   4.537937    -2.12   0.036    -18.58437   -.6541601
   Dug_vat_3 |  -3.225956   .9237699    -3.49   0.001    -5.050947   -1.400965
       _cons |    .101914   .0312066     3.27   0.001     .0402626    .1635654
------------------------------------------------------------------------------
```

v. Lag 4

```
. reg Dunleaded_wk Dmops_mog_php_b_4 Dug_trf_4 Dug_spduty_4 Dug_extax_4 Dug_vat_4  if
year>=2005 & year<=2007, robust

Linear regression                                      Number of obs =     157
                                                       F(  3,   153) =   18.69
                                                       Prob > F      =  0.0000
                                                       R-squared     =  0.1380
                                                       Root MSE      =  .37167

------------------------------------------------------------------------------
             |               Robust
Dunleaded_wk |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
Dmops_mog_~4 |   .1488993    .029745     5.01   0.000     .0901354    .2076633
   Dug_trf_4 |   4.704651   3.369897     1.40   0.165    -1.952883    11.36219
   Dug_vat_4 |  -.2686977    .455882    -0.59   0.556    -1.169334    .6319383
       _cons |   .0999118    .030495     3.28   0.001     .0396661    .1601574
------------------------------------------------------------------------------
```

D. *Period 1999 to 2004

i. Lag 0

```
. reg Dunleaded_wk Dmops_mog_php_b Dug_trf Dug_spduty Dug_extax Dug_vat if year>=1999 &
year<=2004, robust

Linear regression                                      Number of obs =     313
                                                       F(  1,   311) =    0.32
                                                       Prob > F      =  0.5728
                                                       R-squared     =  0.0015
                                                       Root MSE      =  .18096

------------------------------------------------------------------------------
             |               Robust
Dunleaded_wk |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
Dmops_mog_~b |  -.0135726   .0240396    -0.56   0.573    -.0608735    .0337282
       _cons |   .0524769    .010381     5.06   0.000     .0320509    .0729028
------------------------------------------------------------------------------
```

ii. Lag 1

```
. reg Dunleaded_wk Dmops_mog_php_b_1 Dug_trf_1 Dug_spduty_1 Dug_extax_1 Dug_vat_1 if
year>=1999 & year<=2004, robust

Linear regression                                      Number of obs =     313
                                                       F(  1,   311) =    3.69
                                                       Prob > F      =  0.0556
                                                       R-squared     =  0.0116
                                                       Root MSE      =  .18004

------------------------------------------------------------------------------
             |               Robust
Dunleaded_wk |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
```

```
Dmops_mog_~1 |   .0382875   .0199295     1.92   0.056    -.0009262    .0775013
       _cons |   .0504729   .0100239     5.04   0.000     .0307498    .0701961
------------------------------------------------------------------------------
```

iii. Lag 2

```
. reg Dunleaded_wk Dmops_mog_php_b_2 Dug_trf_2 Dug_spduty_2 Dug_extax_2 Dug_vat_2 if
year>=1999 & year<=2004, robust

Linear regression                                      Number of obs =     313
                                                       F(  1,   311) =    9.04
                                                       Prob > F      =  0.0029
                                                       R-squared     =  0.0339
                                                       Root MSE      =    .178

------------------------------------------------------------------------------
             |               Robust
Dunleaded_wk |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
Dmops_mog_~2 |   .0654204   .0217623     3.01   0.003     .0226004    .1082403
       _cons |   .0494126   .0101438     4.87   0.000     .0294533    .0693718
------------------------------------------------------------------------------
```

iv. Lag 3

```
. reg Dunleaded_wk Dmops_mog_php_b_3 Dug_trf_3 Dug_spduty_3 Dug_extax_3 Dug_vat_3 if
year>=1999 & year<=2004, robust

Linear regression                                      Number of obs =     313
                                                       F(  1,   311) =   19.61
                                                       Prob > F      =  0.0000
                                                       R-squared     =  0.0660
                                                       Root MSE      =  .17502

------------------------------------------------------------------------------
             |               Robust
Dunleaded_wk |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
Dmops_mog_~3 |   .0912716   .0206088     4.43   0.000     .0507213    .1318219
       _cons |   .0483391   .0097941     4.94   0.000     .0290682    .0676101
------------------------------------------------------------------------------
```

v. Lag 4

```
. reg Dunleaded_wk Dmops_mog_php_b_4 Dug_trf_4 Dug_spduty_4 Dug_extax_4 Dug_vat_4  if
year>=1999 & year<=2004, robust

Linear regression                                      Number of obs =     313
                                                       F(  1,   311) =   18.71
                                                       Prob > F      =  0.0000
                                                       R-squared     =  0.0626
                                                       Root MSE      =  .17533

------------------------------------------------------------------------------
             |               Robust
Dunleaded_wk |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
Dmops_mog_~4 |   .0923222   .0213441     4.33   0.000     .0503251    .1343193
       _cons |   .0475961   .0099125     4.80   0.000     .0280921    .0671001
------------------------------------------------------------------------------
```

E. *Period 1994 to 1996

i. Lag 0

```
. reg Dunleaded_wk Dmops_mog_php_b Dug_trf Dug_spduty Dug_extax Dug_vat if year>=1994 &
year<=1996, robust

Linear regression                                      Number of obs =     153
                                                       F(  1,   149) =       .
                                                       Prob > F      =       .
                                                       R-squared     =  0.0098
```

```
                                                       Root MSE      =  .13741

------------------------------------------------------------------------------
             |               Robust
Dunleaded_wk |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
Dmops_mog_~b |  -.0445546   .1204164    -0.37   0.712     -.282499    .1933897
     Dug_trf |  -.0044158   .1287271    -0.03   0.973    -.2587822    .2499506
   Dug_extax |   8.139278   .6054163    13.44   0.000     6.942968    9.335589
       _cons |  -.0059704   .0110195    -0.54   0.589    -.0277451    .0158042
------------------------------------------------------------------------------
```

ii. Lag 1

```
. reg Dunleaded_wk Dmops_mog_php_b_1 Dug_trf_1 Dug_spduty_1 Dug_extax_1 Dug_vat_1 if
year>=1994 & year<=1996, robust

Linear regression                                      Number of obs =     153
                                                       F(  1,   149) =       .
                                                       Prob > F      =       .
                                                       R-squared     =  0.0073
                                                       Root MSE      =  .13759

------------------------------------------------------------------------------
             |               Robust
Dunleaded_wk |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
Dmops_mog_~1 |   -.084546   .0809231    -1.04   0.298    -.2444511    .0753591
   Dug_trf_1 |   .0421484   .0830447     0.51   0.613    -.1219491    .2062458
Dug_extax_1 |   .2726769   .6045122     0.45   0.653    -.9218473    1.467201
       _cons |  -.0047607   .0109591    -0.43   0.665    -.0264161    .0168946
------------------------------------------------------------------------------
```

iii. Lag 2

```
. reg Dunleaded_wk Dmops_mog_php_b_2 Dug_trf_2 Dug_spduty_2 Dug_extax_2 Dug_vat_2 if
year>=1994 & year<=1996, robust

Linear regression                                      Number of obs =     153
                                                       F(  1,   149) =       .
                                                       Prob > F      =       .
                                                       R-squared     =  0.0005
                                                       Root MSE      =  .13806

------------------------------------------------------------------------------
             |               Robust
Dunleaded_wk |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
Dmops_mog_~2 |  -.0226281   .0534876    -0.42   0.673    -.1283203    .0830641
   Dug_trf_2 |  -.0193473   .1217631    -0.16   0.874    -.2599528    .2212582
Dug_extax_2 |   .2905558   .6251656     0.46   0.643    -.9447796    1.525891
       _cons |  -.0052558   .0115138    -0.46   0.649    -.0280072    .0174955
------------------------------------------------------------------------------
```

iv. Lag 3

```
. reg Dunleaded_wk Dmops_mog_php_b_3 Dug_trf_3 Dug_spduty_3 Dug_extax_3 Dug_vat_3 if
year>=1994 & year<=1996, robust

Linear regression                                      Number of obs =     153
                                                       F(  1,   149) =       .
                                                       Prob > F      =       .
                                                       R-squared     =  0.0048
                                                       Root MSE      =  .13776

------------------------------------------------------------------------------
             |               Robust
Dunleaded_wk |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
Dmops_mog_~3 |  -.0165343   .0271324    -0.61   0.543    -.0701483    .0370798
   Dug_trf_3 |  -.0307484   .0750974    -0.41   0.683    -.1791418     .117645
```

```
Dug_extax_3 |   6.185091    .611924    10.11   0.000     4.975921    7.394261
      _cons |  -.0059999   .0111579    -0.54   0.592    -.0280481    .0160483
------------------------------------------------------------------------------
```

v. Lag 4

```
. reg Dunleaded_wk Dmops_mog_php_b_4 Dug_trf_4 Dug_spduty_4 Dug_extax_4 Dug_vat_4  if
year>=1994 & year<=1996, robust

Linear regression                                      Number of obs =     153
                                                       F(  1,   149) =       .
                                                       Prob > F      =       .
                                                       R-squared     =  0.0082
                                                       Root MSE      =  .13753

------------------------------------------------------------------------------
             |               Robust
Dunleaded_wk |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
Dmops_mog_~4 |   .0187095   .0261463     0.72   0.475    -.0329558    .0703749
   Dug_trf_4 |  -.0677142   .0909001    -0.74   0.457    -.2473339    .1119056
Dug_extax_4 |   8.160853   .6158087    13.25   0.000     6.944007    9.377699
       _cons |  -.0065368   .0112716    -0.58   0.563    -.0288097    .0157361
------------------------------------------------------------------------------
```

3. Diesel Pump Price = f(MOPS Diesel, taxes), different periods

A. *Period July 2010 to June 2012

i. Lag 0

```
. reg diesel_wk mops_dies_php_b dl_trf dl_spduty dl_extax dl_vat if year>=2010 &
week>=1958, robust

Linear regression                                      Number of obs =     104
                                                       F(  1,   102) =  852.41
                                                       Prob > F      =  0.0000
                                                       R-squared     =  0.9478
                                                       Root MSE      =  1.1882

------------------------------------------------------------------------------
             |               Robust
   diesel_wk |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
mops_dies_~b |   1.156939   .0396265    29.20   0.000      1.07834    1.235538
       _cons |   4.821299   1.331295     3.62   0.000     2.180682    7.461915
------------------------------------------------------------------------------
```

ii. Lag 1

```
. reg diesel_wk mops_dies_php_b_1 dl_trf_1 dl_spduty_1 dl_extax_1 dl_vat_1 if year>=2010
& week>=1958, robust

Linear regression                                      Number of obs =     104
                                                       F(  1,   102) =  933.30
                                                       Prob > F      =  0.0000
                                                       R-squared     =  0.9761
                                                       Root MSE      =  .80375

------------------------------------------------------------------------------
             |               Robust
   diesel_wk |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
mops_dies_~1 |    1.16181   .0380298    30.55   0.000     1.086378    1.237242
       _cons |   4.709304   1.288034     3.66   0.000     2.154494    7.264113
------------------------------------------------------------------------------
```

iii. Lag 2

```
. reg diesel_wk mops_dies_php_b_2 dl_trf_2 dl_spduty_2 dl_extax_2 dl_vat_2 if year>=2010
& week>=1958, robust

Linear regression                                      Number of obs =     104
                                                       F(  1,   102) =  643.84
                                                       Prob > F      =  0.0000
                                                       R-squared     =  0.9520
                                                       Root MSE      =  1.1384

------------------------------------------------------------------------------
             |               Robust
   diesel_wk |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
mops_dies_~2 |   1.137668   .0448359    25.37   0.000     1.048736      1.2266
       _cons |   5.528958   1.505552     3.67   0.000     2.542703    8.515212
------------------------------------------------------------------------------
```

iv. Lag 3

```
. reg diesel_wk mops_dies_php_b_3 dl_trf_3 dl_spduty_3 dl_extax_3 dl_vat_3 if year>=2010
& week>=1958, robust

Linear regression                                      Number of obs =     104
                                                       F(  1,   102) =  543.18
                                                       Prob > F      =  0.0000
                                                       R-squared     =  0.9148
                                                       Root MSE      =  1.5174
```

```
------------------------------------------------------------------------------
             |               Robust
   diesel_wk |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
mops_dies_~3 |   1.103959   .0473675    23.31   0.000     1.010006    1.197912
       _cons |   6.669098   1.567962     4.25   0.000     3.559054    9.779143
------------------------------------------------------------------------------
```

v. Lag 4

```
. reg diesel_wk mops_dies_php_b_4 dl_trf_4 dl_spduty_4 dl_extax_4 dl_vat_4  if year>=2010
& week>=1958, robust

Linear regression                                      Number of obs =     104
                                                       F(  1,   102) =  451.34
                                                       Prob > F      =  0.0000
                                                       R-squared     =  0.8768
                                                       Root MSE      =  1.8245

------------------------------------------------------------------------------
             |               Robust
   diesel_wk |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
mops_dies_~4 |    1.06665   .0502074    21.24   0.000     .9670636    1.166236
       _cons |   7.935104   1.645664     4.82   0.000     4.670937    11.19927
------------------------------------------------------------------------------

.
```

B. *Period 2008 to June 2010

i. Lag 0

```
. reg diesel_wk mops_dies_php_b dl_trf dl_spduty dl_extax dl_vat biodies_rq biodies_rt if
year>=2008 & week<1958, robust

Linear regression                                      Number of obs =     130
                                                       F(  3,   126) =  160.12
                                                       Prob > F      =  0.0000
                                                       R-squared     =  0.8607
                                                       Root MSE      =  3.3326

------------------------------------------------------------------------------
             |               Robust
   diesel_wk |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
mops_dies_~b |   .3700629   .0566089     6.54   0.000     .2580356    .4820903
      dl_trf |  -181.6075   21.01173    -8.64   0.000    -223.1891   -140.0259
  biodies_rt |  -860.3901   76.51057   -11.25   0.000    -1011.802   -708.9779
       _cons |   42.57414   2.781508    15.31   0.000     37.06962    48.07866
------------------------------------------------------------------------------
```

ii. Lag 1

```
. reg diesel_wk mops_dies_php_b_1 dl_trf_1 dl_spduty_1 dl_extax_1 dl_vat_1 biodies_rq_1
biodies_rt_1 if year>=2008 & week<1958, robust

Linear regression                                      Number of obs =     130
                                                       F(  3,   126) =  212.18
                                                       Prob > F      =  0.0000
                                                       R-squared     =  0.8929
                                                       Root MSE      =  2.9225

------------------------------------------------------------------------------
             |               Robust
   diesel_wk |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
mops_dies_~1 |    .476181   .0507973     9.37   0.000     .3756547    .5767074
    dl_trf_1 |  -160.5417   18.71214    -8.58   0.000    -197.5724   -123.5109
biodies_rt_1 |  -740.8169   64.94833   -11.41   0.000    -869.3478   -612.2861
```

```
       _cons |   37.39584   2.421545    15.44   0.000     32.60367      42.188
------------------------------------------------------------------------------
```

iii. Lag 2

```
. reg diesel_wk mops_dies_php_b_2 dl_trf_2 dl_spduty_2 dl_extax_2 dl_vat_2 biodies_rq_2
biodies_rt_2 if year>=2008 & week<1958, robust

Linear regression                                      Number of obs =     130
                                                       F(  3,   126) =  301.17
                                                       Prob > F      =  0.0000
                                                       R-squared     =  0.9209
                                                       Root MSE      =  2.5116

------------------------------------------------------------------------------
             |               Robust
   diesel_wk |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
mops_dies_~2 |   .5625597   .0427268    13.17   0.000     .4780046    .6471148
    dl_trf_2 |  -142.5878   16.57231    -8.60   0.000    -175.3839   -109.7917
biodies_rt_2 |  -640.3797   53.21759   -12.03   0.000    -745.6957   -535.0636
       _cons |   33.11458   1.999197    16.56   0.000     29.15823    37.07093
------------------------------------------------------------------------------
```

iv. Lag 3

```
. reg diesel_wk mops_dies_php_b_3 dl_trf_3 dl_spduty_3 dl_extax_3 dl_vat_3 biodies_rq_3
biodies_rt_3 if year>=2008 & week <1958, robust

Linear regression                                      Number of obs =     130
                                                       F(  3,   126) =  455.95
                                                       Prob > F      =  0.0000
                                                       R-squared     =  0.9423
                                                       Root MSE      =  2.1446

------------------------------------------------------------------------------
             |               Robust
   diesel_wk |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
mops_dies_~3 |   .6346066   .0344669    18.41   0.000     .5663976    .7028156
    dl_trf_3 |   -126.244   14.85566    -8.50   0.000    -155.6429   -96.84512
biodies_rt_3 |  -552.9188   43.18187   -12.80   0.000    -638.3745   -467.4632
       _cons |    29.4582   1.599734    18.41   0.000     26.29238    32.62403
------------------------------------------------------------------------------
```

v. Lag 4

```
. reg diesel_wk mops_dies_php_b_4 dl_trf_4 dl_spduty_4 dl_extax_4 dl_vat_4 biodies_rq_4
biodies_rt_4 if year>=2008 & week<1958, robust

Linear regression                                      Number of obs =     130
                                                       F(  3,   126) =  710.26
                                                       Prob > F      =  0.0000
                                                       R-squared     =  0.9560
                                                       Root MSE      =  1.8727

------------------------------------------------------------------------------
             |               Robust
   diesel_wk |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
mops_dies_~4 |   .6959761   .0276602    25.16   0.000     .6412374    .7507148
    dl_trf_4 |  -109.4237   13.56413    -8.07   0.000    -136.2667   -82.58068
biodies_rt_4 |  -477.1439   36.72955   -12.99   0.000    -549.8306   -404.4571
       _cons |   26.26914   1.308032    20.08   0.000     23.68058    28.85769
------------------------------------------------------------------------------
```

C. *Period 2005 to 2007

i. Lag 0

```
. reg diesel_wk mops_dies_php_b dl_trf dl_spduty dl_extax dl_vat biodies_rq biodies_rt if
year>=2005 & year<=2007, robust

Linear regression                                      Number of obs =     157
                                                       F(  5,    151) =  307.29
                                                       Prob > F      =  0.0000
                                                       R-squared     =  0.9193
                                                       Root MSE      =  1.0767

------------------------------------------------------------------------------
             |               Robust
   diesel_wk |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
mops_dies_~b |   .4536132   .0481652     9.42   0.000     .3584484     .548778
      dl_trf |  -152.9522   24.71814    -6.19   0.000    -201.7903   -104.1141
    dl_extax |   326.6481   91.50998     3.57   0.000     145.8427    507.4534
      dl_vat |   72.81025   12.36168     5.89   0.000     48.38605    97.23445
  biodies_rq |   1.289195   .2231291     5.78   0.000     .8483368    1.730053
       _cons |   18.30337   2.095659     8.73   0.000     14.16277    22.44397
------------------------------------------------------------------------------
```

ii. Lag 1

```
. reg diesel_wk mops_dies_php_b_1 dl_trf_1 dl_spduty_1 dl_extax_1 dl_vat_1 biodies_rq_1
biodies_rt_1 if year>=2005 & year<=2007, robust

Linear regression                                      Number of obs =     157
                                                       F(  5,    151) =  380.22
                                                       Prob > F      =  0.0000
                                                       R-squared     =  0.9305
                                                       Root MSE      =  .99919

------------------------------------------------------------------------------
             |               Robust
   diesel_wk |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
mops_dies_~1 |   .5294552   .0459168    11.53   0.000     .4387328    .6201776
    dl_trf_1 |  -124.5853   22.76694    -5.47   0.000    -169.5682   -79.60237
  dl_extax_1 |   304.8131    78.5716     3.88   0.000     149.5714    460.0548
    dl_vat_1 |   71.23915   10.59557     6.72   0.000     50.30445    92.17386
biodies_rq_1 |   1.170574   .2038597     5.74   0.000     .7677887     1.57336
       _cons |   15.84278   1.869186     8.48   0.000     12.14965    19.53592
------------------------------------------------------------------------------
```

iii. Lag 2

```
. reg diesel_wk mops_dies_php_b_2 dl_trf_2 dl_spduty_2 dl_extax_2 dl_vat_2 biodies_rq_2
biodies_rt_2 if year>=2005 & year<=2007, robust

Linear regression                                      Number of obs =     157
                                                       F(  5,    151) =  468.20
                                                       Prob > F      =  0.0000
                                                       R-squared     =  0.9403
                                                       Root MSE      =  .92551

------------------------------------------------------------------------------
             |               Robust
   diesel_wk |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
mops_dies_~2 |    .595387   .0429843    13.85   0.000     .5104587    .6803153
    dl_trf_2 |  -95.12651   20.80742    -4.57   0.000    -136.2378   -54.01523
  dl_extax_2 |   256.3949   74.65739     3.43   0.001     108.8869    403.9029
    dl_vat_2 |   66.33325   10.08109     6.58   0.000     46.41505    86.25145
biodies_rq_2 |   1.090219   .1795144     6.07   0.000     .7355345    1.444903
       _cons |   13.99331   1.724412     8.11   0.000     10.58622     17.4004
------------------------------------------------------------------------------
```

iv. Lag 3

```
. reg diesel_wk mops_dies_php_b_3 dl_trf_3 dl_spduty_3 dl_extax_3 dl_vat_3 biodies_rq_3
biodies_rt_3 if year>=2005 & year<=2007, robust
```

```
Linear regression                                      Number of obs =     157
                                                       F(  5,   151) =  522.85
                                                       Prob > F      =  0.0000
                                                       R-squared     =  0.9480
                                                       Root MSE      =  .86448

------------------------------------------------------------------------------
             |               Robust
   diesel_wk |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
mops_dies_~3 |   .6447169   .0396543    16.26   0.000     .5663679    .7230659
    dl_trf_3 |   -67.2237   18.67718    -3.60   0.000    -104.1261   -30.32135
  dl_extax_3 |   207.9247   68.12606     3.05   0.003     73.32132    342.5281
    dl_vat_3 |   61.38528   9.269781     6.62   0.000     43.07005     79.7005
biodies_rq_3 |   1.041579   .1600165     6.51   0.000     .7254186     1.35774
       _cons |   12.60958   1.547412     8.15   0.000     9.552202    15.66695
------------------------------------------------------------------------------
```

v. Lag 4

```
. reg diesel_wk mops_dies_php_b_4 dl_trf_4 dl_spduty_4 dl_extax_4 dl_vat_4 biodies_rq_4
biodies_rt_4 if year>=2005 & year > <=2007, robust

Linear regression                                      Number of obs =     157
                                                       F(  5,   151) =  535.24
                                                       Prob > F      =  0.0000
                                                       R-squared     =  0.9530
                                                       Root MSE      =  .82146

------------------------------------------------------------------------------
             |               Robust
   diesel_wk |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
mops_dies_~4 |   .6741997   .0356752    18.90   0.000     .6037127    .7446867
    dl_trf_4 |  -44.03225   16.96142    -2.60   0.010    -77.54462   -10.51989
  dl_extax_4 |   179.7919   58.56278     3.07   0.003     64.08366    295.5002
    dl_vat_4 |   58.86475   8.028025     7.33   0.000     43.00298    74.72651
biodies_rq_4 |   1.001745   .1497183     6.69   0.000     .7059316    1.297558
       _cons |      11.57   1.347705     8.58   0.000     8.907205     14.2328
------------------------------------------------------------------------------
```

D. *Period 1999 to 2004

i. Lag 0

```
. reg diesel_wk mops_dies_php_b dl_trf dl_spduty dl_extax dl_vat if year>=1999 &
year<=2004, robust

Linear regression                                      Number of obs =     313
                                                       F(  1,   311) = 3540.49
                                                       Prob > F      =  0.0000
                                                       R-squared     =  0.9093
                                                       Root MSE      =  1.0852

------------------------------------------------------------------------------
             |               Robust
   diesel_wk |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
mops_dies_~b |    .878227   .0147596    59.50   0.000     .8491856    .9072683
       _cons |   5.366726   .1553662    34.54   0.000     5.061024    5.672428
------------------------------------------------------------------------------
```

ii. Lag 1

```
. reg diesel_wk mops_dies_php_b_1 dl_trf_1 dl_spduty_1 dl_extax_1 dl_vat_1 if year>=1999
& year<=2004, robust

Linear regression                                      Number of obs =     313
                                                       F(  1,   311) = 4485.79
                                                       Prob > F      =  0.0000
```

```
                                                       R-squared     =  0.9205
                                                       Root MSE      =  1.0161

------------------------------------------------------------------------------
             |               Robust
   diesel_wk |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
mops_dies_~1 |   .8844744   .0132058    66.98   0.000     .8584903    .9104585
       _cons |   5.343761    .141864    37.67   0.000     5.064627    5.622896
------------------------------------------------------------------------------
```

iii. Lag 2

```
. reg diesel_wk mops_dies_php_b_2 dl_trf_2 dl_spduty_2 dl_extax_2 dl_vat_2 if year>=1999
& year<=2004, robust

Linear regression                                      Number of obs =     313
                                                       F(  1,    311) = 5365.18
                                                       Prob > F      =  0.0000
                                                       R-squared     =  0.9288
                                                       Root MSE      =  .96204

------------------------------------------------------------------------------
             |               Robust
   diesel_wk |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
mops_dies_~2 |   .8918334   .0121756    73.25   0.000     .8678764    .9157904
       _cons |   5.315752    .131208    40.51   0.000     5.057584     5.57392
------------------------------------------------------------------------------
```

iv. Lag 3

```
. reg diesel_wk mops_dies_php_b_3 dl_trf_3 dl_spduty_3 dl_extax_3 dl_vat_3 if year>=1999
& year<=2004, robust

Linear regression                                      Number of obs =     313
                                                       F(  1,    311) = 6463.14
                                                       Prob > F      =  0.0000
                                                       R-squared     =  0.9357
                                                       Root MSE      =  .91426

------------------------------------------------------------------------------
             |               Robust
   diesel_wk |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
mops_dies_~3 |    .898151   .0111719    80.39   0.000     .8761689    .9201331
       _cons |   5.297259   .1213538    43.65   0.000     5.058481    5.536037
------------------------------------------------------------------------------
```

v. Lag 4

```
. reg diesel_wk mops_dies_php_b_4 dl_trf_4 dl_spduty_4 dl_extax_4 dl_vat_4  if year>=1999
& year<=2004, robust

Linear regression                                      Number of obs =     313
                                                       F(  1,    311) = 7747.73
                                                       Prob > F      =  0.0000
                                                       R-squared     =  0.9409
                                                       Root MSE      =  .87653

------------------------------------------------------------------------------
             |               Robust
   diesel_wk |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
mops_dies_~4 |   .9021975   .0102498    88.02   0.000     .8820298    .9223652
       _cons |    5.29958   .1127203    47.02   0.000     5.077789    5.521371
------------------------------------------------------------------------------
```

E. *Period 1994 to 1996

i. Lag 0

```
. reg diesel_wk mops_dies_php_b dl_trf dl_spduty dl_extax dl_vat if year>=1994 &
year<=1996, robust

Linear regression                                      Number of obs =     157
                                                       F(  3,    153) =   15.76
                                                       Prob > F      =  0.0000
                                                       R-squared     =  0.4433
                                                       Root MSE      =  .18497

------------------------------------------------------------------------------
             |               Robust
   diesel_wk |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
mops_dies_~b |   .2039945   .0524669     3.89   0.000     .1003414    .3076476
      dl_trf |   .6542149   .2334266     2.80   0.006     .1930595     1.11537
    dl_extax |       24.2   6.556139     3.69   0.000     11.24776    37.15225
       _cons |   6.056529   .2157803    28.07   0.000     5.630235    6.482822
------------------------------------------------------------------------------
```

ii. Lag 1

```
. reg diesel_wk mops_dies_php_b_1 dl_trf_1 dl_spduty_1 dl_extax_1 dl_vat_1 if year>=1994
& year<=1996, robust

Linear regression                                      Number of obs =     157
                                                       F(  3,    153) =   17.61
                                                       Prob > F      =  0.0000
                                                       R-squared     =  0.4657
                                                       Root MSE      =  .18122

------------------------------------------------------------------------------
             |               Robust
   diesel_wk |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
mops_dies_~1 |   .2112815   .0542135     3.90   0.000     .1041777    .3183852
    dl_trf_1 |   .6671355   .2398767     2.78   0.006     .1932374    1.141034
  dl_extax_1 |   25.71728   6.739836     3.82   0.000     12.40212    39.03243
       _cons |    6.02108   .2217876    27.15   0.000     5.582918    6.459241
------------------------------------------------------------------------------
```

iii. Lag 2

```
. reg diesel_wk mops_dies_php_b_2 dl_trf_2 dl_spduty_2 dl_extax_2 dl_vat_2 if year>=1994
& year<=1996, robust

Linear regression                                      Number of obs =     157
                                                       F(  3,    153) =   20.34
                                                       Prob > F      =  0.0000
                                                       R-squared     =  0.4857
                                                       Root MSE      =    .1778

------------------------------------------------------------------------------
             |               Robust
   diesel_wk |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
mops_dies_~2 |   .2118366   .0571759     3.70   0.000     .0988804    .3247927
    dl_trf_2 |    .656873     .25816     2.54   0.012     .1468545    1.166891
  dl_extax_2 |    27.9552   7.107266     3.93   0.000     13.91415    41.99625
       _cons |   6.011014   .2323031    25.88   0.000     5.552078    6.469949
------------------------------------------------------------------------------
```

iv. Lag 3

```
. reg diesel_wk mops_dies_php_b_3 dl_trf_3 dl_spduty_3 dl_extax_3 dl_vat_3 if year>=1994
& year<=1996, robust

Linear regression                                      Number of obs =     157
                                                       F(  3,    153) =   20.35
                                                       Prob > F      =  0.0000
                                                       R-squared     =  0.4923
```

```
                                                       Root MSE      =  .17665

------------------------------------------------------------------------------
             |               Robust
   diesel_wk |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
mops_dies_~3 |   .1861774   .0506645     3.67   0.000     .0860852    .2862696
    dl_trf_3 |   .5567041    .224834     2.48   0.014     .1125243    1.000884
  dl_extax_3 |   32.10973    7.32214     4.39   0.000     17.64418    46.57528
       _cons |   6.103783   .2053561    29.72   0.000     5.698084    6.509483
------------------------------------------------------------------------------
```

v. Lag 4

```
. reg diesel_wk mops_dies_php_b_4 dl_trf_4 dl_spduty_4 dl_extax_4 dl_vat_4  if year>=1994
& year<=1996, robust

Linear regression                                      Number of obs =     157
                                                       F(  3,   153) =   21.37
                                                       Prob > F      =  0.0000
                                                       R-squared     =  0.5059
                                                       Root MSE      =  .17426

------------------------------------------------------------------------------
             |               Robust
   diesel_wk |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
mops_dies_~4 |   .1638344   .0477598     3.43   0.001     .0694807    .2581882
    dl_trf_4 |   .4682128   .2126736     2.20   0.029     .0480569    .8883687
  dl_extax_4 |   36.22654   7.588828     4.77   0.000     21.23412    51.21895
       _cons |   6.182614   .1927041    32.08   0.000     5.801909    6.563318
------------------------------------------------------------------------------
```

4. Δ Diesel Pump Price = f(Δ in MOPS Diesel, Δ in taxes), different periods

A. *Period July 2010 to June 2012

i. Lag 0

```
. reg Ddiesel_wk Dmops_dies_php_b Ddl_trf Ddl_spduty Ddl_extax Ddl_vat if year>=2010 &
week>=1958, robust

Linear regression                                      Number of obs =     104
                                                       F(  1,   102) =    7.98
                                                       Prob > F      =  0.0057
                                                       R-squared     =  0.0643
                                                       Root MSE      =  .76779

------------------------------------------------------------------------------
             |               Robust
  Ddiesel_wk |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
Dmop~s_php_b |   .1731245   .0612807     2.83   0.006     .0515745    .2946745
       _cons |    .044081   .0755023     0.58   0.561    -.1056775    .1938396
------------------------------------------------------------------------------
```

ii. Lag 1

```
. reg Ddiesel_wk Dmops_dies_php_b_1 Ddl_trf_1 Ddl_spduty_1 Ddl_extax_1 Ddl_vat_1 if
year>=2010 & week>=1958, robust

Linear regression                                      Number of obs =     104
                                                       F(  1,   102) =    7.18
                                                       Prob > F      =  0.0086
                                                       R-squared     =  0.4411
                                                       Root MSE      =  .59339

------------------------------------------------------------------------------
             |               Robust
  Ddiesel_wk |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
Dmops_dies~1 |   .4527969   .1689682     2.68   0.009     .1176493    .7879445
       _cons |    .034746   .0591859     0.59   0.558     -.082649     .152141
------------------------------------------------------------------------------
```

iii. Lag 2

```
. reg Ddiesel_wk Dmops_dies_php_b_2 Ddl_trf_2 Ddl_spduty_2 Ddl_extax_2 Ddl_vat_2 if
year>=2010 & week>=1958, robust

Linear regression                                      Number of obs =     104
                                                       F(  1,   102) =    1.79
                                                       Prob > F      =  0.1833
                                                       R-squared     =  0.0336
                                                       Root MSE      =   .7803

------------------------------------------------------------------------------
             |               Robust
  Ddiesel_wk |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
Dmops_dies~2 |   .1255314   .0937052     1.34   0.183    -.0603324    .3113953
       _cons |   .0447784   .0773907     0.58   0.564    -.1087257    .1982824
------------------------------------------------------------------------------
```

iv. Lag 3

```
. reg Ddiesel_wk Dmops_dies_php_b_3 Ddl_trf_3 Ddl_spduty_3 Ddl_extax_3 Ddl_vat_3 if
year>=2010 & week>=1958, robust

Linear regression                                      Number of obs =     104
                                                       F(  1,   102) =    0.33
                                                       Prob > F      =  0.5684
                                                       R-squared     =  0.0012
```

```
                                                       Root MSE      =  .79325

------------------------------------------------------------------------------
             |               Robust
  Ddiesel_wk |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
Dmops_dies~3 |   .0239565   .0418584     0.57   0.568    -.0590694    .1069824
       _cons |   .0493882   .0775334     0.64   0.526    -.1043989    .2031753
------------------------------------------------------------------------------
```

v. Lag 4

```
. reg Ddiesel_wk Dmops_dies_php_b_4 Ddl_trf_4 Ddl_spduty_4 Ddl_extax_4 Ddl_vat_4  if
year>=2010 & week>=1958, robust

Linear regression                                      Number of obs =     104
                                                       F(  1,   102) =    0.02
                                                       Prob > F      =  0.8930
                                                       R-squared     =  0.0001
                                                       Root MSE      =  .79369

------------------------------------------------------------------------------
             |               Robust
  Ddiesel_wk |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
Dmops_dies~4 |   .0075982   .0563663     0.13   0.893     -.104204    .1194005
       _cons |   .0502714   .0781641     0.64   0.522    -.1047668    .2053096
------------------------------------------------------------------------------
```

B. *Period 2008 to June 2010

i. Lag 0

```
. reg Ddiesel_wk Dmops_dies_php_b Ddl_trf Ddl_spduty Ddl_extax Ddl_vat Dbiodies_rq
Dbiodies_rt if year>=2008 & week<1958,>  robust

Linear regression                                      Number of obs =     130
                                                       F(  2,   126) =       .
                                                       Prob > F      =       .
                                                       R-squared     =  0.0978
                                                       Root MSE      =  1.0376

------------------------------------------------------------------------------
             |               Robust
  Ddiesel_wk |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
Dmop~s_php_b |   .2288011   .0641545     3.57   0.001     .1018413    .3557609
     Ddl_trf |  -31.34016   22.76934    -1.38   0.171    -76.40001     13.7197
Dbiodies_rt |  -48.37338   15.18468    -3.19   0.002    -78.42342   -18.32334
       _cons |  -.0248961   .0911707    -0.27   0.785    -.2053203     .155528
------------------------------------------------------------------------------
```

ii. Lag 1

```
. reg Ddiesel_wk Dmops_dies_php_b_1 Ddl_trf_1 Ddl_spduty_1 Ddl_extax_1 Ddl_vat_1
Dbiodies_rq_1 Dbiodies_rt_1 if year>=2008 & week<1958, robust

Linear regression                                      Number of obs =     130
                                                       F(  2,   126) =       .
                                                       Prob > F      =       .
                                                       R-squared     =  0.2485
                                                       Root MSE      =  .94702

------------------------------------------------------------------------------
             |               Robust
  Ddiesel_wk |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
Dmops_dies~1 |    .399354   .0705231     5.66   0.000     .2597909    .5389171
   Ddl_trf_1 |  -16.49206   11.97329    -1.38   0.171    -40.18684    7.202723
```

```
Dbiodies~t_1 |  -136.8462   17.28899    -7.92   0.000    -171.0606   -102.6318
       _cons |  -.0107391   .0833461    -0.13   0.898    -.1756785    .1542003
------------------------------------------------------------------------------
```

iii. Lag 2

```
. reg Ddiesel_wk Dmops_dies_php_b_2 Ddl_trf_2 Ddl_spduty_2 Ddl_extax_2 Ddl_vat_2
Dbiodies_rq_2 Dbiodies_rt_2 if year>=2008 & week<1958, robust

Linear regression                                      Number of obs =     130
                                                       F(  2,   126) =       .
                                                       Prob > F      =       .
                                                       R-squared     =  0.1895
                                                       Root MSE      =  .98349

------------------------------------------------------------------------------
             |               Robust
  Ddiesel_wk |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
Dmops_dies~2 |   .3424447   .0679877     5.04   0.000     .2078991    .4769903
   Ddl_trf_2 |  -14.90363   18.91237    -0.79   0.432    -52.33067     22.5234
Dbiodies~t_2 |  -182.2456   16.39109   -11.12   0.000    -214.6831   -149.8081
       _cons |   -.008804   .0865247    -0.10   0.919    -.1800339    .1624259
------------------------------------------------------------------------------
```

iv. Lag 3

```
. reg Ddiesel_wk Dmops_dies_php_b_3 Ddl_trf_3 Ddl_spduty_3 Ddl_extax_3 Ddl_vat_3
Dbiodies_rq_3 Dbiodies_rt_3 if year>=2008 & week<1958, robust

Linear regression                                      Number of obs =     130
                                                       F(  2,   126) =       .
                                                       Prob > F      =       .
                                                       R-squared     =  0.1552
                                                       Root MSE      =  1.0041

------------------------------------------------------------------------------
             |               Robust
  Ddiesel_wk |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
Dmops_dies~3 |   .3036345   .0656462     4.63   0.000     .1737226    .4335465
   Ddl_trf_3 |  -17.59857   32.29338    -0.54   0.587    -81.50622    46.30908
Dbiodies~t_3 |  -184.2999   14.59278   -12.63   0.000    -213.1786   -155.4212
       _cons |  -.0105589   .0875848    -0.12   0.904    -.1838866    .1627688
------------------------------------------------------------------------------
```

v. Lag 4

```
. reg Ddiesel_wk Dmops_dies_php_b_4 Ddl_trf_4 Ddl_spduty_4 Ddl_extax_4 Ddl_vat_4
Dbiodies_rq_4 Dbiodies_rt_4 if year>=2008 & week<1958, robust

Linear regression                                      Number of obs =     130
                                                       F(  2,   126) =       .
                                                       Prob > F      =       .
                                                       R-squared     =  0.2726
                                                       Root MSE      =  .93167

------------------------------------------------------------------------------
             |               Robust
  Ddiesel_wk |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
Dmops_dies~4 |   .2531965   .0620937     4.08   0.000     .1303148    .3760781
   Ddl_trf_4 |  -21.94108   26.77376    -0.82   0.414    -74.92557    31.04341
Dbiodies~t_4 |  -557.8155   15.30425   -36.45   0.000    -588.1022   -527.5288
       _cons |   .0152933   .0816311     0.19   0.852    -.1462522    .1768389
------------------------------------------------------------------------------
```

C. *Period 2005 to 2007

i. Lag 0

```
. reg Ddiesel_wk Dmops_dies_php_b Ddl_trf Ddl_spduty Ddl_extax Ddl_vat  Dbiodies_rq
Dbiodies_rt if year>=2005 & year<=2007, robust

Linear regression                                      Number of obs =     157
                                                       F(  2,    151) =       .
                                                       Prob > F      =       .
                                                       R-squared     =  0.0513
                                                       Root MSE      =  .27687

------------------------------------------------------------------------------
             |               Robust
  Ddiesel_wk |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
Dmop~s_php_b |   .0295133   .0234059     1.26   0.209    -.0167322    .0757587
     Ddl_trf |  -5.503999   4.537391    -1.21   0.227    -14.46897    3.460974
   Ddl_extax |   99.84541   5.855586    17.05   0.000     88.27594    111.4149
     Ddl_vat |   11.06532   1.305596     8.48   0.000     8.485729    13.64492
 Dbiodies_rq |   .3437379   .0259347    13.25   0.000     .2924962    .3949797
       _cons |   .0938643   .0230249     4.08   0.000     .0483716    .1393569
------------------------------------------------------------------------------
```

ii. Lag 1

```
. reg Ddiesel_wk Dmops_dies_php_b_1 Ddl_trf_1 Ddl_spduty_1 Ddl_extax_1 Ddl_vat_1
Dbiodies_rq_1 Dbiodies_rt_1  if year>=2005 & year<=2007, robust

Linear regression                                      Number of obs =     157
                                                       F(  2,    151) =       .
                                                       Prob > F      =       .
                                                       R-squared     =  0.1013
                                                       Root MSE      =  .26947

------------------------------------------------------------------------------
             |               Robust
  Ddiesel_wk |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
Dmops_dies~1 |   .0498571   .0257362     1.94   0.055    -.0009924    .1007066
   Ddl_trf_1 |  -10.62354   6.832603    -1.55   0.122    -24.12339    2.876311
Ddl_extax_1  |   131.0025   5.719548    22.90   0.000     119.7018    142.3032
   Ddl_vat_1 |   13.82447   1.292756    10.69   0.000     11.27024    16.37869
Dbiodies~q_1 |  -.0813715   .0256528    -3.17   0.002    -.1320562   -.0306867
       _cons |     .09663   .0223912     4.32   0.000     .0523896    .1408705
------------------------------------------------------------------------------
```

iii. Lag 2

```
. reg Ddiesel_wk Dmops_dies_php_b_2 Ddl_trf_2 Ddl_spduty_2 Ddl_extax_2 Ddl_vat_2
Dbiodies_rq_2 Dbiodies_rt_2  if year>=2005 & year<=2007, robust

Linear regression                                      Number of obs =     157
                                                       F(  2,    151) =       .
                                                       Prob > F      =       .
                                                       R-squared     =  0.1718
                                                       Root MSE      =  .25868

------------------------------------------------------------------------------
             |               Robust
  Ddiesel_wk |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
Dmops_dies~2 |   .0998501   .0314082     3.18   0.002     .0377938    .1619064
   Ddl_trf_2 |  -11.67356   7.392084    -1.58   0.116    -26.27883    2.931713
Ddl_extax_2 |  -29.12398   5.437424    -5.36   0.000    -39.86724   -18.38073
   Ddl_vat_2 |  -10.23859   1.252457    -8.17   0.000    -12.71319   -7.763983
Dbiodies~q_2 |   .0795048   .0248063     3.21   0.002     .0304924    .1285171
       _cons |   .0939105   .0213222     4.40   0.000     .0517821    .1360389
------------------------------------------------------------------------------
```

iv. Lag 3

```
. reg Ddiesel_wk Dmops_dies_php_b_3 Ddl_trf_3 Ddl_spduty_3 Ddl_extax_3 Ddl_vat_3
Dbiodies_rq_3 Dbiodies_rt_3  if year>=2005 & year<=2007, robust
```

```
Linear regression                                      Number of obs =     157
                                                       F(  2,   151) =       .
                                                       Prob > F      =       .
                                                       R-squared     =  0.1448
                                                       Root MSE      =  .26286

------------------------------------------------------------------------------
             |               Robust
  Ddiesel_wk |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
Dmops_dies~3 |    .100265    .032449     3.09   0.002     .0361523    .1643776
    Ddl_trf_3 |  -1.333939    5.55918    -0.24   0.811    -12.31776    9.649882
Ddl_extax_3  |  -116.2046   5.430496   -21.40   0.000    -126.9342    -105.475
    Ddl_vat_3 |  -20.83401    1.23948   -16.81   0.000    -23.28297   -18.38505
Dbiodies~q_3 |    .296164   .0245566    12.06   0.000      .247645     .344683
       _cons |   .0916651   .0214894     4.27   0.000     .0492063    .1341238
------------------------------------------------------------------------------
```

v. Lag 4

```
. reg Ddiesel_wk Dmops_dies_php_b_4 Ddl_trf_4 Ddl_spduty_4 Ddl_extax_4 Ddl_vat_4
Dbiodies_rq_4 Dbiodies_rt_4  if year>=2005 & year<=2007, robust

Linear regression                                      Number of obs =     157
                                                       F(  2,   151) =       .
                                                       Prob > F      =       .
                                                       R-squared     =  0.1756
                                                       Root MSE      =  .25808

------------------------------------------------------------------------------
             |               Robust
  Ddiesel_wk |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
Dmops_dies~4 |   .1202077    .021539     5.58   0.000      .077651    .1627644
    Ddl_trf_4 |   9.683302   3.324396     2.91   0.004     3.114965    16.25164
Ddl_extax_4  |  -18.87983   5.430191    -3.48   0.001     -29.6088   -8.150864
    Ddl_vat_4 |  -2.579595   1.209716    -2.13   0.035     -4.96975   -.1894397
Dbiodies~q_4 |  -.0533216   .0240317    -2.22   0.028    -.1008033   -.0058398
       _cons |   .0901106   .0213585     4.22   0.000     .0479106    .1323106
------------------------------------------------------------------------------
```

D. *Period 1999 to 2004

i. Lag 0

```
. reg Ddiesel_wk Dmops_dies_php_b Ddl_trf Ddl_spduty Ddl_extax Ddl_vat if year>=1999 &
year<=2004, robust

Linear regression                                      Number of obs =     313
                                                       F(  1,   311) =    1.08
                                                       Prob > F      =  0.3002
                                                       R-squared     =  0.0053
                                                       Root MSE      =  .15407

------------------------------------------------------------------------------
             |               Robust
  Ddiesel_wk |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
Dmop~s_php_b |   .0244347   .0235469     1.04   0.300    -.0218968    .0707661
       _cons |   .0476599   .0089105     5.35   0.000     .0301274    .0651923
------------------------------------------------------------------------------
```

ii. Lag 1

```
. reg Ddiesel_wk Dmops_dies_php_b_1 Ddl_trf_1 Ddl_spduty_1 Ddl_extax_1 Ddl_vat_1 if
year>=1999 & year<=2004, robust

Linear regression                                      Number of obs =     313
                                                       F(  1,   311) =    6.56
```

```
                                                       Prob > F      =  0.0109
                                                       R-squared     =  0.0248
                                                       Root MSE      =  .15255

------------------------------------------------------------------------------
             |               Robust
  Ddiesel_wk |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
Dmops_dies~1 |     .05409   .0211189     2.56   0.011     .0125361     .095644
   Ddl_vat_1 |  (omitted)
       _cons |   .0460241   .0085865     5.36   0.000     .0291291    .0629192
------------------------------------------------------------------------------
```

iii. Lag 2

```
. reg Ddiesel_wk Dmops_dies_php_b_2 Ddl_trf_2 Ddl_spduty_2 Ddl_extax_2 Ddl_vat_2 if
year>=1999 & year<=2004, robust

Linear regression                                      Number of obs =     313
                                                       F(  1,   311) =   11.80
                                                       Prob > F      =  0.0007
                                                       R-squared     =  0.0301
                                                       Root MSE      =  .15214

------------------------------------------------------------------------------
             |               Robust
  Ddiesel_wk |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
Dmops_dies~2 |   .0596056   .0173486     3.44   0.001     .0254701    .0937412
       _cons |   .0458414   .0085458     5.36   0.000     .0290264    .0626564
------------------------------------------------------------------------------
```

iv. Lag 3

```
. reg Ddiesel_wk Dmops_dies_php_b_3 Ddl_trf_3 Ddl_spduty_3 Ddl_extax_3 Ddl_vat_3 if
year>=1999 & year<=2004, robust

Linear regression                                      Number of obs =     313
                                                       F(  1,   311) =   18.75
                                                       Prob > F      =  0.0000
                                                       R-squared     =  0.0650
                                                       Root MSE      =  .14938

------------------------------------------------------------------------------
             |               Robust
  Ddiesel_wk |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
Dmops_dies~3 |   .0880166    .020328     4.33   0.000     .0480188    .1280144
       _cons |   .0446479   .0082382     5.42   0.000     .0284383    .0608575
------------------------------------------------------------------------------
```

v. Lag 4

```
. reg Ddiesel_wk Dmops_dies_php_b_4 Ddl_trf_4 Ddl_spduty_4 Ddl_extax_4 Ddl_vat_4  if
year>=1999 & year<=2004, robust

Linear regression                                      Number of obs =     313
                                                       F(  1,   311) =   10.31
                                                       Prob > F      =  0.0015
                                                       R-squared     =  0.0578
                                                       Root MSE      =  .14995

------------------------------------------------------------------------------
             |               Robust
  Ddiesel_wk |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
Dmops_dies~4 |    .085276    .026561     3.21   0.001     .0330141    .1375379
       _cons |   .0442468   .0086921     5.09   0.000     .0271441    .0613495
------------------------------------------------------------------------------
```

E. *Period 1994 to 1996

i. Lag 0

```
. reg Ddiesel_wk Dmops_dies_php_b Ddl_trf Ddl_spduty Ddl_extax Ddl_vat if year>=1994 &
year<=1996, robust

Linear regression                                      Number of obs =     157
                                                       F(  1,   153) =       .
                                                       Prob > F      =       .
                                                       R-squared     =  0.0010
                                                       Root MSE      =  .14701

------------------------------------------------------------------------------
             |               Robust
  Ddiesel_wk |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
Dmop~s_php_b |   .0432396   .0864153     0.50   0.618    -.1274816    .2139608
     Ddl_trf |    .025793   .0897406     0.29   0.774    -.1514976    .2030836
   Ddl_extax |   .0779045   .8193915     0.10   0.924    -1.540877    1.696686
       _cons |   .0063706   .0124404     0.51   0.609    -.0182065    .0309478
------------------------------------------------------------------------------
```

ii. Lag 1

```
. reg Ddiesel_wk Dmops_dies_php_b_1 Ddl_trf_1 Ddl_spduty_1 Ddl_extax_1 Ddl_vat_1 if
year>=1994 & year<=1996, robust

Linear regression                                      Number of obs =     157
                                                       F(  1,   153) =       .
                                                       Prob > F      =       .
                                                       R-squared     =  0.0017
                                                       Root MSE      =  .14696

------------------------------------------------------------------------------
             |               Robust
  Ddiesel_wk |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
Dmops_dies~1 |   .0566539   .0907463     0.62   0.533    -.1226236    .2359314
   Ddl_trf_1 |   .0217378   .0801323     0.27   0.787    -.1365708    .1800464
 Ddl_extax_1 |  -.9931902   1.116432    -0.89   0.375    -3.198803    1.212422
       _cons |   .0062973   .0120614     0.52   0.602    -.0175311    .0301257
------------------------------------------------------------------------------
```

iii. Lag 2

```
. reg Ddiesel_wk Dmops_dies_php_b_2 Ddl_trf_2 Ddl_spduty_2 Ddl_extax_2 Ddl_vat_2 if
year>=1994 & year<=1996, robust

Linear regression                                      Number of obs =     157
                                                       F(  1,   153) =       .
                                                       Prob > F      =       .
                                                       R-squared     =  0.0237
                                                       Root MSE      =  .14533

------------------------------------------------------------------------------
             |               Robust
  Ddiesel_wk |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
Dmops_dies~2 |   .2144018    .126952     1.69   0.093    -.0364033    .4652069
   Ddl_trf_2 |  -.0306552   .0933098    -0.33   0.743    -.2149971    .1536867
 Ddl_extax_2 |  -2.131831   1.075937    -1.98   0.049    -4.257441   -.0062207
       _cons |   .0046353   .0123068     0.38   0.707     -.019678    .0289485
------------------------------------------------------------------------------
```

iv. Lag 3

```
. reg Ddiesel_wk Dmops_dies_php_b_3 Ddl_trf_3 Ddl_spduty_3 Ddl_extax_3 Ddl_vat_3 if
year>=1994 & year<=1996, robust

Linear regression                                      Number of obs =     157
                                                       F(  1,   153) =       .
```

```
                                                       Prob > F      =      .
                                                       R-squared     =  0.0001
                                                       Root MSE      =  .14707

------------------------------------------------------------------------------
             |               Robust
  Ddiesel_wk |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
Dmops_dies~3 |  -.0083699   .0937379    -0.09   0.929    -.1935576    .1768178
   Ddl_trf_3 |   .0433733   .0510538     0.85   0.397     -.057488    .1442346
 Ddl_extax_3 |  -.5244057   1.581214    -0.33   0.741    -3.648238    2.599426
       _cons |   .0069891   .0111876     0.62   0.533    -.0151131    .0290912
------------------------------------------------------------------------------
```

v. Lag 4

```
. reg Ddiesel_wk Dmops_dies_php_b_4 Ddl_trf_4 Ddl_spduty_4 Ddl_extax_4 Ddl_vat_4  if
year>=1994 & year<=1996, robust

Linear regression                                      Number of obs =     157
                                                       F(  1,   153) =       .
                                                       Prob > F      =       .
                                                       R-squared     =  0.0001
                                                       Root MSE      =  .14707

------------------------------------------------------------------------------
             |               Robust
  Ddiesel_wk |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
Dmops_dies~4 |  -.0085099   .0330699    -0.26   0.797    -.0738425    .0568227
   Ddl_trf_4 |   .0433924   .0705183     0.62   0.539    -.0959228    .1827076
 Ddl_extax_4 |  -.5230004   1.041469    -0.50   0.616    -2.580517    1.534516
       _cons |   .0069859   .0118861     0.59   0.558    -.0164961    .0304679
------------------------------------------------------------------------------
```

5. Equilibrium Correction Models

I. Unleaded

A. *Period July 2010 to June 2012

```
. reg Dunleaded_wk Dmops_mog_php_b_1 Dbioeth_rq_1 Dbioeth_rt_1  unleaded_wk_1
mops_mog_php_b_2 if year>=2010 & week>=1958, robust

Linear regression                                      Number of obs =     104
                                                       F(  3,    99) =       .
                                                       Prob > F      =       .
                                                       R-squared     =  0.5073
                                                       Root MSE      =  .58994

------------------------------------------------------------------------------
             |               Robust
Dunleaded_wk |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
Dmops_mog_~1 |   .5400118   .1621842     3.33   0.001     .2182031    .8618204
Dbioeth_rt_1 |   2.665571   1.170095     2.28   0.025     .3438485    4.987294
unleaded_w~1 |   -.219496   .0749366    -2.93   0.004    -.3681865   -.0708055
mops_mog_p~2 |   .2753825   .1081902     2.55   0.012     .0607097    .4900554
       _cons |   2.946861   .7429731     3.97   0.000     1.472641     4.42108
------------------------------------------------------------------------------
```

B. *Period 2008 to June 2010

```
. reg Dunleaded_wk Dmops_mog_php_b_1 Dug_trf_1 Dbioeth_rq_1 Dbioeth_rt_1 unleaded_wk_1
mops_mog_php_b_2 if year>=2008 & week<1958, robust

Linear regression                                      Number of obs =     130
                                                       F(  4,   124) =       .
                                                       Prob > F      =       .
                                                       R-squared     =  0.4884
                                                       Root MSE      =  .74215

------------------------------------------------------------------------------
             |               Robust
Dunleaded_wk |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
Dmops_mog_~1 |   .4094976   .0650433     6.30   0.000     .2807586    .5382365
   Dug_trf_1 |  -1.472192    11.3698    -0.13   0.897    -23.97621    21.03183
Dbioeth_rq_1 |  -.6077833   .3092596    -1.97   0.052    -1.219895    .0043282
unleaded_w~1 |  -.1260869   .0277503    -4.54   0.000    -.1810124   -.0711614
mops_mog_p~2 |   .1595726   .0338705     4.71   0.000     .0925334    .2266119
       _cons |   1.417997   .4963348     2.86   0.005     .4356112    2.400383
------------------------------------------------------------------------------
```

C. *Period 2005 to June 2007

```
. reg Dunleaded_wk Dmops_mog_php_b_4  Dug_trf_4 Dug_extax_4 Dug_vat_4 unleaded_wk_1
mops_mog_php_b_5 if year>=2005 & year<2007, robust

Linear regression                                      Number of obs =     104
                                                       F(  5,    98) =    7.24
                                                       Prob > F      =  0.0000
                                                       R-squared     =  0.2365
                                                       Root MSE      =  .39682

------------------------------------------------------------------------------
             |               Robust
Dunleaded_wk |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
Dm~g_php_b_4 |   .1749047   .0459399     3.81   0.000     .0837384    .2660709
   Dug_trf_4 |   8.928454   4.272646     2.09   0.039     .4495266    17.40738
   Dug_vat_4 |   .6598232   .7039769     0.94   0.351     -.737196    2.056842
```

```
unleaded_w~1 |   -.041899   .0122597    -3.42   0.001    -.0662279   -.0175701
mops_mog_p~5 |   .0529169   .0171045     3.09   0.003     .0189736    .0868602
       _cons |   .3863329   .2818237     1.37   0.174     -.172937    .9456028
------------------------------------------------------------------------------
```

D. *Period 1999 to June 2004

```
. reg Dunleaded_wk Dmops_mog_php_b_3  unleaded_wk_1 mops_mog_php_b_4 if year>=1999 &
year<2004, robust

Linear regression                                      Number of obs =     261
                                                       F(  3,   257) =   20.75
                                                       Prob > F      =  0.0000
                                                       R-squared     =  0.2408
                                                       Root MSE      =  .14207

------------------------------------------------------------------------------
             |               Robust
Dunleaded_wk |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
Dm~g_php_b_3 |   .1055922   .0217397     4.86   0.000     .0627815    .1484028
unleaded_w~1 |  -.0626405    .009454    -6.63   0.000    -.0812576   -.0440233
mops_mog_p~4 |   .0713571   .0107743     6.62   0.000       .05014    .0925742
       _cons |    .457813   .0772431     5.93   0.000      .305703    .6099231
------------------------------------------------------------------------------
```

E. *Period 1994 to 1996

```
. reg Dunleaded_wk Dmops_mog_php_b_4  unleaded_wk_1 mops_mog_php_b_5  if year>=1994 &
year<1996, robust

Linear regression                                      Number of obs =     100
                                                       F(  3,    96) =    0.89
                                                       Prob > F      =  0.4477
                                                       R-squared     =  0.1990
                                                       Root MSE      =  .13976

------------------------------------------------------------------------------
             |               Robust
Dunleaded_wk |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
Dm~g_php_b_4 |   .0602607   .0583656     1.03   0.304    -.0555942    .1761155
unleaded_w~1 |  -.1227376   .0827729    -1.48   0.141    -.2870405    .0415654
mops_mog_p~5 |   .0416687   .0640559     0.65   0.517    -.0854813    .1688187
       _cons |   .9688968   .6054743     1.60   0.113    -.2329602    2.170754
------------------------------------------------------------------------------
```

II. Diesel

A. *Period July 2010 to June 2012

```
. reg Ddiesel_wk Dmops_dies_php_b_1 diesel_wk_1 mops_dies_php_b_2  if year>=2010 &
week>=1958, robust

Linear regression                                      Number of obs =     104
                                                       F(  3,   100) =   15.04
                                                       Prob > F      =  0.0000
                                                       R-squared     =  0.5561
                                                       Root MSE      =  .53409

------------------------------------------------------------------------------
             |               Robust
  Ddiesel_wk |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
Dm~s_php_b_1 |   .5839963   .2024094     2.89   0.005     .1824219    .9855707
 diesel_wk_1 |   -.388143   .1456318    -2.67   0.009    -.6770723   -.0992136
mo~s_php_b_2 |   .4508502   .1874695     2.40   0.018      .078916    .8227843
```

```
       _cons |    1.85743   .3453946     5.38   0.000     1.172177    2.542684
------------------------------------------------------------------------------
```

B. *Period 2008 to June 2010

```
. reg Ddiesel_wk Dmops_dies_php_b_1 Ddl_trf_1  Dbiodies_rq_1 Dbiodies_rt_1  diesel_wk_1
mops_dies_php_b_2 if year>=2008 & week<1958, robust

Linear regression                                      Number of obs =     130
                                                       F(  4,    124) =       .
                                                       Prob > F      =       .
                                                       R-squared     =  0.5055
                                                       Root MSE      =  .77438

------------------------------------------------------------------------------
             |               Robust
  Ddiesel_wk |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
Dmops_dies~1 |   .2530304   .0639258     3.96   0.000     .1265033    .3795575
   Ddl_trf_1 |  -.5264709   13.37619    -0.04   0.969    -27.0017    25.94876
Dbiodies~t_1 |   10.97981   30.14412     0.36   0.716    -48.68384    70.64347
 diesel_wk_1 |  -.1261582   .0200365    -6.30   0.000     -.165816   -.0865004
mops_dies_~2 |   .1494911   .0222917     6.71   0.000     .1053696    .1936126
       _cons |   .4350054   .2724495     1.60   0.113    -.1042484    .9742592
------------------------------------------------------------------------------
```

C. *Period 2005 to 2007

```
. reg Ddiesel_wk Dmops_dies_php_b_4  Ddl_trf_4 Ddl_extax_4 Ddl_vat_4 Dbiodies_rq_4
Dbiodies_rt_4 diesel_wk_1 mops_dies_php_b_5 if year>=2005 & year<=2007, robust

Linear regression                                      Number of obs =     157
                                                       F(  4,    149) =       .
                                                       Prob > F      =       .
                                                       R-squared     =  0.2248
                                                       Root MSE      =  .25194

------------------------------------------------------------------------------
             |               Robust
  Ddiesel_wk |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
Dmops_dies~4 |   .1285106   .0202494     6.35   0.000     .0884975    .1685237
   Ddl_trf_4 |   10.53143   5.072494     2.08   0.040     .5081177    20.55475
 Ddl_extax_4 |  -10.28593   5.949798    -1.73   0.086    -22.04281    1.470948
   Ddl_vat_4 |  -1.183779   1.243308    -0.95   0.343    -3.640572    1.273014
Dbiodies~q_4 |   -.005172   .0270165    -0.19   0.848    -.0585569    .0482129
diesel_wk_1  |  -.0271363   .0082453    -3.29   0.001     -.043429   -.0108435
mops_dies_~5 |   .0238618   .0106001     2.25   0.026     .0029158    .0448078
       _cons |   .3872272   .1774982     2.18   0.031     .0364884    .7379661
------------------------------------------------------------------------------
```

D. *Period 1999 to 2004

```
. reg Ddiesel_wk Dmops_dies_php_b_3 diesel_wk_1 mops_dies_php_b_4  if year>=1999 &
year<=2004, robust

Linear regression                                      Number of obs =     313
                                                       F(  3,    309) =   14.10
                                                       Prob > F      =  0.0000
                                                       R-squared     =  0.1918
                                                       Root MSE      =  .13932

------------------------------------------------------------------------------
             |               Robust
  Ddiesel_wk |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
```

```
-------------+----------------------------------------------------------------
Dm~s_php_b_3 |   .0996586   .0193855     5.14   0.000     .0615142    .1378029
 diesel_wk_1 |  -.0497412   .0112105    -4.44   0.000    -.0717997   -.0276826
mo~s_php_b_4 |   .0527533   .0106575     4.95   0.000     .0317828    .0737237
       _cons |   .2285181   .0610719     3.74   0.000     .1083488    .3486875
------------------------------------------------------------------------------
```

E. *Period 1994 to 1996

```
. reg Ddiesel_wk Dmops_dies_php_b_2  Ddl_trf_2 Ddl_extax_2 diesel_wk_1 mops_dies_php_b_3
if year>=1994 & year<=1996, robust

Linear regression                                      Number of obs =     157
                                                       F(  3,   151) =       .
                                                       Prob > F      =       .
                                                       R-squared     =  0.1505
                                                       Root MSE      =  .13646

------------------------------------------------------------------------------
             |               Robust
  Ddiesel_wk |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
Dm~s_php_b_2 |   .2302255   .1206048     1.91   0.058    -.0080653    .4685163
   Ddl_trf_2 |     .23939   .1812329     1.32   0.189    -.1186898    .5974699
 Ddl_extax_2 |  -5.175598   2.531542    -2.04   0.043    -10.17742   -.1737797
 diesel_wk_1 |  -.2746342   .2850071    -0.96   0.337    -.8377509    .2884825
mo~s_php_b_3 |   .0961338     .07922     1.21   0.227     -.060389    .2526565
       _cons |   1.584553   1.717275     0.92   0.358    -1.808438    4.977543
------------------------------------------------------------------------------
```

6. Thailand Unleaded Gasoline Pump Price = f(MOPS Mogas 95), different periods

A. *Period July 2010 to May 2012

i. Lag 0
```
. reg unleaded_th_wk mops_mog_th_b if year>=2010 & week>=1958, robust

Linear regression                                      Number of obs =     100
                                                       F(  1,    98) =  386.06
                                                       Prob > F      =  0.0000
                                                       R-squared     =  0.7713
                                                       Root MSE      =  1.2303

------------------------------------------------------------------------------
             |               Robust
unleaded_t~k |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
mops_mog_t~b |   .6959743   .0354214    19.65   0.000     .6256817    .7662669
       _cons |   19.70456   .7433625    26.51   0.000     18.22938    21.17974
------------------------------------------------------------------------------
```

ii. Lag 1
```
. reg unleaded_th_wk mops_mog_th_b_1 if year>=2010 & week>=1958, robust

Linear regression                                      Number of obs =     100
                                                       F(  1,    98) =  381.32
                                                       Prob > F      =  0.0000
                                                       R-squared     =  0.7901
                                                       Root MSE      =  1.1788

------------------------------------------------------------------------------
             |               Robust
unleaded_t~k |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
mops_mog_t~1 |   .6965508   .0356702    19.53   0.000     .6257643    .7673372
       _cons |   19.73529   .7646428    25.81   0.000     18.21788     21.2527
------------------------------------------------------------------------------
```

iii. Lag 2
```
. reg unleaded_th_wk mops_mog_th_b_2 if year>=2010 & week>=1958, robust

Linear regression                                      Number of obs =     100
                                                       F(  1,    98) =  320.52
                                                       Prob > F      =  0.0000
                                                       R-squared     =  0.7676
                                                       Root MSE      =  1.2401

------------------------------------------------------------------------------
             |               Robust
unleaded_t~k |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
mops_mog_t~2 |   .6805709   .0380141    17.90   0.000     .6051331    .7560087
       _cons |   20.12224   .8188355    24.57   0.000     18.49729    21.74719
------------------------------------------------------------------------------
```

iv. Lag 3
```
. reg unleaded_th_wk mops_mog_th_b_3 if year>=2010 & week>=1958, robust

Linear regression                                      Number of obs =     100
                                                       F(  1,    98) =  280.64
                                                       Prob > F      =  0.0000
                                                       R-squared     =  0.7364
                                                       Root MSE      =  1.3208

------------------------------------------------------------------------------
             |               Robust
unleaded_t~k |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
```

```
-------------+----------------------------------------------------------------
mops_mog_t~3 |   .6614451   .0394839    16.75   0.000     .5830906    .7397996
       _cons |   20.57918    .843482    24.40   0.000     18.90532    22.25304
------------------------------------------------------------------------------
```

v. Lag 4

```
. reg unleaded_th_wk mops_mog_th_b_4 if year>=2010 & week>=1958, robust

Linear regression                                      Number of obs =     100
                                                       F(  1,    98) =  225.15
                                                       Prob > F      =  0.0000
                                                       R-squared     =  0.6955
                                                       Root MSE      =  1.4196

------------------------------------------------------------------------------
             |               Robust
unleaded_t~k |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
mops_mog_t~4 |   .6368539    .042443    15.00   0.000     .5526272    .7210807
       _cons |   21.15936   .9000589    23.51   0.000     19.37323     22.9455
------------------------------------------------------------------------------
```

B. *Period 2008 to June 2010

i. Lag 0

```
. reg unleaded_th_wk mops_mog_th_b if year>=2008 & week<1958, robust

Linear regression                                      Number of obs =     129
                                                       F(  1,   127) =  265.92
                                                       Prob > F      =  0.0000
                                                       R-squared     =  0.7024
                                                       Root MSE      =  3.1151

------------------------------------------------------------------------------
             |               Robust
unleaded_t~k |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
mops_mog_t~b |   .9596911   .0588518    16.31   0.000      .843234    1.076148
       _cons |   12.63704   1.094921    11.54   0.000     10.47039     14.8037
------------------------------------------------------------------------------
```

ii. Lag 1

```
. reg unleaded_th_wk mops_mog_th_b_1 if year>=2008 & week<1958, robust

Linear regression                                      Number of obs =     129
                                                       F(  1,   127) =  192.67
                                                       Prob > F      =  0.0000
                                                       R-squared     =  0.6684
                                                       Root MSE      =   3.291

------------------------------------------------------------------------------
             |               Robust
unleaded_t~k |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
mops_mog_t~1 |   .9368013   .0674896    13.88   0.000     .8032516    1.070351
       _cons |   13.03021   1.220741    10.67   0.000     10.61458    15.44584
------------------------------------------------------------------------------
```

iii. Lag 2

```
. reg unleaded_th_wk mops_mog_th_b_2 if year>=2008 & week<1958, robust

Linear regression                                      Number of obs =     129
                                                       F(  1,   127) =  124.86
                                                       Prob > F      =  0.0000
                                                       R-squared     =  0.6073
                                                       Root MSE      =  3.5856
```

```
------------------------------------------------------------------------------
             |               Robust
unleaded_t~k |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
mops_mog_t~2 |   .8937652   .0799841    11.17   0.000     .7354912    1.052039
       _cons |    13.7945   1.423642     9.69   0.000     10.97737    16.61163
------------------------------------------------------------------------------
```

iv. Lag 3

```
. reg unleaded_th_wk mops_mog_th_b_3 if year>=2008 & week<1958, robust

Linear regression                                      Number of obs =     129
                                                       F(  1,   127) =   83.86
                                                       Prob > F      =  0.0000
                                                       R-squared     =  0.5346
                                                       Root MSE      =  3.9158

------------------------------------------------------------------------------
             |               Robust
unleaded_t~k |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
mops_mog_t~3 |   .8413271   .0918728     9.16   0.000     .6595275    1.023127
       _cons |    14.7334   1.624868     9.07   0.000     11.51808    17.94872
------------------------------------------------------------------------------
```

v. Lag 4

```
. reg unleaded_th_wk mops_mog_th_b_4 if year>=2008 & week<1958, robust

Linear regression                                      Number of obs =     129
                                                       F(  1,   127) =   59.28
                                                       Prob > F      =  0.0000
                                                       R-squared     =  0.4576
                                                       Root MSE      =  4.2387

------------------------------------------------------------------------------
             |               Robust
unleaded_t~k |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
mops_mog_t~4 |     .78079   .1014094     7.70   0.000      .580119     .981461
       _cons |   15.81885   1.788042     8.85   0.000     12.28064    19.35706
------------------------------------------------------------------------------
```

C. *Period 2005 to 2007

i. Lag 0

```
. reg unleaded_th_wk mops_mog_th_b if year>=2005 & year<2008, robust

Linear regression                                      Number of obs =     157
                                                       F(  1,   155) =  127.27
                                                       Prob > F      =  0.0000
                                                       R-squared     =  0.5452
                                                       Root MSE      =  2.0855

------------------------------------------------------------------------------
             |               Robust
unleaded_t~k |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
mops_mog_t~b |   .9574627    .084872    11.28   0.000     .7898076    1.125118
       _cons |   10.98413   1.420143     7.73   0.000     8.178793    13.78946
------------------------------------------------------------------------------
```

ii. Lag 1

```
. reg unleaded_th_wk mops_mog_th_b_1 if year>=2005 & year<2008, robust

Linear regression                                      Number of obs =     157
                                                       F(  1,   155) =  147.53
                                                       Prob > F      =  0.0000
```

```
                                                       R-squared     =  0.5791
                                                       Root MSE      =  2.0063

------------------------------------------------------------------------------
             |               Robust
unleaded_t~k |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
mops_mog_t~1 |   .9723567   .0800541    12.15   0.000     .8142188    1.130495
       _cons |   10.79316   1.332335     8.10   0.000     8.161287    13.42504
------------------------------------------------------------------------------
```

iii. Lag 2

```
. reg unleaded_th_wk mops_mog_th_b_2 if year>=2005 & year<2008, robust

Linear regression                                      Number of obs =     157
                                                       F(  1,   155) =  159.71
                                                       Prob > F      =  0.0000
                                                       R-squared     =  0.5825
                                                       Root MSE      =   1.998

------------------------------------------------------------------------------
             |               Robust
unleaded_t~k |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
mops_mog_t~2 |   .9641064   .0762894    12.64   0.000     .8134052    1.114808
       _cons |   10.98429   1.265996     8.68   0.000     8.483463    13.48513
------------------------------------------------------------------------------
```

iv. Lag 3

```
. reg unleaded_th_wk mops_mog_th_b_3 if year>=2005 & year<2008, robust

Linear regression                                      Number of obs =     157
                                                       F(  1,   155) =  162.81
                                                       Prob > F      =  0.0000
                                                       R-squared     =  0.5703
                                                       Root MSE      =  2.0272

------------------------------------------------------------------------------
             |               Robust
unleaded_t~k |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
mops_mog_t~3 |   .9408195   .0737336    12.76   0.000     .7951671    1.086472
       _cons |    11.4165   1.222613     9.34   0.000     9.001366    13.83163
------------------------------------------------------------------------------
```

v. Lag 4

```
. reg unleaded_th_wk mops_mog_th_b_4 if year>=2005 & year<2008, robust

Linear regression                                      Number of obs =     157
                                                       F(  1,   155) =  149.49
                                                       Prob > F      =  0.0000
                                                       R-squared     =  0.5434
                                                       Root MSE      =  2.0895

------------------------------------------------------------------------------
             |               Robust
unleaded_t~k |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
mops_mog_t~4 |   .9059632   .0740966    12.23   0.000     .7595937    1.052333
       _cons |   12.03602   1.227594     9.80   0.000     9.611043    14.46099
------------------------------------------------------------------------------
```

D. 2004

i. Lag 0

```
. reg unleaded_th_wk mops_mog_th_b if year>=1999 & year<2005, robust
```

```
Linear regression                                      Number of obs =      53
                                                       F(  1,    51) =  114.84
                                                       Prob > F      =  0.0000
                                                       R-squared     =  0.5871
                                                       Root MSE      =  1.3007

------------------------------------------------------------------------------
             |               Robust
unleaded_t~k |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
mops_mog_t~b |   1.146617   .1069966    10.72   0.000     .9318126    1.361422
       _cons |   5.351829    1.26004     4.25   0.000     2.822192    7.881466
------------------------------------------------------------------------------
```

ii. Lag 1

```
. reg unleaded_th_wk mops_mog_th_b_1 if year>=1999 & year<2005, robust

Linear regression                                      Number of obs =      52
                                                       F(  1,    50) =  151.54
                                                       Prob > F      =  0.0000
                                                       R-squared     =  0.6632
                                                       Root MSE      =  1.1775

------------------------------------------------------------------------------
             |               Robust
unleaded_t~k |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
mops_mog_t~1 |   1.221721    .099244    12.31   0.000     1.022383    1.421058
       _cons |   4.456856   1.177967     3.78   0.000      2.09084    6.822872
------------------------------------------------------------------------------
```

iii. Lag 2

```
. reg unleaded_th_wk mops_mog_th_b_2 if year>=1999 & year<2005, robust

Linear regression                                      Number of obs =      51
                                                       F(  1,    49) =  168.10
                                                       Prob > F      =  0.0000
                                                       R-squared     =  0.6975
                                                       Root MSE      =  1.1196

------------------------------------------------------------------------------
             |               Robust
unleaded_t~k |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
mops_mog_t~2 |   1.251495    .096527    12.97   0.000     1.057517    1.445473
       _cons |   4.108261   1.150798     3.57   0.001     1.795645    6.420876
------------------------------------------------------------------------------
```

iv. Lag 3

```
. reg unleaded_th_wk mops_mog_th_b_3 if year>=1999 & year<2005, robust

Linear regression                                      Number of obs =      50
                                                       F(  1,    48) =  169.09
                                                       Prob > F      =  0.0000
                                                       R-squared     =  0.7029
                                                       Root MSE      =  1.1082

------------------------------------------------------------------------------
             |               Robust
unleaded_t~k |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
mops_mog_t~3 |   1.249714   .0961072    13.00   0.000     1.056478     1.44295
       _cons |   4.146067   1.143342     3.63   0.001     1.847224     6.44491
------------------------------------------------------------------------------
```

v. Lag 4

```
. reg unleaded_th_wk mops_mog_th_b_4 if year>=1999 & year<2005, robust
```

```
Linear regression                                      Number of obs =      49
                                                       F(  1,    47) =  159.26
                                                       Prob > F      =  0.0000
                                                       R-squared     =  0.6818
                                                       Root MSE      =  1.1451

------------------------------------------------------------------------------
             |               Robust
unleaded_t~k |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
mops_mog_t~4 |   1.224389   .0970213    12.62   0.000     1.029208    1.419571
       _cons |   4.466813   1.143658     3.91   0.000      2.16607    6.767556
------------------------------------------------------------------------------
```

7. Δ Thailand Unleaded Gasoline Pump Price = f(Δ in MOPS Mogas 95), different periods

A. *Period July 2010 to May 2012

i. Lag 0

```
. reg Dunleaded_th_wk Dmops_mog_th_b if year>=2010 & week>=1958, robust

Linear regression                                      Number of obs =     100
                                                       F(  1,    98) =    8.51
                                                       Prob > F      =  0.0044
                                                       R-squared     =  0.1063
                                                       Root MSE      =  .52478

------------------------------------------------------------------------------
             |               Robust
Dunlead~h_wk |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
Dmops_mo~h_b |   .2245528   .0769977     2.92   0.004     .0717534    .3773523
       _cons |   .0291795   .0527035     0.55   0.581    -.0754088    .1337679
------------------------------------------------------------------------------
```

ii. Lag 1

```
. reg Dunleaded_th_wk Dmops_mog_th_b_1 if year>=2010 & week>=1958, robust

Linear regression                                      Number of obs =     100
                                                       F(  1,    98) =    6.23
                                                       Prob > F      =  0.0142
                                                       R-squared     =  0.2042
                                                       Root MSE      =  .49522

------------------------------------------------------------------------------
             |               Robust
Dunlead~h_wk |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
Dmo~g_th_b_1 |   .3105715   .1244268     2.50   0.014     .0636505    .5574925
       _cons |   .0255746   .0503811     0.51   0.613    -.0744052    .1255543
------------------------------------------------------------------------------
```

iii. Lag 2

```
. reg Dunleaded_th_wk Dmops_mog_th_b_2 if year>=2010 & week>=1958, robust

Linear regression                                      Number of obs =     100
                                                       F(  1,    98) =    0.99
                                                       Prob > F      =  0.3226
                                                       R-squared     =  0.0093
                                                       Root MSE      =  .55254

------------------------------------------------------------------------------
             |               Robust
Dunlead~h_wk |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
Dmo~g_th_b_2 |   .0662879   .0666755     0.99   0.323    -.0660275    .1986033
```

```
       _cons |   .0390416   .0548762     0.71   0.478    -.0698584    .1479415
------------------------------------------------------------------------------
```

iv. Lag 3

```
. reg Dunleaded_th_wk Dmops_mog_th_b_3 if year>=2010 & week>=1958, robust

Linear regression                                      Number of obs =     100
                                                       F(  1,    98) =    2.76
                                                       Prob > F      =  0.0998
                                                       R-squared     =  0.0121
                                                       Root MSE      =  .55174

------------------------------------------------------------------------------
             |               Robust
Dunlead~h_wk |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
Dmo~g_th_b_3 |   .0758012   .0456267     1.66   0.100    -.0147435    .1663459
       _cons |   .0375678   .0559853     0.67   0.504    -.0735334    .1486689
------------------------------------------------------------------------------
```

v. Lag 4

```
. reg Dunleaded_th_wk Dmops_mog_th_b_4 if year>=2010 & week>=1958, robust

Linear regression                                      Number of obs =     100
                                                       F(  1,    98) =    2.48
                                                       Prob > F      =  0.1185
                                                       R-squared     =  0.0263
                                                       Root MSE      =  .54778

------------------------------------------------------------------------------
             |               Robust
Dunlead~h_wk |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
Dmo~g_th_b_4 |  -.1127603   .0715951    -1.57   0.118    -.2548384    .0293179
       _cons |   .0525287   .0544531     0.96   0.337    -.0555317     .160589
------------------------------------------------------------------------------
```

B. *Period 2008 to June 2010

i. Lag 0

```
. reg Dunleaded_th_wk Dmops_mog_th_b if year>=2008 & week<1958, robust

Linear regression                                      Number of obs =     128
                                                       F(  1,   126) =   30.29
                                                       Prob > F      =  0.0000
                                                       R-squared     =  0.2438
                                                       Root MSE      =  .74114

------------------------------------------------------------------------------
             |               Robust
Dunlead~h_wk |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
Dmops_mo~h_b |   .4810736   .0874123     5.50   0.000     .3080873    .6540599
       _cons |   .0137527   .0644235     0.21   0.831    -.1137395    .1412449
------------------------------------------------------------------------------
```

ii. Lag 1

```
. reg Dunleaded_th_wk Dmops_mog_th_b_1 if year>=2008 & week<1958, robust

Linear regression                                      Number of obs =     128
                                                       F(  1,   126) =   42.49
                                                       Prob > F      =  0.0000
                                                       R-squared     =  0.4406
                                                       Root MSE      =  .63778

------------------------------------------------------------------------------
             |               Robust
```

```
Dunlead~h_wk |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
Dmo~g_th_b_1 |   .6475206    .099331     6.52   0.000     .4509474    .8440938
       _cons |   .0107952   .0552714     0.20   0.845    -.0985853    .1201757
------------------------------------------------------------------------------
```

iii. Lag 2

```
. reg Dunleaded_th_wk Dmops_mog_th_b_2 if year>=2008 & week<1958, robust

Linear regression                                      Number of obs =     128
                                                       F(  1,   126) =   16.32
                                                       Prob > F      =  0.0001
                                                       R-squared     =  0.1249
                                                       Root MSE      =  .79312

------------------------------------------------------------------------------
             |               Robust
Dunlead~h_wk |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
Dmo~g_th_b_2 |   .3408375   .0843785     4.04   0.000     .1738549    .5078202
       _cons |  -.0080869   .0698743    -0.12   0.908    -.1463661    .1301924
------------------------------------------------------------------------------
```

iv. Lag 3

```
. reg Dunleaded_th_wk Dmops_mog_th_b_3 if year>=2008 & week<1958, robust

Linear regression                                      Number of obs =     128
                                                       F(  1,   126) =   11.20
                                                       Prob > F      =  0.0011
                                                       R-squared     =  0.0770
                                                       Root MSE      =  .81088

------------------------------------------------------------------------------
             |               Robust
Dunlead~h_wk |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
Dmo~g_th_b_3 |   .2670256   .0798027     3.35   0.001     .1090984    .4249527
       _cons |  -.0134832   .0717679    -0.19   0.851    -.1555097    .1285434
------------------------------------------------------------------------------
```

v. Lag 4

```
. reg Dunleaded_th_wk Dmops_mog_th_b_4 if year>=2008 & week<1958, robust

Linear regression                                      Number of obs =     128
                                                       F(  1,   126) =    1.69
                                                       Prob > F      =  0.1962
                                                       R-squared     =  0.0152
                                                       Root MSE      =  .82742

------------------------------------------------------------------------------
             |               Robust
Dunlead~h_wk |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
Dmo~g_th_b_4 |   .1172974   .0902776     1.30   0.196    -.0613593    .2959541
       _cons |   -.023981   .0737388    -0.33   0.746    -.1699079    .1219459
------------------------------------------------------------------------------
```

C. *Period 2005 to 2007

i. Lag 0

```
. reg Dunleaded_th_wk Dmops_mog_th_b if year>=2005 & year<2008, robust

Linear regression                                      Number of obs =     157
                                                       F(  1,   155) =   20.16
                                                       Prob > F      =  0.0000
                                                       R-squared     =  0.1152
                                                       Root MSE      =  .33477
```

```
------------------------------------------------------------------------------
             |               Robust
Dunlead~h_wk |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
Dmops_mo~h_b |   .1703332   .0379373     4.49   0.000     .0953924     .245274
       _cons |   .0783008   .0275424     2.84   0.005      .023894    .1327077
------------------------------------------------------------------------------
```

ii. Lag 1

```
. reg Dunleaded_th_wk Dmops_mog_th_b_1 if year>=2005 & year<2008, robust

Linear regression                                      Number of obs =     157
                                                       F(  1,   155) =   19.60
                                                       Prob > F      =  0.0000
                                                       R-squared     =  0.3273
                                                       Root MSE      =  .29191

------------------------------------------------------------------------------
             |               Robust
Dunlead~h_wk |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
Dmo~g_th_b_1 |   .2866999   .0647553     4.43   0.000     .1587831    .4146167
       _cons |   .0722212   .0242208     2.98   0.003     .0243759    .1200666
------------------------------------------------------------------------------
```

iii. Lag 2

```
. reg Dunleaded_th_wk Dmops_mog_th_b_2 if year>=2005 & year<2008, robust

Linear regression                                      Number of obs =     157
                                                       F(  1,   155) =   19.08
                                                       Prob > F      =  0.0000
                                                       R-squared     =  0.1651
                                                       Root MSE      =  .32521

------------------------------------------------------------------------------
             |               Robust
Dunlead~h_wk |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
Dmo~g_th_b_2 |   .2048324   .0468953     4.37   0.000     .1121961    .2974688
       _cons |   .0781199   .0263785     2.96   0.004     .0260121    .1302277
------------------------------------------------------------------------------
```

iv. Lag 3

```
. reg Dunleaded_th_wk Dmops_mog_th_b_3 if year>=2005 & year<2008, robust

Linear regression                                      Number of obs =     157
                                                       F(  1,   155) =   26.39
                                                       Prob > F      =  0.0000
                                                       R-squared     =  0.1084
                                                       Root MSE      =  .33606

------------------------------------------------------------------------------
             |               Robust
Dunlead~h_wk |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
Dmo~g_th_b_3 |   .1660251   .0323166     5.14   0.000     .1021874    .2298629
       _cons |   .0801736    .027208     2.95   0.004     .0264273    .1339199
------------------------------------------------------------------------------
```

v. Lag 4

```
. reg Dunleaded_th_wk Dmops_mog_th_b_4 if year>=2005 & year<2008, robust

Linear regression                                      Number of obs =     157
                                                       F(  1,   155) =    5.77
                                                       Prob > F      =  0.0175
                                                       R-squared     =  0.0559
                                                       Root MSE      =  .34581
```

```
------------------------------------------------------------------------------
             |               Robust
Dunlead~h_wk |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
Dmo~g_th_b_4 |   .1170633   .0487326     2.40   0.017     .0207976    .2133291
       _cons |   .0839588   .0279896     3.00   0.003     .0286684    .1392491
------------------------------------------------------------------------------
```

D. *Period 2004

i. Lag 0

```
. reg Dunleaded_th_wk Dmops_mog_th_b if year>=1999 & year<2005, robust

Linear regression                                      Number of obs =      52
                                                       F(  1,    50) =    1.15
                                                       Prob > F      =  0.2895
                                                       R-squared     =  0.0306
                                                       Root MSE      =  .29878

------------------------------------------------------------------------------
             |               Robust
Dunlead~h_wk |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
Dmops_mo~h_b |   .0928806   .0867547     1.07   0.289    -.0813714    .2671325
       _cons |   .0383787   .0414499     0.93   0.359    -.0448759    .1216333
------------------------------------------------------------------------------
```

ii. Lag 1

```
. reg Dunleaded_th_wk Dmops_mog_th_b_1 if year>=1999 & year<2005, robust

Linear regression                                      Number of obs =      51
                                                       F(  1,    49) =    5.33
                                                       Prob > F      =  0.0252
                                                       R-squared     =  0.1476
                                                       Root MSE      =  .28269

------------------------------------------------------------------------------
             |               Robust
Dunlead~h_wk |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
Dmo~g_th_b_1 |   .2047991   .0886752     2.31   0.025     .0265996    .3829986
       _cons |   .0347681   .0395978     0.88   0.384    -.0448067    .1143429
------------------------------------------------------------------------------
```

iii. Lag 2

```
. reg Dunleaded_th_wk Dmops_mog_th_b_2 if year>=1999 & year<2005, robust

Linear regression                                      Number of obs =      50
                                                       F(  1,    48) =    3.34
                                                       Prob > F      =  0.0740
                                                       R-squared     =  0.0720
                                                       Root MSE      =  .29041

------------------------------------------------------------------------------
             |               Robust
Dunlead~h_wk |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
Dmo~g_th_b_2 |     .13938    .076302     1.83   0.074    -.0140354    .2927953
       _cons |   .0448698   .0410496     1.09   0.280     -.037666    .1274056
------------------------------------------------------------------------------
```

iv. Lag 3

```
. reg Dunleaded_th_wk Dmops_mog_th_b_3 if year>=1999 & year<2005, robust

Linear regression                                      Number of obs =      49
                                                       F(  1,    47) =    5.34
```

```
                                                       Prob > F      =  0.0252
                                                       R-squared     =  0.0648
                                                       Root MSE      =  .29454

------------------------------------------------------------------------------
             |               Robust
Dunlead~h_wk |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
Dmo~g_th_b_3 |   .1322521   .0572049     2.31   0.025     .0171707    .2473335
       _cons |   .0459592   .0419601     1.10   0.279    -.0384537    .1303721
------------------------------------------------------------------------------
```

v. Lag 4

```
. reg Dunleaded_th_wk Dmops_mog_th_b_4 if year>=1999 & year<2005, robust

Linear regression                                      Number of obs =      48
                                                       F(  1,    46) =    4.90
                                                       Prob > F      =  0.0319
                                                       R-squared     =  0.0739
                                                       Root MSE      =   .2962

------------------------------------------------------------------------------
             |               Robust
Dunlead~h_wk |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
Dmo~g_th_b_4 |   .1555254   .0702901     2.21   0.032     .0140387     .297012
       _cons |   .0413524   .0427906     0.97   0.339    -.0447806    .1274855
------------------------------------------------------------------------------
```

8. Thailand Diesel Pump Price = f(MOPS Diesel), different periods

A. *Period July 2010 to May 2012

i. Lag 0

```
. reg diesel_th_wk mops_dies_th_b if year>=2010 & week>=1958, robust

Linear regression                                      Number of obs =     100
                                                       F(  1,    98) =   57.28
                                                       Prob > F      =  0.0000
                                                       R-squared     =  0.3348
                                                       Root MSE      =  1.0162

------------------------------------------------------------------------------
             |               Robust
diesel_th_wk |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
mops_die~h_b |   .2155665   .0284815     7.57   0.000     .1590459    .2720871
       _cons |   24.72671   .6219672    39.76   0.000     23.49244    25.96099
------------------------------------------------------------------------------
```

ii. Lag 1

```
. reg diesel_th_wk mops_dies_th_b_1 if year>=2010 & week>=1958, robust

Linear regression                                      Number of obs =     100
                                                       F(  1,    98) =   56.13
                                                       Prob > F      =  0.0000
                                                       R-squared     =  0.3428
                                                       Root MSE      =  1.0101

------------------------------------------------------------------------------
             |               Robust
diesel_th_wk |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
mops_d~h_b_1 |   .2155228   .0287683     7.49   0.000     .1584329    .2726126
       _cons |   24.74157   .6354426    38.94   0.000     23.48055    26.00258
------------------------------------------------------------------------------
```

iii. Lag 2

```
. reg diesel_th_wk mops_dies_th_b_2 if year>=2010 & week>=1958, robust

Linear regression                                      Number of obs =     100
                                                       F(  1,    98) =   55.73
                                                       Prob > F      =  0.0000
                                                       R-squared     =  0.3340
                                                       Root MSE      =  1.0168

------------------------------------------------------------------------------
             |               Robust
diesel_th_wk |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
mops_d~h_b_2 |   .2109228   .0282533     7.47   0.000     .1548549    .2669906
       _cons |   24.85884   .6241468    39.83   0.000     23.62024    26.09744
------------------------------------------------------------------------------
```

iv. Lag 3

```
. reg diesel_th_wk mops_dies_th_b_3 if year>=2010 & week>=1958, robust

Linear regression                                      Number of obs =     100
                                                       F(  1,    98) =   56.35
                                                       Prob > F      =  0.0000
                                                       R-squared     =  0.3209
                                                       Root MSE      =  1.0268

------------------------------------------------------------------------------
             |               Robust
diesel_th_wk |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
```

```
mops_d~h_b_3 |   .2049443   .0273027     7.51   0.000      .150763    .2591256
       _cons |   25.00854   .6004113    41.65   0.000     23.81705    26.20004
------------------------------------------------------------------------------
```

v. Lag 4

```
. reg diesel_th_wk mops_dies_th_b_4 if year>=2010 & week>=1958, robust

Linear regression                                      Number of obs =     100
                                                       F(  1,    98) =   47.25
                                                       Prob > F      =  0.0000
                                                       R-squared     =  0.2912
                                                       Root MSE      =   1.049

------------------------------------------------------------------------------
             |               Robust
diesel_th_wk |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
mops_d~h_b_4 |   .1931671    .028101     6.87   0.000     .1374016    .2489326
       _cons |   25.29034   .6151101    41.12   0.000     24.06967    26.51101
------------------------------------------------------------------------------
```

B. *Period 2008 to June 2010

i. Lag 0

```
. reg diesel_th_wk mops_dies_th_b if year>=2008 & week<1958, robust

Linear regression                                      Number of obs =     129
                                                       F(  1,   127) =  613.44
                                                       Prob > F      =  0.0000
                                                       R-squared     =  0.8520
                                                       Root MSE      =  2.1054

------------------------------------------------------------------------------
             |               Robust
diesel_th_wk |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
mops_die~h_b |   .7623177   .0307786    24.77   0.000     .7014124    .8232231
       _cons |   13.03973   .6473307    20.14   0.000     11.75877    14.32068
------------------------------------------------------------------------------
```

ii. Lag 1

```
. reg diesel_th_wk mops_dies_th_b_1 if year>=2008 & week<1958, robust

Linear regression                                      Number of obs =     129
                                                       F(  1,   127) =  757.44
                                                       Prob > F      =  0.0000
                                                       R-squared     =  0.8511
                                                       Root MSE      =  2.1126

------------------------------------------------------------------------------
             |               Robust
diesel_th_wk |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
mops_d~h_b_1 |   .7622807   .0276975    27.52   0.000     .7074724    .8170889
       _cons |   13.01743   .6146493    21.18   0.000     11.80115    14.23371
------------------------------------------------------------------------------
```

iii. Lag 2

```
. reg diesel_th_wk mops_dies_th_b_2 if year>=2008 & week<1958, robust

Linear regression                                      Number of obs =     129
                                                       F(  1,   127) =  549.02
                                                       Prob > F      =  0.0000
                                                       R-squared     =  0.8175
                                                       Root MSE      =  2.3412
```

```
------------------------------------------------------------------------------
             |               Robust
diesel_th_wk |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
mops_d~h_b_2 |   .7476541   .0319084    23.43   0.000     .6845131    .8107951
       _cons |   13.28413   .6877683    19.31   0.000     11.92316     14.6451
------------------------------------------------------------------------------
```

iv. Lag 3

```
. reg diesel_th_wk mops_dies_th_b_3 if year>=2008 & week<1958, robust

Linear regression                                      Number of obs =     129
                                                       F(  1,   127) =  335.13
                                                       Prob > F      =  0.0000
                                                       R-squared     =  0.7672
                                                       Root MSE      =  2.6425

------------------------------------------------------------------------------
             |               Robust
diesel_th_wk |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
mops_d~h_b_3 |   .7240364   .0395505    18.31   0.000     .6457732    .8022996
       _cons |   13.73727   .8058882    17.05   0.000     12.14256    15.33198
------------------------------------------------------------------------------
```

v. Lag 4

```
. reg diesel_th_wk mops_dies_th_b_4 if year>=2008 & week<1958, robust

Linear regression                                      Number of obs =     129
                                                       F(  1,   127) =  212.67
                                                       Prob > F      =  0.0000
                                                       R-squared     =  0.7082
                                                       Root MSE      =  2.9558

------------------------------------------------------------------------------
             |               Robust
diesel_th_wk |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
mops_d~h_b_4 |   .6954562   .0476891    14.58   0.000     .6010881    .7898242
       _cons |   14.29237   .9316305    15.34   0.000     12.44884     16.1359
------------------------------------------------------------------------------
```

C. *Period 2005 to 2007

i. Lag 0

```
. reg diesel_th_wk mops_dies_th_b if year>=2005 & year<2008, robust

Linear regression                                      Number of obs =     157
                                                       F(  1,   155) =  142.62
                                                       Prob > F      =  0.0000
                                                       R-squared     =  0.5021
                                                       Root MSE      =  2.5642

------------------------------------------------------------------------------
             |               Robust
diesel_th_wk |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
mops_die~h_b |   1.116233   .0934672    11.94   0.000     .9315988    1.300867
       _cons |   3.814496   1.771833     2.15   0.033     .3144403    7.314553
------------------------------------------------------------------------------
```

ii. Lag 1

```
. reg diesel_th_wk mops_dies_th_b_1 if year>=2005 & year<2008, robust

Linear regression                                      Number of obs =     157
                                                       F(  1,   155) =  156.44
                                                       Prob > F      =  0.0000
```

```
                                                       R-squared     =  0.5376
                                                       Root MSE      =  2.4712

------------------------------------------------------------------------------
             |               Robust
diesel_th_wk |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
mops_d~h_b_1 |   1.139139   .0910749    12.51   0.000     .9592306    1.319047
       _cons |   3.472676    1.72109     2.02   0.045     .0728582    6.872495
------------------------------------------------------------------------------
```

iii. Lag 2

```
. reg diesel_th_wk mops_dies_th_b_2 if year>=2005 & year<2008, robust

Linear regression                                      Number of obs =     157
                                                       F(  1,   155) =  157.65
                                                       Prob > F      =  0.0000
                                                       R-squared     =  0.5526
                                                       Root MSE      =  2.4307

------------------------------------------------------------------------------
             |               Robust
diesel_th_wk |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
mops_d~h_b_2 |   1.151473   .0917081    12.56   0.000     .9703142    1.332632
       _cons |    3.31694   1.724957     1.92   0.056    -.0905179    6.724399
------------------------------------------------------------------------------
```

iv. Lag 3

```
. reg diesel_th_wk mops_dies_th_b_3 if year>=2005 & year<2008, robust

Linear regression                                      Number of obs =     157
                                                       F(  1,   155) =  159.43
                                                       Prob > F      =  0.0000
                                                       R-squared     =  0.5578
                                                       Root MSE      =  2.4167

------------------------------------------------------------------------------
             |               Robust
diesel_th_wk |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
mops_d~h_b_3 |   1.149232   .0910173    12.63   0.000     .9694371    1.329026
       _cons |   3.418259   1.703922     2.01   0.047     .0523525    6.784165
------------------------------------------------------------------------------
```

v. Lag 4

```
. reg diesel_th_wk mops_dies_th_b_4 if year>=2005 & year<2008, robust

Linear regression                                      Number of obs =     157
                                                       F(  1,   155) =  158.41
                                                       Prob > F      =  0.0000
                                                       R-squared     =  0.5576
                                                       Root MSE      =  2.4172

------------------------------------------------------------------------------
             |               Robust
diesel_th_wk |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
mops_d~h_b_4 |   1.135399   .0902103    12.59   0.000     .9571983    1.313599
       _cons |   3.722447   1.679708     2.22   0.028     .4043726    7.040521
------------------------------------------------------------------------------
```

D. * 2004

i. Lag 0

```
. reg diesel_th_wk mops_dies_th_b if year>=1999 & year<2005, robust
```

```
Linear regression                                      Number of obs =      53
                                                       F(  1,    51) =    1.37
                                                       Prob > F      =  0.2472
                                                       R-squared     =  0.0324
                                                       Root MSE      =  .02772

------------------------------------------------------------------------------
             |               Robust
diesel_th_wk |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
mops_die~h_b |   .0026109   .0022302     1.17   0.247    -.0018664    .0070881
       _cons |    14.5542    .030473   477.61   0.000     14.49303    14.61538
------------------------------------------------------------------------------
```

ii. Lag 1

```
. reg diesel_th_wk mops_dies_th_b_1 if year>=1999 & year<2005, robust

Linear regression                                      Number of obs =      52
                                                       F(  1,    50) =    1.01
                                                       Prob > F      =  0.3202
                                                       R-squared     =  0.0242
                                                       Root MSE      =  .00553

------------------------------------------------------------------------------
             |               Robust
diesel_th_wk |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
mops_d~h_b_1 |   .0004443   .0004426     1.00   0.320    -.0004446    .0013332
       _cons |   14.58391   .0060615  2406.00   0.000     14.57173    14.59608
------------------------------------------------------------------------------
```

iii. Lag 2

```
. reg diesel_th_wk mops_dies_th_b_2 if year>=1999 & year<2005, robust

Linear regression                                      Number of obs =      51
                                                       F(  0,    49) =       .
                                                       Prob > F      =       .
                                                       R-squared     =       .
                                                       Root MSE      =       0

------------------------------------------------------------------------------
             |               Robust
diesel_th_wk |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
mops_d~h_b_2 |  (omitted)
       _cons |      14.59          .        .       .            .           .
------------------------------------------------------------------------------
```

iv. Lag 3

```
. reg diesel_th_wk mops_dies_th_b_3 if year>=1999 & year<2005, robust

Linear regression                                      Number of obs =      50
                                                       F(  0,    48) =       .
                                                       Prob > F      =       .
                                                       R-squared     =       .
                                                       Root MSE      =       0

------------------------------------------------------------------------------
             |               Robust
diesel_th_wk |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
mops_d~h_b_3 |  (omitted)
       _cons |      14.59          .        .       .            .           .
------------------------------------------------------------------------------
```

v. Lag 4

```
. reg diesel_th_wk mops_dies_th_b_4 if year>=1999 & year<2005, robust
```

```
Linear regression                                      Number of obs =      49
                                                       F(  0,    47) =       .
                                                       Prob > F      =       .
                                                       R-squared     =       .
                                                       Root MSE      =       0

------------------------------------------------------------------------------
             |               Robust
diesel_th_wk |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
mops_d~h_b_4 |  (omitted)
       _cons |      14.59          .        .       .            .           .
------------------------------------------------------------------------------
```

9. ∆ Thailand Diesel Pump Price = f(∆ in MOPS Diesel), different periods

A. *Period July 2010 to May 2012

i. Lag 0

```
. reg Ddiesel_th_wk Dmops_dies_th_b if year>=2010 & week>=1958, robust

Linear regression                                      Number of obs =     100
                                                       F(  1,    98) =    0.16
                                                       Prob > F      =  0.6937
                                                       R-squared     =  0.0014
                                                       Root MSE      =  .42858

------------------------------------------------------------------------------
             |               Robust
Ddiesel_th~k |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
Dmops_di~h_b |   .0203836   .0515984     0.40   0.694    -.0820118     .122779
       _cons |   .0080895   .0418892     0.19   0.847    -.0750382    .0912172
------------------------------------------------------------------------------
```

ii. Lag 1

```
. reg Ddiesel_th_wk Dmops_dies_th_b_1 if year>=2010 & week>=1958, robust

Linear regression                                      Number of obs =     100
                                                       F(  1,    98) =    1.96
                                                       Prob > F      =  0.1651
                                                       R-squared     =  0.0344
                                                       Root MSE      =  .42145

------------------------------------------------------------------------------
             |               Robust
Ddiesel_th~k |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
Dmo~s_th_b_1 |   .0994426    .071107     1.40   0.165    -.0416669    .2405521
       _cons |   .0035677   .0420584     0.08   0.933    -.0798959    .0870312
------------------------------------------------------------------------------
```

iii. Lag 2

```
. reg Ddiesel_th_wk Dmops_dies_th_b_2 if year>=2010 & week>=1958, robust

Linear regression                                      Number of obs =     100
                                                       F(  1,    98) =    0.42
                                                       Prob > F      =  0.5163
                                                       R-squared     =  0.0026
                                                       Root MSE      =  .42833

------------------------------------------------------------------------------
             |               Robust
Ddiesel_th~k |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
Dmo~s_th_b_2 |   .0273454   .0419807     0.65   0.516     -.055964    .1106547
       _cons |   .0075705   .0421279     0.18   0.858    -.0760308    .0911719
------------------------------------------------------------------------------
```

iv. Lag 3

```
. reg Ddiesel_th_wk Dmops_dies_th_b_3 if year>=2010 & week>=1958, robust

Linear regression                                      Number of obs =     100
                                                       F(  1,    98) =    2.68
                                                       Prob > F      =  0.1046
                                                       R-squared     =  0.0382
                                                       Root MSE      =  .42063

------------------------------------------------------------------------------
             |               Robust
Ddiesel_th~k |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
```

```
Dmo~s_th_b_3 |   .1047414   .0639378     1.64   0.105    -.0221411     .231624
       _cons |   .0014331   .0449479     0.03   0.975    -.0877645    .0906308
------------------------------------------------------------------------------
```

v. Lag 4

```
. reg Ddiesel_th_wk Dmops_dies_th_b_4 if year>=2010 & week>=1958, robust

Linear regression                                      Number of obs =     100
                                                       F(  1,    98) =    0.33
                                                       Prob > F      =  0.5694
                                                       R-squared     =  0.0015
                                                       Root MSE      =  .42857

------------------------------------------------------------------------------
             |               Robust
Ddiesel_th~k |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
Dmo~s_th_b_4 |   -.020992   .0367771    -0.57   0.569    -.0939749    .0519909
       _cons |     .01117   .0446753     0.25   0.803    -.0774866    .0998266
------------------------------------------------------------------------------
```

B. *Period 2008 to June 2010

i. Lag 0

```
. reg Ddiesel_th_wk Dmops_dies_th_b if year>=2008 & week<1958, robust

Linear regression                                      Number of obs =     128
                                                       F(  1,   126) =   44.65
                                                       Prob > F      =  0.0000
                                                       R-squared     =  0.2824
                                                       Root MSE      =   .7144

------------------------------------------------------------------------------
             |               Robust
Ddiesel_th~k |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
Dmops_di~h_b |   .4615352   .0690687     6.68   0.000     .3248502    .5982201
       _cons |   .0187812   .0620929     0.30   0.763    -.1040988    .1416612
------------------------------------------------------------------------------
```

ii. Lag 1

```
. reg Ddiesel_th_wk Dmops_dies_th_b_1 if year>=2008 & week<1958, robust

Linear regression                                      Number of obs =     128
                                                       F(  1,   126) =   86.49
                                                       Prob > F      =  0.0000
                                                       R-squared     =  0.5954
                                                       Root MSE      =  .53757

------------------------------------------------------------------------------
             |               Robust
Ddiesel_th~k |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
Dmo~s_th_b_1 |   .6718482   .0722403     9.30   0.000     .5288868    .8148096
       _cons |   .0187232   .0474225     0.39   0.694    -.0751245     .112571
------------------------------------------------------------------------------
```

iii. Lag 2

```
. reg Ddiesel_th_wk Dmops_dies_th_b_2 if year>=2008 & week<1958, robust

Linear regression                                      Number of obs =     128
                                                       F(  1,   126) =   23.53
                                                       Prob > F      =  0.0000
                                                       R-squared     =  0.2169
                                                       Root MSE      =  .74768

------------------------------------------------------------------------------
```

```
             |               Robust
Ddiesel_th~k |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
Dmo~s_th_b_2 |   .4048957   .0834693     4.85   0.000     .2397123     .570079
       _cons |   .0093048    .065944     0.14   0.888    -.1211965    .1398061
------------------------------------------------------------------------------
```

iv. Lag 3

```
. reg Ddiesel_th_wk Dmops_dies_th_b_3 if year>=2008 & week<1958, robust

Linear regression                                      Number of obs =     128
                                                       F(  1,   126) =   10.12
                                                       Prob > F      =  0.0018
                                                       R-squared     =  0.0837
                                                       Root MSE      =   .8088

------------------------------------------------------------------------------
             |               Robust
Ddiesel_th~k |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
Dmo~s_th_b_3 |   .2513089   .0790016     3.18   0.002     .0949671    .4076507
       _cons |   .0086824   .0716632     0.12   0.904    -.1331369    .1505017
------------------------------------------------------------------------------
```

v. Lag 4

```
. reg Ddiesel_th_wk Dmops_dies_th_b_4 if year>=2008 & week<1958, robust

Linear regression                                      Number of obs =     128
                                                       F(  1,   126) =    3.15
                                                       Prob > F      =  0.0784
                                                       R-squared     =  0.0268
                                                       Root MSE      =  .82519

------------------------------------------------------------------------------
             |               Robust
Ddiesel_th~k |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
Dmo~s_th_b_4 |    .140802   .0793586     1.77   0.078    -.0162464    .2978504
       _cons |  -.0084474   .0737628    -0.11   0.909     -.154422    .1375271
------------------------------------------------------------------------------
```

C. *Period 2005 to 2007

i. Lag 0

```
. reg Ddiesel_th_wk Dmops_dies_th_b if year>=2005 & year<2008, robust

Linear regression                                      Number of obs =     157
                                                       F(  1,   155) =   14.74
                                                       Prob > F      =  0.0002
                                                       R-squared     =  0.0612
                                                       Root MSE      =  .33571

------------------------------------------------------------------------------
             |               Robust
Ddiesel_th~k |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
Dmops_di~h_b |   .1252573   .0326288     3.84   0.000     .0608028    .1897117
       _cons |   .0881553   .0273084     3.23   0.002     .0342106    .1421001
------------------------------------------------------------------------------
```

ii. Lag 1

```
. reg Ddiesel_th_wk Dmops_dies_th_b_1 if year>=2005 & year<2008, robust

Linear regression                                      Number of obs =     157
                                                       F(  1,   155) =   11.61
                                                       Prob > F      =  0.0008
```

```
                                                       R-squared     =  0.1377
                                                       Root MSE      =  .32173

------------------------------------------------------------------------------
             |               Robust
Ddiesel_th~k |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
Dmo~s_th_b_1 |   .1864748    .054719     3.41   0.001     .0783835    .2945661
       _cons |   .0852384   .0262035     3.25   0.001     .0334763    .1370005
------------------------------------------------------------------------------
```

iii. Lag 2

```
. reg Ddiesel_th_wk Dmops_dies_th_b_2 if year>=2005 & year<2008, robust

Linear regression                                      Number of obs =     157
                                                       F(  1,   155) =    6.30
                                                       Prob > F      =  0.0131
                                                       R-squared     =  0.0791
                                                       Root MSE      =  .33249

------------------------------------------------------------------------------
             |               Robust
Ddiesel_th~k |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
Dmo~s_th_b_2 |   .1415711   .0563826     2.51   0.013     .0301937    .2529485
       _cons |   .0880764    .026105     3.37   0.001     .0365089    .1396439
------------------------------------------------------------------------------
```

iv. Lag 3

```
. reg Ddiesel_th_wk Dmops_dies_th_b_3 if year>=2005 & year<2008, robust

Linear regression                                      Number of obs =     157
                                                       F(  1,   155) =    8.69
                                                       Prob > F      =  0.0037
                                                       R-squared     =  0.0476
                                                       Root MSE      =  .33812

------------------------------------------------------------------------------
             |               Robust
Ddiesel_th~k |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
Dmo~s_th_b_3 |   .1100655   .0373391     2.95   0.004     .0363063    .1838247
       _cons |   .0899325   .0267942     3.36   0.001     .0370036    .1428613
------------------------------------------------------------------------------
```

v. Lag 4

```
. reg Ddiesel_th_wk Dmops_dies_th_b_4 if year>=2005 & year<2008, robust

Linear regression                                      Number of obs =     157
                                                       F(  1,   155) =    6.62
                                                       Prob > F      =  0.0110
                                                       R-squared     =  0.0592
                                                       Root MSE      =  .33606

------------------------------------------------------------------------------
             |               Robust
Ddiesel_th~k |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
Dmo~s_th_b_4 |   .1214092   .0471754     2.57   0.011     .0282196    .2145988
       _cons |   .0904918   .0260285     3.48   0.001     .0390753    .1419082
------------------------------------------------------------------------------
```

D. *Period 2004

i. Lag 0

```
. reg Ddiesel_th_wk Dmops_dies_th_b if year>=1999 & year<2005, robust
```

```
Linear regression                                      Number of obs =      52
                                                       F(  1,    50) =    1.25
                                                       Prob > F      =  0.2690
                                                       R-squared     =  0.0057
                                                       Root MSE      =  .02293

------------------------------------------------------------------------------
             |               Robust
Ddiesel_th~k |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
Dmops_di~h_b |   .0033111   .0029623     1.12   0.269    -.0026388     .009261
       _cons |   .0037123   .0030688     1.21   0.232    -.0024516    .0098763
------------------------------------------------------------------------------
```

ii. Lag 1

```
. reg Ddiesel_th_wk Dmops_dies_th_b_1 if year>=1999 & year<2005, robust

Linear regression                                      Number of obs =      51
                                                       F(  1,    49) =    0.83
                                                       Prob > F      =  0.3667
                                                       R-squared     =  0.0032
                                                       Root MSE      =  .00565

------------------------------------------------------------------------------
             |               Robust
Ddiesel_th~k |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
Dmo~s_th_b_1 |   .0006454   .0007083     0.91   0.367    -.0007781    .0020688
       _cons |   .0007426   .0007484     0.99   0.326    -.0007613    .0022465
------------------------------------------------------------------------------
```

iii. Lag 2

```
. reg Ddiesel_th_wk Dmops_dies_th_b_2 if year>=1999 & year<2005, robust

Linear regression                                      Number of obs =      50
                                                       F(  0,    48) =       .
                                                       Prob > F      =       .
                                                       R-squared     =       .
                                                       Root MSE      =       0

------------------------------------------------------------------------------
             |               Robust
Ddiesel_th~k |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
Dmo~s_th_b_2 |  (omitted)
       _cons |  (omitted)
------------------------------------------------------------------------------
```

iv. Lag 3

```
. reg Ddiesel_th_wk Dmops_dies_th_b_3 if year>=1999 & year<2005, robust

Linear regression                                      Number of obs =      49
                                                       F(  0,    47) =       .
                                                       Prob > F      =       .
                                                       R-squared     =       .
                                                       Root MSE      =       0

------------------------------------------------------------------------------
             |               Robust
Ddiesel_th~k |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
Dmo~s_th_b_3 |  (omitted)
       _cons |  (omitted)
------------------------------------------------------------------------------
```

v. Lag 4

```
. reg Ddiesel_th_wk Dmops_dies_th_b_4 if year>=1999 & year<2005, robust
```

```
Linear regression                                      Number of obs =      48
                                                       F(  0,    46) =       .
                                                       Prob > F      =       .
                                                       R-squared     =       .
                                                       Root MSE      =       0

------------------------------------------------------------------------------
             |               Robust
Ddiesel_th~k |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
Dmo~s_th_b_4 |  (omitted)
       _cons |  (omitted)
------------------------------------------------------------------------------
```

10. Regressions Checking Asymmetry in Pump Price Changes vis-à-vis MOPS Changes

I. Unleaded

A. *Period July 2010 to June 2012

```
. reg Dunleaded_wk Dmops_mog_php_b_1 Dug_trf_1 Dug_spduty_1 Dug_extax_1 Dug_vat_1
Dbioeth_rq_1 Dbioeth_rt_1 increase_1 i
> f year>=2010 & week>=1958, robust


Linear regression                                      Number of obs =     104
                                                       F(  2,   100) =       .
                                                       Prob > F      =       .
                                                       R-squared     =  0.5840
                                                       Root MSE      =  .53935

------------------------------------------------------------------------------
             |               Robust
Dunleaded_wk |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
Dmops_mog_~1 |   .2451533   .1567411     1.56   0.121    -.0658166    .5561232
Dbioeth_rt_1 |  -.2833187   2.136451    -0.13   0.895    -4.521977     3.95534
  increase_1 |   .8168653   .1867913     4.37   0.000     .4462767    1.187454
       _cons |  -.3952026   .0954323    -4.14   0.000    -.5845375   -.2058676
------------------------------------------------------------------------------
```

B. *Period 2008 to June 2010

```
. reg Dunleaded_wk Dmops_mog_php_b_1  Dug_trf_1 Dug_spduty_1 Dug_extax_1 Dug_vat_1
Dbioeth_rq_1 Dbioeth_rt_1 increase_1 if year>=2008 & week<1958, robust

Linear regression                                      Number of obs =     130
                                                       F(  3,   125) =       .
                                                       Prob > F      =       .
                                                       R-squared     =  0.3363
                                                       Root MSE      =  .84194

------------------------------------------------------------------------------
             |               Robust
Dunleaded_wk |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
Dmops_mog_~1 |   .3861726   .1202865     3.21   0.002     .1481107    .6242346
   Dug_trf_1 |  -11.41681   8.720956    -1.31   0.193    -28.67667    5.843042
Dbioeth_rq_1 |  -1.522522   .2064457    -7.37   0.000    -1.931104    -1.11394
  increase_1 |   .3064315   .2669974     1.15   0.253    -.2219894    .8348525
       _cons |  -.1434461   .1623736    -0.88   0.379    -.4648037    .1779115
------------------------------------------------------------------------------
```

C. *Period 2005 to June 2007

```
. reg Dunleaded_wk Dmops_mog_php_b_4  Dug_trf_4 Dug_extax_4 Dug_vat_4 increase_4 if
year>=2005 & year<2007, robust

Linear regression                                      Number of obs =     104
                                                       F(  4,    99) =    8.24
                                                       Prob > F      =  0.0000
                                                       R-squared     =  0.1340
                                                       Root MSE      =  .42047

------------------------------------------------------------------------------
             |               Robust
Dunleaded_wk |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
Dm~g_php_b_4 |   .1734346   .0650061     2.67   0.009     .0444483    .3024208
```

```
    Dug_trf_4 |   4.734449   3.383336     1.40   0.165    -1.978824    11.44772
    Dug_vat_4 |  -.0234895   .8104688    -0.03   0.977    -1.631635    1.584656
   increase_4 |  -.0081958   .1199885    -0.07   0.946     -.246279    .2298874
        _cons |   .0912864   .0778266     1.17   0.244    -.0631384    .2457111
------------------------------------------------------------------------------
```

D. *Period 1999 to June 2004

```
. reg Dunleaded_wk Dmops_mog_php_b_3  increase_3 if year>=1999 & year<2004, robust

Linear regression                                      Number of obs =     261
                                                       F(  2,   258) =    6.44
                                                       Prob > F      =  0.0019
                                                       R-squared     =  0.0669
                                                       Root MSE      =   .1572

------------------------------------------------------------------------------
             |               Robust
Dunleaded_wk |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
Dm~g_php_b_3 |   .1195147   .0397473     3.01   0.003     .0412442    .1977852
  increase_3 |  -.0316795   .0300934    -1.05   0.293    -.0909395    .0275805
       _cons |   .0499154   .0182302     2.74   0.007     .0140165    .0858144
------------------------------------------------------------------------------
```

E. *Period 1994 to 1996

```
. reg Dunleaded_wk Dmops_mog_php_b_4  increase_4 if year>=1994 & year<1996, robust

Linear regression                                      Number of obs =     100
                                                       F(  2,    97) =    0.70
                                                       Prob > F      =  0.4986
                                                       R-squared     =  0.0102
                                                       Root MSE      =  .15455

------------------------------------------------------------------------------
             |               Robust
Dunleaded_wk |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
Dm~g_php_b_4 |   .1294839   .1347053     0.96   0.339    -.1378689    .3968366
  increase_4 |  -.0478073   .0591417    -0.81   0.421    -.1651873    .0695727
       _cons |  -.0005161   .0248898    -0.02   0.983    -.0499155    .0488833
------------------------------------------------------------------------------
```

II. Diesel

A. *Period July 2010 to June 2012

```
. reg Ddiesel_wk Dmops_dies_php_b_1  increase_d_1 if year>=2010 & week>=1958, robust

Linear regression                                      Number of obs =     104
                                                       F(  2,   101) =   88.90
                                                       Prob > F      =  0.0000
                                                       R-squared     =  0.6214
                                                       Root MSE      =  .49079

------------------------------------------------------------------------------
             |               Robust
  Ddiesel_wk |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
Dmops_dies~1 |   .2412523   .1444287     1.67   0.098    -.0452555      .52776
increase_d_1 |   .8323914   .1600991     5.20   0.000     .5147978    1.149985
       _cons |    -.42195   .0909614    -4.64   0.000    -.6023929    -.241507
------------------------------------------------------------------------------
```

B. *Period 2008 to June 2010

```
. reg Ddiesel_wk Dmops_dies_php_b_1  Ddl_trf_1 Ddl_spduty_1 Ddl_extax_1 Ddl_vat_1
Dbiodies_rq_1 Dbiodies_rt_1 increase_d_ if year>=2008 & week<1958, robust

Linear regression                                      Number of obs =     130
                                                       F(  3,   125) =       .
                                                       Prob > F      =       .
                                                       R-squared     =  0.2585
                                                       Root MSE      =  .94442

------------------------------------------------------------------------------
             |               Robust
  Ddiesel_wk |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
Dmops_dies~1 |   .3115867   .1064345     2.93   0.004     .1009397    .5222337
   Ddl_trf_1 |   -19.8035   12.06665    -1.64   0.103     -43.6849    4.077904
Dbiodies~t_1 |  -133.2904   16.96515    -7.86   0.000    -166.8665   -99.71426
increase_d_1 |   .3165147   .2727978     1.16   0.248     -.223386    .8564154
       _cons |  -.1677034   .1403621    -1.19   0.234    -.4454973    .1100906
------------------------------------------------------------------------------
```

C. *Period 2005 to 2007

```
. reg Ddiesel_wk Dmops_dies_php_b_4 Ddl_trf_4 Ddl_spduty_4 Ddl_extax_4 Ddl_vat_4
Dbiodies_rq_4 Dbiodies_rt_4  increase_d_
> 4 if year>=2005 & year<=2007, robust
note: Ddl_spduty_4 omitted because of collinearity
note: Dbiodies_rt_4 omitted because of collinearity

Linear regression                                      Number of obs =     157
                                                       F(  3,   150) =       .
                                                       Prob > F      =       .
                                                       R-squared     =  0.1757
                                                       Root MSE      =  .25893

------------------------------------------------------------------------------
             |               Robust
  Ddiesel_wk |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
Dmops_dies~4 |   .1170951   .0290098     4.04   0.000     .0597745    .1744156
   Ddl_trf_4 |   9.636016   3.322045     2.90   0.004     3.071969    16.20006
Ddl_spduty_4 |  (omitted)
 Ddl_extax_4 |  -17.92817   8.470605    -2.12   0.036    -34.66528   -1.191053
   Ddl_vat_4 |  -2.418505   1.647685    -1.47   0.144    -5.674175    .8371655
Dbiodies~q_4 |   -.050055   .0330268    -1.52   0.132    -.1153128    .0152029
increase_d_4 |   .0082237   .0579653     0.14   0.887    -.1063103    .1227577
       _cons |   .0858914   .0357196     2.40   0.017     .0153129    .1564699
------------------------------------------------------------------------------
```

D. *Period 1999 to 2004

```
. reg Ddiesel_wk Dmops_dies_php_b_3  increase_d_3 if year>=1999 & year<=2004, robust

Linear regression                                      Number of obs =     313
                                                       F(  2,   310) =   10.28
                                                       Prob > F      =  0.0000
                                                       R-squared     =  0.0663
                                                       Root MSE      =  .14951

------------------------------------------------------------------------------
             |               Robust
  Ddiesel_wk |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
Dmops_dies~3 |   .0753361   .0301049     2.50   0.013     .0161003     .134572
increase_d_3 |   .0160239   .0251163     0.64   0.524    -.0333962    .0654439
       _cons |   .0363808   .0156064     2.33   0.020      .005673    .0670887
```

```
------------------------------------------------------------------------------
```

E. *Period 1994 to 1996

```
. reg Ddiesel_wk Dmops_dies_php_b_2  Ddl_trf_2 Ddl_extax_2 increase_d_2 if year>=1994 &
year<=1996, robust

Linear regression                                      Number of obs =     157
                                                       F(  2,   152) =       .
                                                       Prob > F      =       .
                                                       R-squared     =  0.0241
                                                       Root MSE      =  .14578

------------------------------------------------------------------------------
             |               Robust
  Ddiesel_wk |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
Dmops_dies~2 |   .1829648       .1435     1.28   0.204    -.1005474    .4664769
   Ddl_trf_2 |   -.048279    .1033305    -0.47   0.641    -.2524285    .1558704
 Ddl_extax_2 |  -2.246874    1.208243    -1.86   0.065    -4.633994    .1402449
increase_d_2 |   .0088062    .0248013     0.36   0.723    -.0401937     .057806
       _cons |   .0001954    .0162734     0.01   0.990    -.0319557    .0323466
------------------------------------------------------------------------------
```

B. Regional Variations in Oil Pump Prices

In accordance with the scope of the Terms of Reference (TOR) of the IOPRC to study possible instances of grossly unfair pricing in oil products, the IOPRC decided to carry out an empirical study to determine the factors behind variations in pump prices across the different regions. This was done in response to a common concern of some relevant groups during the consultations conducted by IOPRC. It is also aimed at a better understanding of the pricing of unleaded gasoline and diesel products in the key cities of the Philippines.

B.1. Key Questions

The central issue revolves around two key questions:

1) What is the extent of price differences across regional cities?
2) What are the possible factors accounting for such variations in oil prices?

B.2. Regional Price Variations

The regional oil pricing issue was raised during the public consultations of the IOPRC following the recent surge in international oil prices which led to local pump prices of unleaded gasoline reaching historic highs of P60/liter in July 2008. Up to that point, the pump prices of unleaded gasoline in Visayas and Mindanao cities were generally about 1-4% higher than in Metro Manila although there were instances when regional prices were actually up to 1% lower as in the cities of Davao, CDO and Iligan.

When international oil prices later fell by as much as 70% in early 2009, Metro Manila prices stabilized to around P35-P38/liter. Regional prices did not appear to keep pace in Visayas where prices did not drop below P40/liter during the correctional phase. In contrast, prices in select Mindanao cities were on par with if not actually lower than Metro Manila prices in the first four months of 2009. The situation changed starting in May 2009 when Mindanao prices rose above P40/liter – a price level Metro Manila did not reach until six months later in December 2009. In the interim period, oil prices in both Visayas and Mindanao rose to as high as 25% more than in Metro Manila. It was at this time that the issue of "overpricing" in the regions arose which some attribute to the recouping of supposed losses by oil firms after the government issued E.O. 839 to set oil prices back to the levels of October 15 following the widespread devastation caused by Typhoon Ondoy in September which led to the government declaring a state of calamity in Luzon.

Since the end of 2009, the price situation has stabilized considerably. During the first six months of 2012, prices in Visayas have generally settled to be only 6% higher than in Metro Manila excluding Cebu City where prices are about 5% cheaper. For the same period, prices in Mindanao are now 3% higher excluding Davao City where prices are virtually the same as in Metro Manila.

The historical price differences of pump prices for both unleaded gasoline in Visayas and Mindanao with Metro Manila prices as a percentage of the latter can be seen in Figures B.1 and B.2 respectively. The version for diesel is in Figures B.3 and B.4, respectively.

Figure B.1 % Difference in Unleaded Gasoline Prices of Visayas Cities vs Metro Manila (Jan 2008 – Jun 2012)

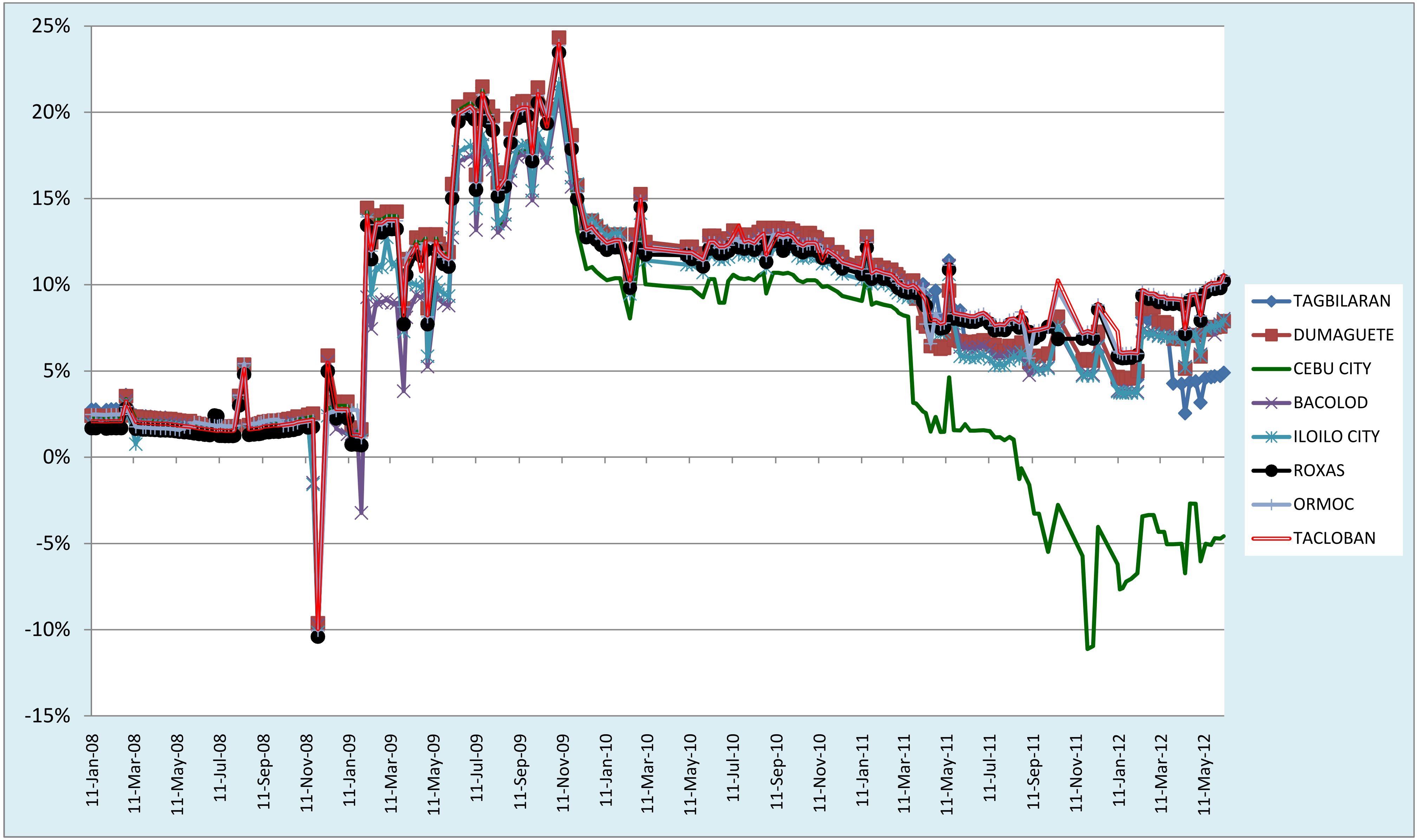


Figure B.2: % Difference in Unleaded Gasoline Prices of Mindanao Cities vs Metro Manila (Mar 2008 – Jun 2012)

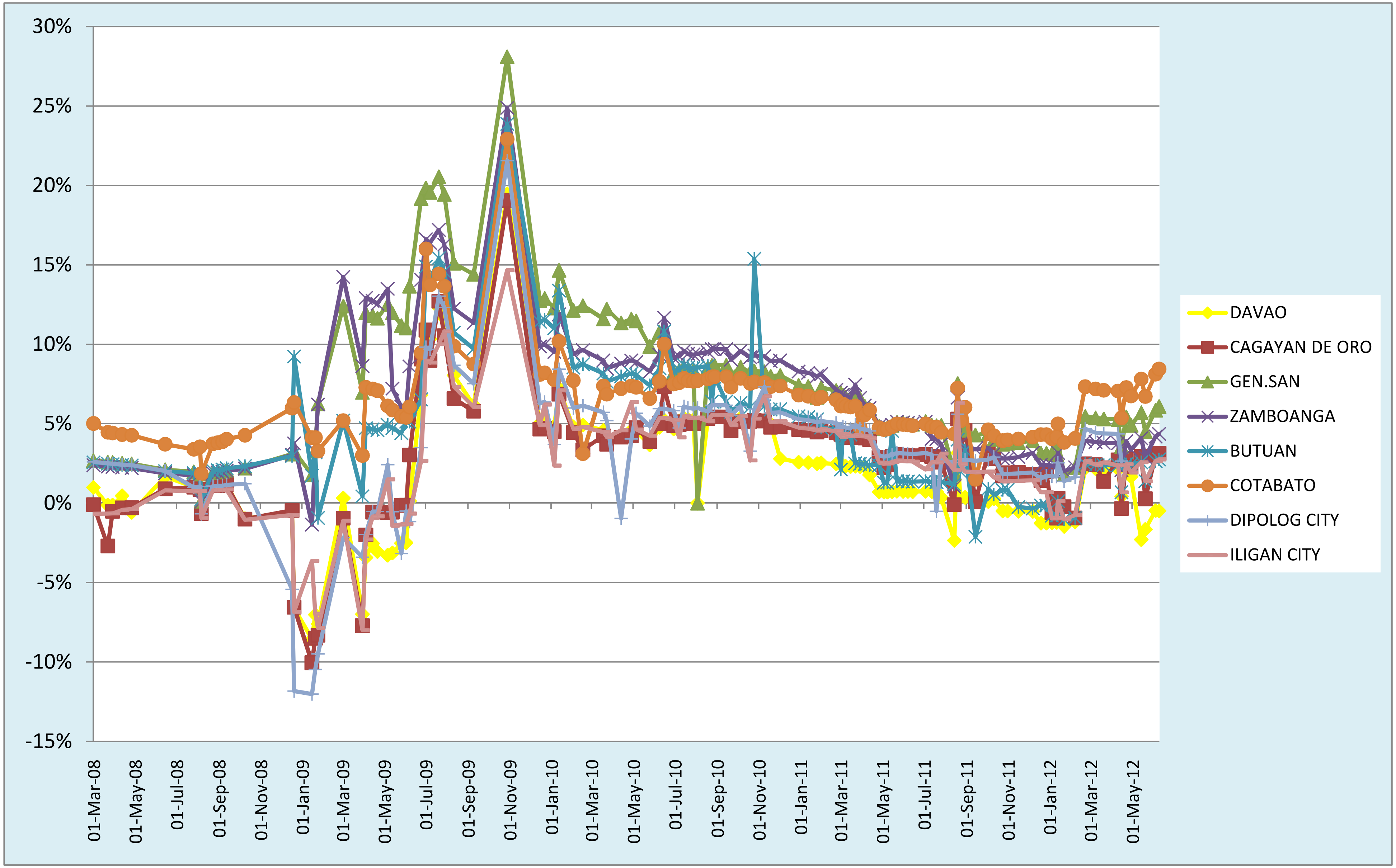


Figure B.3: % Difference in Diesel Prices of Visayan Cities vs Metro Manila (Jan 2008 – Jun 2012)

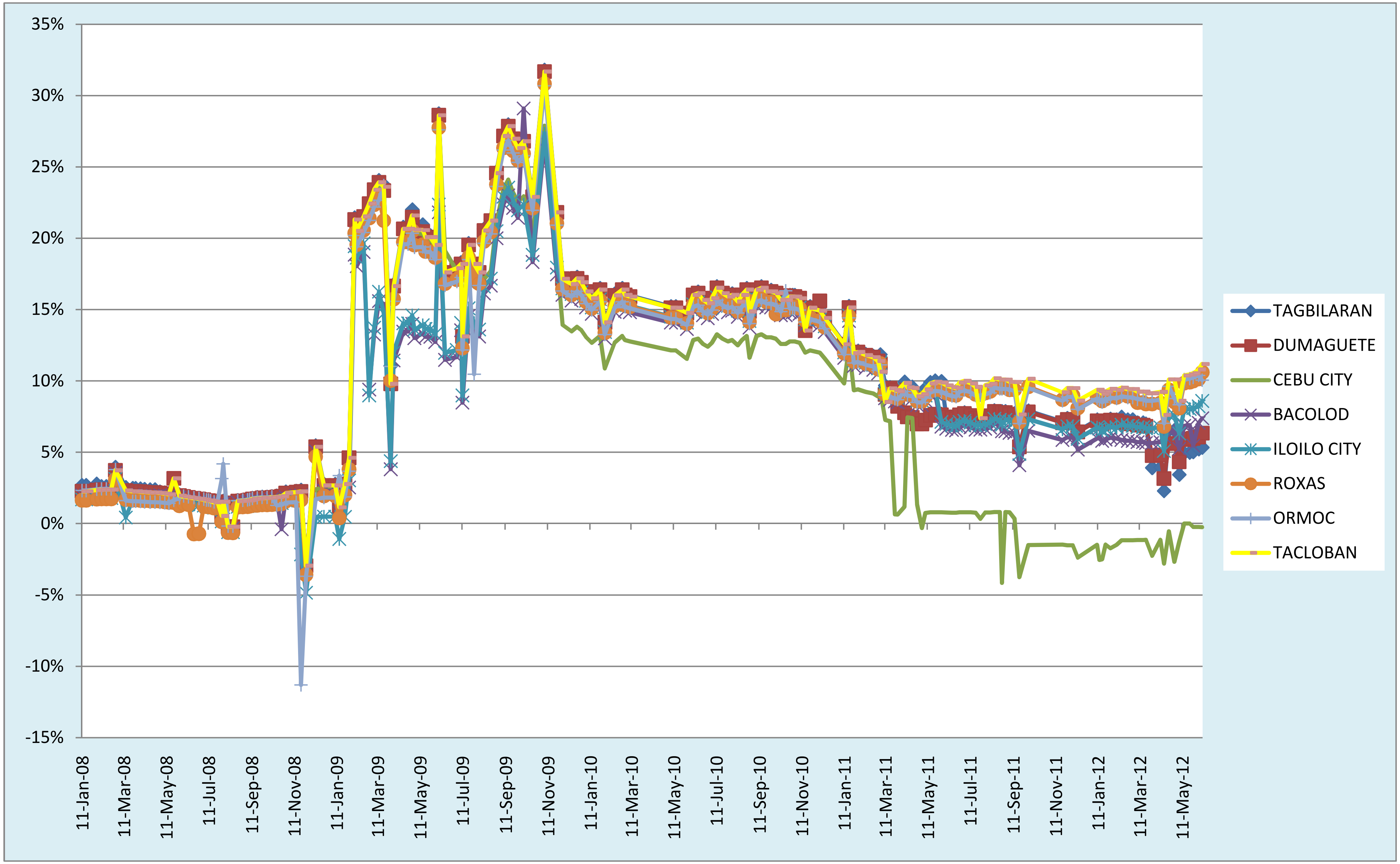
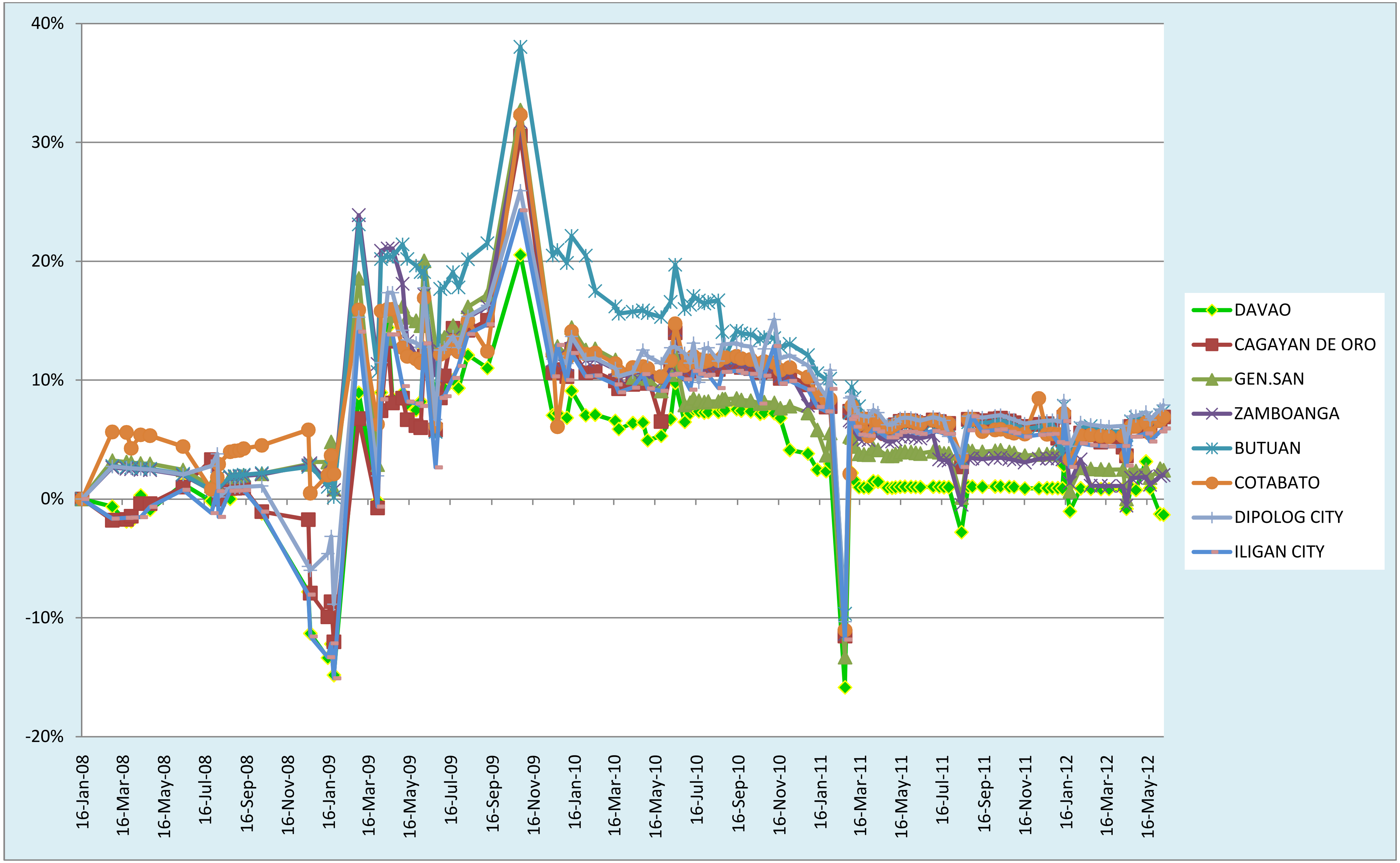


Figure B.4: % Difference in Diesel Prices of Mindanao Cities vs Metro Manila (Jan 2008 – Jun 2012)



The variation of pump prices in diesel follows the same trend as in unleaded gasoline. Diesel prices in Visayas and Mindanao were up to 1-3% higher than in Metro Manila up to July 2008. The price differential peaked in late 2009 when prices in Visayas and Mindanao were priced higher by 20% and 30% respectively. During the first six months of 2012, the price ranges have narrowed to about 6% in Visayas excluding Cebu City where prices have been 5% cheaper and down to 3% in Mindanao – similar to the range of unleaded gasoline.

In summary, it would appear even as the price differential across regions widened during the crisis period in 2009, the circumstances and the price ranges have returned to normal levels at present, except for pump prices in the Visayas which are still 2-3% higher than the pre-crisis ranges. The situation has even been reversed in the case of Cebu City where prices are consistently cheaper than in Metro Manila since September 2011.

B.3. Basic Model and Methodology

This study to account for the variables affecting pump prices across regions was done using cities in Visayas and Mindanao. The main reason for the non-inclusion of Luzon is the difference in basic configuration and means of transport. In Luzon, transport of petroleum product is partly by pipeline and partly by a combination of barges and trucks. For Visayas and Mindanao, there is a necessary transport by sea to each island from Metro Manila or Luzon (refineries) and then trucks for inland cargo movement.

The basic model used here is the so-called gravity model, which relates price to distance (in this case from Manila which is considered as the de facto point of origin of virtually all oil transhipments to Visayas and Mindanao). However, the IOPRC added other explanatory variables to account for price variations. Based on the results of the consultations with oil companies, we included the degree of competition as a key factor in pricing. Of course, the basic cost (the domestic price landed cost or TPLC) remains the fundamental element in the model. And so, the final model is:

City Weekly Pump Price = f (TPLC, Distance, Degree of Competition, Dummy Variable for the Administrative Region of City)

Regression analysis was, thus, carried out across the cities where there was price data available from the DOE, on panel data (4 weekly TPLCs in May-June 2012) so as to provide a way to measure its effect. The IOPRC used the random-effects model for panel data, which means that the intercept estimated is applicable to all cities.

The cities covered are those where price monitoring is done by DOE. Due to budget constraints, it appears that pump prices in Luzon are of a very recent vintage (starts only in August 2012) and are thus not comparable with the time period of data from the following:

Visayas Cities	Region	Mindanao Cities	Region
1. Bacolod	VI	1. Zamboanga	IX
2. Iloilo	VI	2. Cagayan de Oro	X
3. Roxas	VI	3. Iligan	X

4. Cebu	VII	4. Davao	XI
5. Dumaguete	VII	5. Cotobato	XII
6. Tagbilaran	VII	6. General Santos	XII
7. Ormoc	VIII	7. Butuan	CARAGA
8. Tacloban	VIII		

The variables used are explained further below.

a) **Weekly City Pump Price** refers to the end-of-week price of unleaded gasoline and diesel in a particular city during May and June of 2012 as measured in pesos per liter inclusive of all applicable taxes, tariffs and related costs
b) **Tax Paid Landed Cost (TPLC)** refers to the peso-denominated cost of importing one liter of unleaded gasoline inclusive of all applicable fees and charges including but not limited to cost in freight, insurance, brokerage, arrastre, wharfage, Customs processing, documentary stamp tax, excise tax and VAT. Data covers the same week as the pump price mentioned above.
c) **Degree of Competition** is proxied by the No. of Gasoline Stations/city population, and designated in our results as STATPOP
d) **Distance** refers to the shortest possible road distance from Manila in kilometres which is used as a proxy for the nautical distance between ports for the sake of simplicity
e) **Dummy Variable for Region of City** following the official designation by geographic location

The data were sourced from the following: The pump prices of unleaded gasoline and diesel as well as the number of gasoline stations are data from the DOE. The TPLC is the sum of its specific cost components in the OPPC Model that was developed following consultations with oil industry players and relevant government agencies (e.g. DOE, Bureau of Customs, Bureau of Internal Revenue, and the Department of Finance). The city populations were from the 2010 Census of Population as reported by the National Statistics Office. The road distance is sourced from tiptopglobe.com which utilizes Googlemaps to lay out road distances between locations worldwide.

B.4. Analysis of Results

The results for the Model 1 for regional **unleaded gasoline** prices in Visayas-Mindanao are shown in Annex B.1 and summarized in Table B.1 as follows:

Table B.1: Summary Results for Unleaded Gasoline prices

Variable	Symbol	Coefficient	Std. Error	T-statistics	p-value	Significance
Intercept	Const	26.1623	3.98113	6.5716	<0.00001	***
Tax Paid Landed Cost	TPLC_UG	0.712159	0.102858	6.9237	<0.00001	***
Land Travel Distance from Manila	Distance_L	0.00636441	0.00170031	3.7431	0.00048	***

Number of gasoline stations per capita	Statpop	-5.30735	1.16466	-4.5570	0.00003	***
Dummy var - region 6	R6	7.29987	1.24234	5.8759	<0.00001	***
Dummy var - region 7	R7	4.30083	1.21586	3.5373	0.00090	***
Dummy var - region 8	R8	4.59034	0.80605	5.6949	<0.00001	***
Dummy var - region 9	R9	-1.67064	1.06686	-1.5659	0.12380	
Dummy var - region 10	R10	-0.496225	0.801309	-0.6193	0.53861	
Dummy var - region 11	R11	-2.1638	0.975533	-2.2181	0.03122	**
Dummy var - region 12	R12	1.19844	0.842276	1.4229	0.16111	

The positive effect of TPLC on city average pump prices is as expected. The coefficient estimated is highly significant denoting that the landed cost of imported oil remains a significant factor with regard to the pricing of oil products.

The signs for distance and STATPOP coefficients are consistent with our expectations based on economic theory and are highly significant. It means that the cost for transporting the fuel from Manila based on road distance remains a determining price factor. Prices are also negatively influenced by the elevated degree of competition centered around urban areas where retail stations generally converge. It is worthwhile to note that these two diverging factors tend to cancel each other out in far flung areas such as Mindanao cities which are 1000 km or more away from Manila.

The signs for the dummy variable assigned per region, which is to account for factors like Average Income of the city, trade practices, and all other factors not explained by the above three explanatory variables, are not all the same. The normal expectation is for it to be positive. This is true for Regions VI (cities of Bacolod, Iloilo and Roxas), VII (cities of Tagbilaran, Dumaguete and Cebu), VIII (cities of Ormoc and Tacloban), and XII (cities of Cotabato and General Santos). In the case of Regions IX, X and XI the coefficients are negative, which means that compared to the average of other cities, the pump prices there are lower. Why could this be so? Among the possible reasons accounting for other pressures leading to lower prices are (a) the existence of more developed support infrastructure for oil storage and distribution (Region XI) and (b) the susceptibility to smuggling (for Region IX).

The results of Model 2 for regional **diesel** prices in Visayas and Mindanao are shown in Annex B.2 and summarized in Table B.2 as follows.

Table B.2: Summary Results for Diesel prices

Variable	Symbol	Coefficient	Std. Error	T-statistics	p-value	Significance
Intercept	Const	17.2349	3.22648	5.3417	<0.00001	***
Tax Paid Landed Cost	TPLC_D	0.797432	0.0833834	9.5634	<0.00001	***
Land Travel Distance from Manila	Distance_L	0.00135595	0.00124087	1.0927	0.27985	
Number of gasoline stations per capita	Statpop	-2.13407	0.849958	-2.5108	0.01540	**
Dummy var - region 6	R6	1.82844	0.906654	2.0167	0.04923	**
Dummy var - region 7	R7	0.101616	0.887323	0.1145	0.90929	
Dummy var - region 8	R8	1.65873	0.588249	2.8198	0.00692	***
Dummy var - region 9	R9	-3.08552	0.778587	-3.9630	0.00024	***
Dummy var - region 10	R10	-0.562834	0.58479	-0.9625	0.34055	
Dummy var - region 11	R11	-2.55596	0.711936	-3.5901	0.00076	***
Dummy var - region 12	R12	-1.35333	0.614687	-2.2017	0.03243	**

The variables whose signs correspond to economic theory and whose coefficients are highly significant include the TPLC, Station per capita (STATPOP) and dummy variables for Region VI and Region VIII. Higher input costs and average incomes provide impetus for higher pump prices from the cost and demand side. In contrast, more intense price competition based on higher number of retail stations per capita creates downward pressures on fuel prices. The coefficients of dummy variables for Regions IX and XI are highly significant but the signs are both negative denoting downward pressures on prices from other factors (see above). Land distance no longer appears to be a major factor for diesel prices possibly on account of the higher volumes involved.

Based on the Breuch-Pagan test and the Hausman test for both models, the respective null hypothesess that the variance of unit-specific errors is zero and that the GLS estimates are consistent cannot be rejected.

B.5. Conclusions and Policy Implications

Based on theory, the empirical results presented, and industry practices, the IOPRC comes to the following conclusions:

1. The most important explanatory factor is, of course, TPLC which denotes the overriding cost of imported oil. The policies aimed to address this factor are beyond the scope of this specific study and is addressed in the main report.

2. Based on the gravity model, distance is also an important factor in explaining regional pump price differences, at least for unleaded gasoline. Transport and handling costs, of course, play an important role in this, and the overall efficiency of the logistics sector is vital here. The government should, therefore, foster this efficiency by investing in the necessary infrastructure.

3. Based on theory and the testimony of market players and DOE, the results would show that greater competition results in lower prices. This is a very important

empirical finding because it means that promotion of more competition is essential to keep prices relatively low and fair. DOE should, therefore, make a deeper study on the different means to foster competition (e.g., funding common terminal depots, etc.) while exercising regulatory oversight on quantity and quality standards.

4. The negative signs in some of the regional dummy variables lead us to be wary about possible smuggling and/or more maintenance of quality standards and correct quantities delivered to customers. This will involve the Department of Finance (for BOC and the BIR), the DOE (for setting and ensuring quality standards) while the municipal/city governments should ensure the correct quantities since they issue permits, have control over the pumps, and collect business taxes on retail stations.

5. Because of the paucity of data available, the results should be considered as preliminary, and subject to future updating and validation. Nevertheless, the IOPRC believes that it has made a good start in this area of analyzing regional oil price movements.

Annex B.1: Panel Data Model -- Random-effects (GLS), using 60 observations
Included 15 Cities as cross-sectional units
Time-series length = 4 time periods per city
Dependent variable: **Unleaded Gasoline**

	Coefficient	*Std. Error*	*t-ratio*	*p-value*	
Const	26.1623	3.98113	6.5716	<0.00001	***
TPLC_UG	0.712159	0.102858	6.9237	<0.00001	***
Distance_L	0.00636441	0.00170031	3.7431	0.00048	***
Statpop	-5.30735	1.16466	-4.5570	0.00003	***
R6	7.29987	1.24234	5.8759	<0.00001	***
R7	4.30083	1.21586	3.5373	0.00090	***
R8	4.59034	0.80605	5.6949	<0.00001	***
R9	-1.67064	1.06686	-1.5659	0.12380	
R10	-0.496225	0.801309	-0.6193	0.53861	
R11	-2.1638	0.975533	-2.2181	0.03122	**
R12	1.19844	0.842276	1.4229	0.16111	

Mean dependent var	55.78167	S.D. dependent var	2.554445
Sum squared resid	82.31184	S.E. of regression	1.283058
Log-likelihood	-94.62143	Akaike criterion	211.2429
Schwarz criterion	234.2806	Hannan-Quinn	220.2542

'Within' variance = 1.69933
'Between' variance = 0.249929
theta used for quasi-demeaning = 0

Breusch-Pagan test -
Null hypothesis: Variance of the unit-specific error = 0
Asymptotic test statistic: Chi-square(1) = 0.506635
with p-value = 0.476599
This test result indicates that the null hypothesis cannot be rejected.

Hausman test -
Null hypothesis: GLS estimates are consistent
Asymptotic test statistic: Chi-square(10) = 16.5987
with p-value = 0.0837282
This test result indicates that the null hypothesis that the GLS estimates are consistent cannot be rejected

Annex B.2: Panel Data Model: Random-effects (GLS), using 60 observations
Included 15 cross-sectional units
Time-series length = 4
Dependent variable: **Diesel**

	Coefficient	*Std. Error*	*t-ratio*	*p-value*	
Const	17.2349	3.22648	5.3417	<0.00001	***
TPLC_D	0.797432	0.0833834	9.5634	<0.00001	***
Distance_L	0.00135595	0.00124087	1.0927	0.27985	
Statpop	-2.13407	0.849958	-2.5108	0.01540	**
R6	1.82844	0.906654	2.0167	0.04923	**
R7	0.101616	0.887323	0.1145	0.90929	
R8	1.65873	0.588249	2.8198	0.00692	***
R9	-3.08552	0.778587	-3.9630	0.00024	***
R10	-0.562834	0.58479	-0.9625	0.34055	
R11	-2.55596	0.711936	-3.5901	0.00076	***
R12	-1.35333	0.614687	-2.2017	0.03243	**

Mean dependent var	45.84200	S.D. dependent var	1.957806
Sum squared resid	43.83904	S.E. of regression	0.936366
Log-likelihood	-75.72172	Akaike criterion	173.4434
Schwarz criterion	196.4812	Hannan-Quinn	182.4548

'Within' variance = 0.96358
'Between' variance = 0.0802239
theta used for quasi-demeaning = 0

Breusch-Pagan test -
Null hypothesis: Variance of the unit-specific error = 0
Asymptotic test statistic: Chi-square(1) = 1.31481
with p-value = 0.251525
This test result indicates that the null hypothesis cannot be rejected.

Hausman test -
Null hypothesis: GLS estimates are consistent
Asymptotic test statistic: Chi-square(10) = 14.4512
with p-value = 0.153389
This test result indicates that the null hypothesis that the GLS estimates are consistent cannot be rejected.

C. Assessing the Profitability of Oil Industry Players and the Impact of Changes in MOPS and Foreign Exchange on Local Pump Prices.

C.1. Research Question and Significance

The objective of the study is to assess the profitability of the local oil industry players for the purpose of evaluating the reasonableness of the local oil pump prices. The study is designed to answer the following questions:

1. Is there any evidence that oil company/ies accumulated unreasonable profits?
2. Has any oil company profited unreasonably?

The results of this study will be presented to the DOE and Office of the President as a guide to assess the reasonableness of profits earned by the oil companies since the promulgation of the Act. It will address the concerns of various interested groups such as the transport sector, the oil refineries and retailers and the general public as to the proper amount of price regulation afforded to the oil companies.

Profits are necessary for the continuance of private business. However, as diesel and unleaded gasoline are prime commodities, their pricing affects the mainstream of economy. Any increase in cost has a multiplier effect on economy, starting with the transport sector, and then the agricultural and manufacturing sectors. Thus, the perception of the general public as to the causes of high pump prices is very important to keep the peace while ensuring a robust economy.

C.2. Methodology and Data Description

This study is prepared on the assumption that any mark-up made by oil companies will eventually contribute to its profitability, thus, affecting key profitability ratios.

For this purpose, the IOPRC computed the Return on Equity (ROE) and Internal Rate of Return (IRR) and of the local oil industry since its deregulation in 1998 up to 2011. ROE measures a corporation's profitability by showing how much profit a company generated from the money invested by its shareholders. The formula for ROE is Income divided by Net Equity. Both the net income and equity figures are directly sourced from the published audited financial statements in the Securities and Exchange Commission (SEC).

IRR, on the other hand, provides information about the annual return on investment, by taking into account the net cash inflows and the time value of money. The IRR is the discount rate that equates the present value of present and future cash flows to the present value of the total investment. The cash flows and the investment are derived from the audited financial statements, specifically from the cash flow statements and balance sheets.

The computed ROE and IRR are then compared to the risk-free interest rates in general, and the computed ROEs to ROEs of five other industries, namely the mining, telecommunications, power, gaming and real estate.

All data used in this study were from the audited financial statements submitted by the oil companies from 1998 to 2011 to the SEC. Other references are Bangko Sentral ng Pilipinas (BSP) economic statistics and Mean of Platts Singapore (MOPS) provided by the DOE

C.3. Results and Findings

Based on the IOPRC's examination and analyses of the audited financial statements, the following are its findings:

C.3.1. Return on Equity (ROE) versus Risk Free Investments

Risk exposure is inevitable in every business. Generally, to earn higher return, you need take greater risk. In this regard, the IOPRC decided to compare the ROE of oil industry with the risk-free rate of a risk-free investment. Risk-free investment is an investment wherein there is a minimal or no chance of default. Government bonds are conventionally considered to be relatively risk-free since government can raise taxes or create additional currency in order to redeem the bond at maturity.

Normally, the risk-free rate is the minimum return an investor expects for any investment because the latter will not accept additional risk unless the potential rate of return is greater than the risk-free rate. It is expected, therefore, that the rate of return on investment for oil companies is higher than the rate of return on risk free investments. Presented below is a comparison of the average ROE of oil companies from 1998 to 2011 and the rate of return on risk free investments. Because of the unusually high interest rates in 1998 brought about by Asian crisis, the group decided to use the risk free rates in year 2000 onwards for the purpose of this comparison.

Table C.1

Oil Companies	Year	ROE	Risk Free Rate
A	1998	12%	15%
B	1998	6%	15%
C	1998	20%	15%
D	1998	26%	15%
E	1998	17%	15%
F	1998	13%	15%
G	1998	n/a	15%
H	1998	-9%	15%
I	1999	7%	15%
J	2001	2%	17%
K	2002	2%	13%
L	2005	22%	11%
AVERAGE		**11%**	**15%**

The above table shows that eight out of twelve industry players have ROE lower than the risk free interest rates. This seems unusual because as stated earlier, it is expected that oil companies will have a higher rate of return considering the risks associated with the business. Moreover, the average ROE in the oil industry is 4% lower than the average risk free interest rate over the same period. The computed ROEs would have been different had an appraisal of fixed assets been made.

C.3.2. ROE of Oil Industry during Regulated Period versus the Deregulated Period

The IOPRC also compared the average ROE of the oil companies (major players) before the deregulation law in 1998 with the ROE after the deregulation. The IOPRC obtained the audited financial statements from 1994 to 1996 to compute the oil companies' ROE. Results of the computation are as follows:

Oil Companies	Average (regulated)	Average (deregulated)
Average	**23%**	**13%**

From the comparison above, we can see that there was a significant decline in ROE of the major players from 23% to only 13% after the implementation of the deregulation law. It should be noted that during the regulated period, the oil companies did not incur any losses in their audited financial statements since the government agreed to subsidize any losses that is to be incurred by the oil companies. Subsidy from the government through the OPSF was removed during the deregulated period. Furthermore, the deregulation also gave way to the entry of new oil players that increased competition in the industry.

C.3.3. ROE of Oil Industry versus ROE of Other Industries

The IOPRC also compared the average ROE from 1998 to 2011 of the oil companies with the average ROE of companies operating in other industries for the same period. The IOPRC selected three companies operating in a particular industry and computed the average ROE per industry. The table below shows a summary of this comparison:

Oil Industry		Other Industries				
Major Players	**Independent Players**	**Real Estate**	**Mining**	**Telecom**	**Power**	**Gaming**
13%	9%	8%	14%	16%	15%	14%

The comparison shows that the average ROE of oil companies is lower compared to other industries. The computation revealed that the 9% to 13% average ROE of oil industry is lower as compared to the average ROE of other industries, i.e. mining, telecom, power and gaming, that ranges between 14% and 16%. The average ROE for oil companies, on the other hand, is higher by 1% to 5% when compared to the real estate industry which reported only an average ROE of 8%.

C.3.4. Computation of Return on Invested Capital

Return on Invested Capital (ROIC) is *the "measure of how efficient a Company uses its money invested in its operation"*. Money may be defined as those resources owned (equity) or owed (long term debt) by the Company. For Oil Companies, Capital Investments may be in the form of fixed assets and/ or plant assets (refinery assets).

We obtained the audited financial statements from 1998 to 2011 to compute the oil companies' ROIC. Results of the computation are as follows:

Oil Companies	ROIC
A	14%
B	11%
C	11%
D	10%
E	17%
F	-1%
G	-22%
H	-6%
I	3%
J	16%
K	1%
L	5%
Average	**5%**

The above ratio indicates the efficiency and profitability of a company's capital investments. To make the above ratios more meaningful, it is suggested to compare the same against the borrowing rate of the Company's long term debt. Ideally, ROIC should be higher than those of borrowing rate. Otherwise, higher borrowing rate will reduce the earnings available for the shareholders.

C.3.5. Internal Rate of Return (IRR)

The IOPRC also computed the IRR to measure the annual rate of return over the life of an investment. Using the average equity as the cost of investment, the IRR of the oil companies based on their audited financial statements are as follows:

	Refiners			Non Refiners						Others
	A	B	Ave.	C	D	E	F	G	Ave.	H
IRR (13 years)	**14%**	**26%**	**20%**	18%	17%	24%	-4%	n/a	**14%**	18%
Risk Free Rate	15%	15%		15%	15%	15%	15%	15%		15%

The above table shows that the refiners IRR are higher than those companies that do not have refinery facilities. This can be partly attributed to the fact that the depreciation of the facilities, which is a major component of the expense, was added to the net income to arrive at the net cash inflows. Thus, the higher the depreciation expense, the higher will be the net cash inflows.

C.3.6. IRR on Oil Company Stocks

As of the date of this study, Petron Corporation and Phoenix Petroleum are the only players in the oil industry whose shares are listed in the stock exchange. IRR for Petron and Phoenix shares from the time they made an IPO up to December 31, 2011.

	Petron	Phoenix
IPO Price	9	9.8
Return on Investment	3.86	0.45
Market Value as of 12/31/2011	11.3	11.2
IRR	8%	12%

This shows that the IRR , after taking into account the cash and stock dividends is quite lower when compared to the interest rate on treasury bonds and average rate of return for other industries of 15%.

C.3.7. Components of Oil Prices

Currently, there are only two refiners operating in the Philippines. The gasoline and diesel produced by their plants however are not enough to meet the customers' demand. Consequently, all oil companies import some, if not all of the gasoline and diesel that they sell to the public. The components of oil prices were broken down on the assumption that gasoline and diesel were imported as finished products. Based on the current formula on how the changes in pump prices are computed, the components of the pump price in terms of percentages can be expressed as follows:

GASOLINE

	@ P30	@ P40	@ P50	@ P60	@ P70
Product Cost	41%	57%	67%	74%	79%
Government Take	28%	24%	21%	19%	18%
Dealers/Haulers Take	5%	4%	3%	3%	2%
Company Take	26%	15%	9%	4%	1%
	100%	**100%**	**100%**	**100%**	**100%**

DIESEL

	@ P35	@ P40	@ P45	@ P50	@ P55
Product Cost	79%	81%	84%	86%	87%
Government Take	11%	11%	11%	11%	11%
Dealers/Haulers Take	4%	4%	3%	3%	3%
Company Take	6%	4%	2%	0%	-1%
	100%	**100%**	**100%**	**100%**	**100%**

From the above computation, it can be seen that the percentages of oil company profit vary inversely in relation to the pump prices. This means that the formula that is currently being used holds true only over a relevant range.

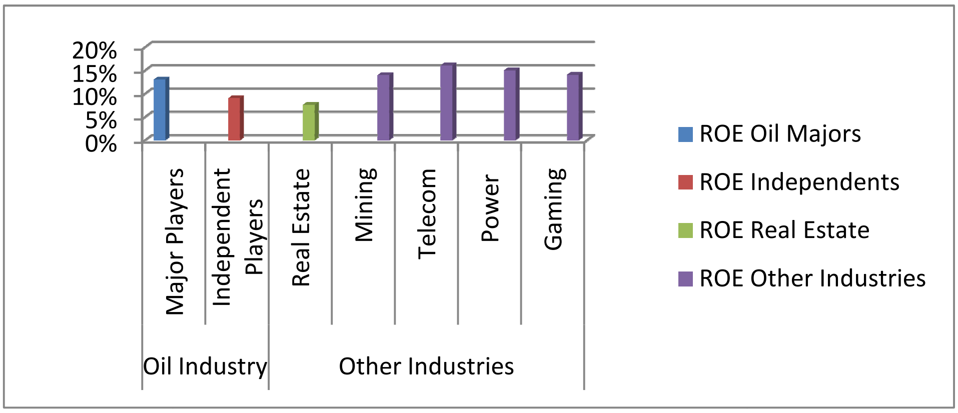
The IOPRC believes that a transparent computation as to how the oil prices are determined will be beneficial to the public. By having this formula, the assumption that the local oil prices are manipulated and the perception that oil price adjustments are not timely implemented can be avoided. Since the oil prices are dictated primarily by the MOPS (define MOPS) and the foreign exchange rate (FOREX), a formula based on the MOPS and FOREX will be very helpful to guide the public in assessing the reasonableness of the weekly adjustments on oil prices. We can therefore estimate the percentage of change in pump prices by using the percentage of change in MOPS and foreign exchange rate.

After analyzing the components of oil prices, the IOPRC determined that the costs components of imported diesel are purely variable in nature- that is, they change directly proportional with the change in MOPS and FOREX. Furthermore, almost all components making up the costs of gasoline are variable in nature; with the exception of the excise taxes, and other minor expenditures, which account for P 5.07 per litre of gasoline. The IOPRC can therefore conclude that a percentage of change in MOPS and FOREX should have exactly the same percentage of change in the corresponding pump prices of diesel. The same computation is true for the prices of gasoline with a margin for error of ± 1% for every 10% change in MOPS/FOREX of the pump price due to the fixed cost components.

On the assumption that the current pump prices are reasonable, any subsequent adjustments will just be computed based on the percentage of change in MOPS and FOREX.

C.4. Conclusions

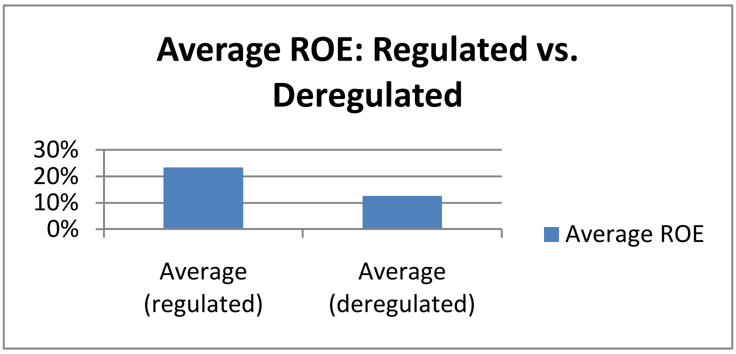
- After studying the ROE and IRR of oil companies and relating the same to the comparative ratio in other industries and risk free interest rates, the IOPRC concludes that the oil companies' profit are reasonable.



- In spite of the fact that the Rate of Return for the oil industry is relatively lower compared to other industries, it is still attractive to enter into this business because of the long term steady return on invested capital brought about by the fact that any risk associated with oil prices and foreign exchange rate are ultimately passed on to the consumers, not to mention the fact that the demand for oil products is continuously increasing, thus providing opportunities for higher peso return on capital investment.

- A percentage of change in MOPS and FOREX should have exactly the same percentage of change in the corresponding pump prices of diesel. The same computation is true for the prices of gasoline with a margin for error of ± 1% for every 10% change in MOPS/FOREX of the pump price due to the fixed cost components.

- The deregulation resulted to a lower ROE of Oil Companies as shown in the graph below, hence we can conclude that the Act is more beneficial to the public rather than to the players in the oil industry.



C.5. Recommendations

After the study of the profitability and components of local oil prices, the IOPRC recommends that the following be considered to increase transparency in oil prices and financial performances and conditions of companies in the oil industry.

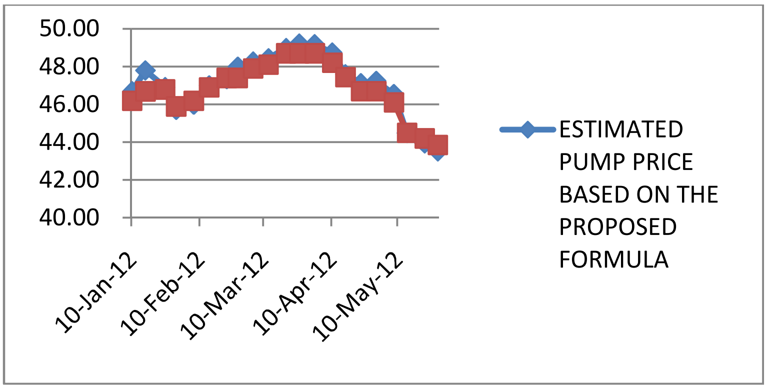
1. The percentage of change in MOPS and FOREX should be used as a guide in monitoring oil price adjustments. By using this as a model, one who has access to MOPS and FOREX through Bloomberg or other sources can compute the potential adjustments to oil prices. Below is a graphical presentation of the difference between pump price using the current formula and the pump price using the suggested formula:

   For diesel:

$$\text{Average } \Delta \text{ in Pump Price}_{w-2} = \frac{(\text{MOPS}_{w-1\ \text{Average}} \times \text{FOREX}_{w-1\ \text{Average}}) - (\text{MOPS}_{w-2\ \text{Average}} \times \text{FOREX}_{w-2\ \text{Average}})}{(\text{MOPS}_{w-1\ \text{Average}} \times \text{FOREX}_{w-1\ \text{Average}})} \times \text{PUMP Price}_{w-2}$$

$$\text{Expected Price} = \text{Average } \Delta \text{ in Pump Price}_{w-2} + \text{Pump Price}_{w-2}$$

   Below is the graphical presentation of the relationship between the proposed pump price calculation model and the actual pump price of diesel



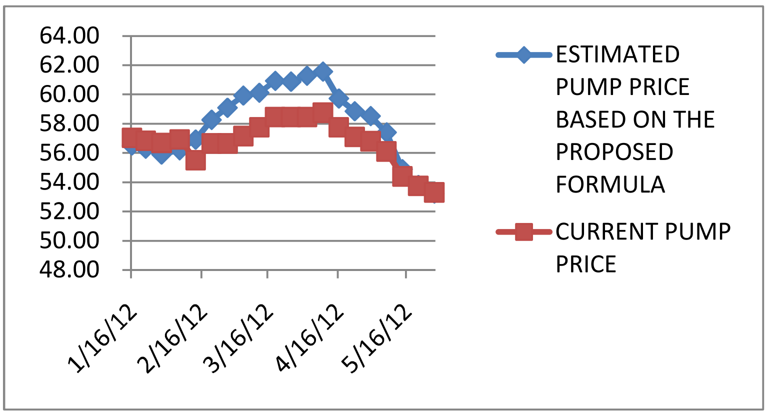
For Gasoline:

$$\text{Average } \Delta \text{ in Pump Price}_{w-2} = \frac{(MOPS_{w\text{-}1\ Average} \times FOREX_{w\text{-}1\ Average}) - (MOPS_{w\text{-}2\ Average} \times FOREX_{w\text{-}2\ Average})}{(MOPS_{w\text{-}1\ Average} \times FOREX_{w\text{-}1\ Average})} \times (\text{PUMP Price}_{w-2} - PhP5)$$

$$\text{Expected Price} = \text{Average } \Delta \text{ in Pump Price}_{w-2} + PhP5$$

Unleaded Gasoline

Below is the graphical presentation of the relationship between the proposed pump price calculation model and the actual pump price of diesel



The above formula takes into account the percent (%) change of average international oil prices and average change of peso-dollar exchange rates as the determinant of the expected changes in oil prices for the following weeks.

If we are to compare the formula to determine the expected change in the prices of diesel and gasoline, we can see that the only difference between the two formulae is that a P5 per litre is excluded in the determination of the change in pump price. The P5 difference is actually the estimated fixed component of the gasoline costs that does not change regardless of the movement in MOPS and foreign exchange rates.

Although the above formulae are effective gauge to predict changes in pump prices, it is important to note that these formulae presume that the profit of oil companies will vary directly in proportion to the change in MOPS and foreign exchange rates. Accordingly, the higher the MOPS and foreign exchange become, the more beneficial it would be for the oil companies.

It is recommended therefore, that when the percentage of increase is unusually high, the government should step in to ensure that the oil companies are not taking advantage of the increases in oil prices and FOREX to make excessive profits. Furthermore, in instances where there are significant increases in MOPS and FOREX, a ceiling on the percentage of increase in pump prices should be set to avoid its domino effect on the prices of other commodities.

2. The DOE should establish stricter and more industry-specific reporting guidelines. Correspondingly, the DOE should build a staff of industry financial experts.

3. The DOE should continuously monitor the quality of petroleum products which do not comply with the national standard of quality. Quality of products may suffer just to maintain the target return/profit.

4. The DOE should post an annual analysis of oil industry performance, including findings and issues encountered by the Joint Committees formed by the DOE.

D. Oil Pump Price Model and Oil company Gross Margin

Summary

By going into each value adding step in the oil supply chain, either thru refining of crude oil or direct importation of finished petroleum products such as gasoline and diesel and then marketing, transporting, storing and blending in depots with biofuels such as ETHANOL and CME BIODIESEL, then hauling and retailing at dealer's pumps, it is possible to calculate the oil company gross margin (also known as oil company take) by subtracting from the actual pump price all the intervening costs arising from its importation, unloading, processing, marketing, transporting and retailing.

This residual value or oil company gross margin takes care of the oil company's costs and provides also a profit margin that serves as the economic incentive or driver for importing, refining, processing, marketing, distributing and retailing of petroleum products.

And applying the concepts of accounting, engineering and economics, a mathematical formula could be developed to model and represent each importation value adding activities to arrive at the Tax Paid Landed Cost (TPLC).

Once the TPLC is known, all other local value adding activities such as refining, processing, transshipment, pipeline, depot operation and biofuels addition, hauling and retailing will lead to the determination of the pump price.

Using precise accounting tools is by far the best method of calculating the reasonable pump price rather than ratio and proportion methods proposed by other government agencies as well as so called rule of thumb formulas.

The pump price is calculated using the model below:

PP =TPLC * (1 – % biofuel) + [TPLC * (1 - % biofuel) * %GM + (TS + PL + DE) * (1 – % biofuel) + BIO + HF + DM] * (1 + %VAT2) + OPSF

To calibrate this model, the % gross margin (GM) is derived algebraically as follows:

%GM = {[PP - OPSF - TPLC * (1 - % biofuel)] / (1 + VAT2) – [(TS + PL + DE) * (1 - % biofuel) + BIO + HF + DM]} / {TPLC * (1 - % biofuel)}

Finally, after we have calibrated the model by determining the economic behavior of the oil company as exemplified by its % GM appetite, the absolute oil company gross margin in Pesos per Liter is calculated:

OCGM (P/L) = TPLC * (1 - % biofuel) * %GM

The above formulas were applied on data supplied by the DOE and the oil companies from Jan 1973 - May 2012 (the data consist of average pump price, exchange rate, Dubai and MOPS, customs duty, excise tax and value added tax, BOC imposts, transshipment, pipeline, depot operation, hauling fee and dealer's margin). Recent data (2005-2012) were supplied by the oil companies while earlier data (1984-2004) were supplied by the DOE, and very early data (1973-1983) were culled from other sources such as the DOE and the data base of Engr. Marcial Ocampo, formerly Section Chief for Transport, Buildings and Machineries at the Conservation Division of the Bureau of Energy Utilization (BEU) of the Department of Energy.

Main Findings:

The main findings from applying the above formulas on the historical data are summarized below:

1) The TPLC and Oil Pump Price Formulas have calculated % OCGM as well as absolute Pesos per Liter gross margin that are no larger than 7.300 P/L in 2011 for gasoline and 1.437 P/L in 1985 for diesel.
2) In 2012 (January-June average), the difference between the gasoline pump price and its TPLC includes costs for transshipment, pipeline, depot, biofuels, hauling and dealer's margin which totals 5.053 P/L and the gross margin is 6.863 P/L. Hence, there is no over pricing of the order of 8.0 P/L as manifested by other government agencies, consumer groups and NGOs.
3) As of June 2012, the average OCGM is 16.96% of TPLC for gasoline (6.863 P/L) and 2.17% of TPLC for diesel (0.885 P/L). This indicates that the oil companies are heavily subsidizing diesel used mainly for public transport thru the larger margins of gasoline used mainly for private motoring. It is for this reason that small retail outlets with mainly diesel pumps have gone out of business or suffering from financial difficulty because of the low gross margin from diesel retailing.
4) Based on the ratio of gross margin to pump price of 12.33% and 1.93% for gasoline and diesel, respectively, an estimate of the oil industry profitability will be in the order of 5.39% return on sales assuming that sales proportion are in the order of 1 part gasoline sales to 2 parts diesel sales. The reader is advised to refer to the other TWG report on profitability that utilized the oil company financial statements submitted to the SEC.
5) The OCGM for gasoline during the regulated periods (63.93% of TPLC from 1973-1983; 31.93% of TPLC from 1984-1997) were much larger than that

during the deregulated period (11.38% of TPLC in 1998; 6.74% of TPLC from 1999-2005; 11.57% of TPLC from 2006-June 2012), indicating that the level of competition arising from the oil industry deregulation law. It appears that the regulated period assures profit to the least efficient operating refinery or marketer.

6) On the other hand, the OCGM for diesel during the regulated periods (-17.84% of TPLC from 1973-1983; 7.26% of TPLC from 1984-1997) as well as during the deregulated period (13.89% of TPLC in 1998; 1.38% of TPLC from 1999-2005; 0.79% of TPLC from 2006-June 2012) were consistently lower compared to gasoline, indicating that oil companies are cross-subsidizing diesel from their higher gasoline margins to sustain their operations.
7) The behavior of the oil industry is characterized today by series of weekly price adjustments to approximate but not equal the calculated price increase in the international markets (Dubai, MOPS) based on current prices vs. last week's average cost inputs. Likewise, downward price adjustments do not reflect immediately the calculated price decrease in the international markets as there are under recoveries arising from the earlier moderate price increase that needs to be recovered to sustain their operations.

Conclusions:

There may be isolated instances of larger than normal gross margins on a daily or weekly basis as the oil companies adjust their gross margins to recoup spikes in international crude oil and product prices. But the IOPRC can not rely on transient short-term adjustments to conclude that there is deliberate overpricing as this will constitute cherry-picking of data such as when using ratio and proportion when ratio of pump price to MOPS is lower in previous period when compared to current period with an international price spike where the ratio of pump price to MOPS is extraordinarily high; hence, the predicted price using ratio and proportion would also be abnormally high and some NGOs and government agency therefore conclude that there was overpricing.

With today's 10% ETHANOL gasoline blend, it is expected that oil companies will adjust upward domestic prices up to 90% or less (less because of competition) of the increase in the peso per liter equivalent value of gasoline MOPS and also 90% or less (less because of any previous under recoveries) of the decrease in the MOPS of gasoline. This is because the gasoline blend consists of only 90% pure gasoline component.

For diesel with 2% CME biodiesel blend, the oil companies will adjust upward domestic prices up to 98% or less of the increase in diesel MOPS and also 98% or less of the decrease in diesel MOPS. Aside from the level of adjustment, the upward price adjustments are effective immediately while downward price adjustments are implemented immediately but held for a longer period of time as oil companies recover any previous under recoveries.

On a monthly and annual average basis, however, can it be concluded that there is overpricing for gasoline and diesel? THE ANSWER IS NONE.

Using an OPPC Model developed by the Committee -- wherein the retail prices of gasoline and diesel are built up from import costs to transport and distribution including all taxes -- there is no evidence of overpricing:

- Using the OPPC model developed by the IOPRC, no evidence was found of overpricing of some P8 per liter for diesel and P16 per liter for unleaded gasoline, as claimed by some consumer groups. The largest annual average gross margin was 7.300 P/L in 2011 and 1.437 P/L in 1985 for gasoline and diesel, respectively.
- As of June 2012, the average OCGM was estimated at 16.96% of Tax Paid Landed Cost (TPLC) for gasoline and 2.17% of TPLC for diesel.
- In June 2012, the average OCGM as percentage of pump price is 12.3% (6.86 P/L) for gasoline and 1.9% (0.88 P/L) for diesel. This gives a weighted average of 5.4% (2.88 P/L), assuming that sales proportion are in the order of one-third gasoline sales to two-thirds diesel sales.
- The OCGM for gasoline during the regulated periods were much larger than that during the deregulated period, indicating the level of competition arising from the oil industry deregulation law.
- On the other hand, the OCGM for diesel during the regulated period, as well as during the deregulated period, were consistently lower compared to gasoline. This suggests that oil companies are cross-subsidizing diesel from their higher gasoline margins to sustain their operations.

Recommendations:

The TWG for Oil Pump Price Model and Oil Company Gross Margin therefore recommends the following:

1) The DOE should adopt the OPPC Model for calculating the TPLC and the Pump Price to consider accurately the effect of biofuels addition and other logistical costs. Other approximate methods such as Ratio and Proportion (such as pump price to MOPS ratio) and Rule of Thumb (such as 3 US$/bbl MOPS change per 1 PhP/L or 1 PhP/US$ FOREX change per 1 PhP/L) are at best approximations and may not be able to predict accurately absolute pump price in Pesos per Liter or price adjustments and are not recommended for regulatory use and monitoring by the DOE.

2) The DOE should make available through its website the OPPC Model for TPLC and Pump Prices to regulators, the academe, and other interested parties

Acknowledgements

The group that worked on the Oil Pump Price Model and Oil Company Gross Margin is composed of the IOPRC Principal Member, Dr. Rene Azurin, formerly of the UP College of Business Administration and his designated TWG member Engr. Marcial Ocampo, an Independent International Expert/Consultant doing international engagements for the mid-term and full-term evaluation of UNDP projects on energy & climate change (Indonesia, China and India) as well as local projects related to preparation of feed-in-tariff determination, pre-feasibility studies and resource assessment for renewable energy and conventional and fossil power generation such as gas, oil, coal, geothermal, hydro and nuclear energy.

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D.1. Chapter 1 – Introduction

This technical paper will present the various OPPC Model (regulated and de-regulated periods) which together with the supply cost, end pump price, taxes (customs duty, special duty or Estanislao Peso, excise tax or specific tax, value added tax or VAT), biofuels (10% ETHANOL gasoline blend and 2% CME BIODIESEL blend), logistical costs (transshipment, pipeline, depot operation, hauling fee), and dealer's margin will be subsequently used to calculate the residual component (by difference) that goes to the oil company (refiner, importer/marketer).

This residual component is generally known as the oil company gross margin which takes care of the oil company's costs for refining, storage, marketing, administrative and profit margin. This profit margin provides the economic incentive for an oil company to invest in the business of importing crude oil or finished products and refining the crude oil into finished products such as LPG, gasoline, kerosene, diesel, bunker or fuel oil and asphalt.

The OPPC Model requires numerous data that are at times difficult to obtain or verify such as import entries on quantity, value and product density and various cost factors such as Dubai crude oil price and MOPS of finished products, ocean freight, ocean insurance and application of BOC tables for the calculation of customs duty, brokerage fee, bank charges, arrastre charge, wharfage charge, import processing fee, customs documentary stamp, excise (specific) tax and VAT on the importation activities to arrive at the Tax Paid Landed Cost (TPLC) of the crude or product.

The coverage of this oil price review is broken down into the following regulatory era, namely: regulated period, unregulated period and the RVAT period as shown below:

Table D.1: COVERAGE OF SAMPLE DATA

Era	Unleaded Gas	Diesel
Regulated	1 Jan 1973 - 13 Mar 1998	1 Jan 1973 - 13 Mar 1998
Unregulated	14 Mar 1998 - 31 Oct 2005	14 Mar 1998 - 31 Oct 2005
RVAT	1 Nov 2005 - 9 Mar 2012	1 Nov 2005 - 9 Mar 2012

Source: DOE

The various executive orders, republic acts affecting the Tax Paid Landed Cost of unleaded gasoline and diesel are shown below:

Table D.2: LIST OF MILESTONE EVENTS AFFECTING THE TAXATION OF UNLEADED GASOLINE AND DIESEL

Event	Date of Effectivity	UNLEADED GAS			DIESEL			VAT
		Tariff	Special Duty	Excise Tax	Tariff	Special Duty	Excise Tax	
EO 470	20-Aug-91	20%	1.00		20%	1.00		
RA 6965	19-Sep-90			2.52			0.45	
EO 115	27 Jul-93		2.00			2.00		
EO160	23 Mar 94		1.00			1.00		
RA 8180	2-Apr-96	7%			3%			
RA 8184	14-Aug-96		0.00	4.35		0.00	1.63	
EO 461	4-Jan-98	3%			3%			
RA 8479 - Oil Deregulation Law	14-Mar-98							
EO 336	1-Jan-05	5%			5%			
EO 440	1-Jul-05	3%			3%			
RA 9337 – RVAT	1-Nov-05			4.35			0.00	10%
	1-Feb-06							12%
EO 527	*1-Jun-06*	2%			2%			
	1-Jul-06	3%			3%			
	17-Jul-06	2%			2%			
	1-Oct-06	3%			3%			

EO 691 - Automatic Tariff Adjustments	1-Feb-08	1%			1%			
	1-Mar-08	2%			2%			
	1-Apr-08	1%			1%			
	1-Jun-08	0%			0%			
	1-Oct-08	1%			1%			
	1-Nov-08	3%			3%			
EO 850 – CEPT	1-Jan-10	0%			0%			
EO 851 – ASEAN	1-Jan-10	0%			0%			
EO 890	4-Jul-10	0%			0%			
RA 9367	May-07				1%	CME	B1 biodiesel	
	Jan-09				2%	CME	B2 biodiesel	
	Jan-09	5%	ethanol	E5 bioethanol				
	Jan-11	10%	ethanol	E10 bioethanol				

Source: Department of Energy (as of 26 April 2012)

The Bureau of Customs provided the table for brokerage fees and import processing fees in addition to customs document stamps of P256 per import entry:

Table D.3 BUREAU OF CUSTOMS BROKERAGE FEES

(May 22, 2001 CUSTOMS ADMINISTRATIVE ORDER NO. 01-2001)

Dutiable Value of Shipment	Old Rate Pesos	New Rates Pesos
Up to P10,000	885.95	1300
Over P10,000 to 20,000	1,328.91	2,000.00
Over P20,000 to 30,000	1,771.91	2,700.00
Over P30,000 to 40,000	2,214.84	3,300.00
Over P40,000 to 50,000	2,433.38	3,600.00

Over P50,000 to 60,000	2,657.82	4,000.00
Over P60,000 to 100,000	3,100.79	4,700.00
Over P100,000 to 200,000	3,543.75	5,300.00
Over P200,000		5,300 + 1/8 of 1% over P200,000

Table D.4 BUREAU OF CUSTOMS IMPORT PROCESSING FEES
(May 22, 2001 CUSTOMS ADMINISTRATIVE ORDER NO. 02-2001)

Dutiable Value of Shipment	**New Rates Pesos per Entry**
Up to P250,000	250.00
Over P250,000 to 500,000	500.00
Over P500,000 to 750,000	750.00
Over P750,000	1,000.00

The customs dutiable value is the CIF value after adding the freight on board (FOB which is also the MOPS of the finished product or the value of the DUBAI crude oil), ocean freight (around 2% of FOB) and ocean insurance (around 4% of FOB).

Bank charge at the rate of 0.00125 of the CIF value is also levied.

Arrastre charge of P122 per metric ton is then collected by the port operator (e.g. CTSI) while a wharfage charge of P36.65 per metric ton is collected by the Philippine Port Authority (PPA).

An excise tax or specific tax has been levied by the national government on gasoline (4.35 ₱/L) and diesel (1.63 ₱/L). Presently, however, only gasoline, avturbo (3.67 ₱/L) and lubes (4.50 ₱/L) have excise taxes as diesel has been exempted from the excise tax being a delicate transport fuel commodity. However, all of the products including diesel have VAT of 12% on all importation activities.

Then local value-adding activities are aggregated such as oil company gross margin (OCGM), other oil company costs (OOCC) such as transshipment (TS), pipeline (PL), depot (DE), biofuels (BF), hauler’s fee (HF) and dealer’s margin (DM), in order to calculate the 12% VAT on all local value adding activities. The pump price is then calculated by adding all the above cost factors, which in certain cases are different from the actual pump price adopted by the oil companies. There may be small as well as significant errors on the estimates of certain cost factors since not all companies surveyed provided the requested local costs.

Table D.5: LOCAL VALUE-ADDING ACTIVITIES FOR GASOLINE AND DIESEL (Average value from Oil Company submission to the IOPRC 2012)

Unleaded Gasoline	TS	DE	BF	HF	DM	% BF	Pure BF
2005	0.100	0.120	0.000	0.150	2.000	0.00%	0.000
2006	0.321	0.110	0.000	0.163	1.600	0.00%	0.000
2007	0.337	0.343	0.000	0.155	1.467	0.00%	0.000
2008	0.357	0.345	0.000	0.168	1.467	0.00%	0.000
2009	0.335	0.270	2.680	0.181	1.475	5.00%	53.609
2010	0.391	0.312	3.364	0.156	1.452	5.00%	67.280
2011	0.553	0.286	3.445	0.181	1.596	10.00%	34.447
2012	0.523	0.312	3.779	0.360	1.826	10.00%	37.790
Diesel	**TS**	**DE**	**BF**	**HF**	**DM**	**% BF**	**Pure BF**
2005	0.100	0.120	0.000	0.150	1.500	0.00%	0.000
2006	0.321	0.305	0.000	0.163	1.300	0.00%	0.000
2007	0.337	0.343	0.578	0.155	1.267	0.67%	57.750
2008	0.357	0.345	0.854	0.168	1.267	2.00%	42.700
2009	0.463	0.270	1.068	0.181	1.250	2.00%	53.418
2010	0.449	0.308	1.025	0.156	1.286	2.00%	51.260
2011	0.553	0.295	1.523	0.181	1.300	2.00%	76.133
2012	0.523	0.311	1.234	0.197	1.472	2.00%	61.679

Table D.6: LOCAL VALUE-ADDING ACTIVITIES FOR GASOLINE AND DIESEL (Estimated from historical DOE data)

Unleaded Gasoline	TS	DE	BF	HF	DM
1973	0.016	0.016		0.029	0.157
1974	0.016	0.016		0.029	0.157
1975	0.016	0.016		0.029	0.157
1976	0.016	0.016		0.029	0.157
1977	0.016	0.016		0.029	0.157
1978	0.032	0.031		0.057	0.313
1979	0.032	0.031		0.057	0.313
1980	0.032	0.031		0.057	0.313
1981	0.032	0.031		0.057	0.313

1982	0.032	0.031		0.057	0.313
1983	0.032	0.031		0.057	0.313

Unleaded Gasoline	**TS**	**DE**	**BF**	**HF**	**DM**
1984	0.032	0.031		0.057	0.313
1985	0.032	0.031		0.057	0.313
1986	0.032	0.031		0.057	0.313
1987	0.032	0.031		0.057	0.313
1988	0.063	0.063		0.114	0.626
1989	0.063	0.063		0.114	0.626
1990	0.063	0.063		0.114	0.626
1991	0.063	0.063		0.114	0.626
1992	0.063	0.063		0.114	0.626
1993	0.063	0.063		0.114	0.626
1994	0.063	0.063		0.114	0.626
1995	0.063	0.063		0.114	0.626
1996	0.063	0.063		0.114	0.626
1997	0.079	0.089		0.171	0.746
1998 (transition)	0.100	0.125		0.250	0.913
1999	0.100	0.125		0.250	0.913
2000	0.100	0.125		0.250	0.913
2001	0.100	0.125		0.250	0.913
2002	0.100	0.125		0.250	0.913
2003	0.100	0.125		0.250	0.913
2004	0.100	0.125		0.250	0.913

Diesel	**TS**	**DE**	**BF**	**HF**	**DM**
1973	0.016	0.016		0.029	0.126
1974	0.016	0.016		0.029	0.126
1975	0.016	0.016		0.029	0.126
1976	0.016	0.016		0.029	0.126
1977	0.016	0.016		0.029	0.126
1978	0.032	0.031		0.057	0.253
1979	0.032	0.031		0.057	0.253
1980	0.032	0.031		0.057	0.253
1981	0.032	0.031		0.057	0.253

1982	0.032	0.031		0.057	0.253
1983	0.032	0.031		0.057	0.253

Diesel	TS	DE	BF	HF	DM
1984	0.032	0.031		0.057	0.253
1985	0.032	0.031		0.057	0.253
1986	0.032	0.031		0.057	0.253
1987	0.032	0.031		0.057	0.253
1988	0.063	0.063		0.114	0.505
1989	0.063	0.063		0.114	0.505
1990	0.063	0.063		0.114	0.505
1991	0.063	0.063		0.114	0.505
1992	0.063	0.063		0.114	0.505
1993	0.063	0.063		0.114	0.505
1994	0.063	0.063		0.114	0.505
1995	0.063	0.063		0.114	0.505
1996	0.063	0.063		0.114	0.505
1997	0.079	0.089		0.171	0.650
1998 (transition)	0.100	0.125		0.250	0.853

1999	0.100	0.125		0.250	0.853
2000	0.100	0.125		0.250	0.853
2001	0.100	0.125		0.250	0.853
2002	0.100	0.125		0.250	0.853
2003	0.100	0.125		0.250	0.853
2004	0.100	0.125		0.250	0.853

Finally to complete the oil pump price picture, the main oil price determinants such foreign exchange rate (Peso to US Dollar), crude oil import cost such as Dubai, and finished product import costs (Mean of Platts of Singapore or MOPS of gasoline products as Premium 95 RON and Unleaded 93 RON and diesel products with 0.50%, 0.25% and 0.05% Sulfur) are presented in Annex D.1 of this technical paper.

D.2. Chapter 2 – Analysis and Conclusions

This chapter presents the evolution and derivation of the oil pump price formula. There is a need to develop an oil pump price formula simply because the oil companies never divulge their oil company gross margin which is the residual or price difference when we subtract from the actual pump price all the importation value adding activities such as supply cost or FOB/MOPS/Dubai, ocean freight and insurance, customs duty, BOC fee, import processing fee, customs doc stamps, bank charge, arrastre charge, wharfage charge, and excise tax or specific tax to arrive at the 12% VAT on all importation activities, and all local value adding activities such as oil company gross margin, transshipment, pipeline, depot operation, biofuels, hauler's fee and dealer's margin to arrive at the 12% VAT on local activities.

The oil company gross margin (similar to % markup on raw material cost) is calculated as % of the Tax Paid Landed Cost (TPLC) which is the cost input to the refiner or importer/marketer. It could also be expressed as a % of the actual pump price which is similar to % return on sales in financial analysis parlance. The absolute oil company gross margin in Peso per Liter is then calculated by multiplying the % oil company gross margin to the TPLC.

However, since this study is limited only to gasoline and diesel, the weighted average oil company gross margin in this study may be calculated by considering that the proportion of gasoline to diesel sales is 1 part gasoline per 2 parts of diesel sales.

D.2.1. *Oil Pump Price Model (Oil Company Gross Margin)*

The third and last methodology to be used by the IOPRC is a step-by-step calculation of all the economic and value-adding activities in the supply chain. It requires knowledge of the international price (Dubai crude oil marker, MOPS of gasoline and diesel products), ocean freight, ocean insurance, and foreign exchange rate from US dollar to Philippine Peso to arrive at the dutiable value of the cargo (the Cargo, Insurance and Freight or CIF in peso value). It also requires an assumption of the parcel size of the cargo (minimum of 100,000 barrels per import entry) and for the purpose of this method, the IOPRC assumes the typical 300,000 barrels cargo size to minimize the cost impact of fixed charges which become magnified in smaller cargo size.

The following is a summary of the consultation and discussion with representatives of the Bureau of Customs (BOC). (See Annex D.7 for the Oil Pump Price Calculation Procedure)

The first step is to compute the customs dutiable value of the importation:

DUBAI$ = given Dubai crude oil price

MOPS$ = DUBAI$ x (factor to refine crude oil to finished product)
= MOPS + premium risks (supply, security, bottoms)

FOB$ = MOPS$ * 300,000

FRT$ = FOB$ * 2.00% (benchmark from BOC)

INS$ = FOB$ * 4.00% (benchmark from BOC)

CIF$ = FOB$ + FRT$ + INS$

CIF = CIF$ * (FOREX, P/$) (this is the customs dutiable value)

Then the BOC collects the applicable Customs Duty (CD paid to BOC) depending on the unit value of the crude or product (there are trigger points for 0%, 1%, 2% and 3% customs duty based on the US Dollar per Barrel value of the Dubai crude oil or MOPS provided by DOE memorandum circular):

CD = Customs Duty = CIF * 3.00% (presently zero per ASEAN AFTA)

Using the brokerage table from Customs Administrative Order CAO 1-2001, the brokerage fee (BF) is calculated. Since the value is way past the P200,000 maximum value in the table, the brokerage fee is calculated at the maximum rate as follows:

BF= Brokerage Fee = 5,300 + (CIF – 200,000) * 0.00125

Bank Charge (BC from Letter of Credit) is then calculated for the import cargo:

BC = Bank Charges = CIF * 0.00125

Arrastre Charge (AC paid to port operator) of 122 P/mt is then applied. This requires knowledge of the density of the cargo (0.75 kg/L for gasoline and 0.80 kg/L for diesel):

AC = Arrastre Charge (gasoline) = 122 * (0.75 * 158.9868 / 1000) * 300,000
AC = Arrastre Charge (diesel) = 122 * (0.80 * 158.9868 / 1000) * 300,000

Wharfage Charge (WC paid to Philippine Port Authority or PPA) of 36.65 P/mt is also applied as follows like the Arrastre Charge:

WC = Wharfage Charge (gasoline) = 36.65 * (0.75 * 158.9868 / 1000) * 300,000
WC = Wharfage Charge (diesel) = 36.65 * (0.80 * 158.9868 / 1000) * 300,000

Import Processing Fee (IPF paid to BOC) is computed from table defined by CAO 2-2001 and given the magnitude of the dutiable value, it is equal to the maximum fee of 1,000 P per import entry:

IPF = Import Processing Fee = 1,000

Customs Documentary Stamp (CDS paid to BOC) is a fixed amount of 256 P per import entry:

CDS = Customs Documentary Stamp = 256

Excise Tax (ET paid to BIR but collected by BOC on imports) is a fixed amount per L of product (4.35 P/L of gasoline up to now; 1.63 P/L of diesel when there was no VAT and zero when the VAT was introduced):

ET = Excise Tax (gasoline) = 4.35 * 158.9868 * 300,000
ET = Excise Tax (diesel) = 1.63 * 158.9868 * 300,000

The total Landed Cost (LC) is then the sum of the dutiable value and all charges:

Landed Cost = CIF (P) + CD + BF + BC + AC + WC + IPF + CDS + ET

The Value Added Tax (VAT1 paid to BIR but collected by BOC on imports) is then calculated based on the VAT rate which started initially at 10% in November 2005 and 12% later in February 2006:

VAT1 (on import) = 10% * Landed Cost (Nov 2005 – Jan 200
= 12% * Landed Cost (Feb 2006 – present)

Finally, the Tax Paid Landed Cost (TPLC) is calculated to include the VAT on imports:

TPLC = LC + VAT1 (imports) = LC * (1 + %VAT1)

On a per L basis, the TPLC is calculated:

TPLC (P/L) = TPLC / (300,000 * 158.9868)

A summary of charges collected by the BOC is then prepared and converted to a per L basis

Summary to BOC = CD + IPF + CDS + ET + VAT1

Summary to BOC (P/L) = Summary to BOC / (300,000 * 158.9868)

The TPLC from Dubai crude is the input cost of the crude oil refiner while the TPLC from the finished product MOPS is the input cost of the oil marketer. Then add the oil company gross margin (OCGM) which takes care of the refining, marketing and distribution costs as well as the profit margin of the oil company.

In this methodology, the OCGM is assumed as an add-on percentage of the TPLC – similar to a mark-up of any retailer selling goods and services to a customer. The mark-up takes care of all his operating expenses as well as profit margin needed to recover his investments while the TPLC takes care of his raw material (product) cost:

OCGM = Oil Company Gross Margin (P/L) = TPLC * (1 - % biofuel) * % gross margin

The % gross margin could further be disaggregated into cost recovery margin and profit margin:

% gross margin = % cost recovery margin + % profit margin

The % cost recovery margin takes care of the oil company costs such as refining (crude oil refiners), logistics (importers/marketers), marketing while the % profit margin takes care of recovering the invested capital in a reasonable recovery period. However, it is difficult to disaggregate the above gross margin into its components.

Later on, you will see that the OCGM is the residual value from subtracting all costs in the supply chain from the retail pump price. It is calculated by difference using goal seek function of MS Excel by setting to zero the variance between the calculated pump price and the actual pump price by varying the assumed % gross margin. It can also be calculated algebraically for the forward cost build-up formula shown below.

Other oil company costs (OOCC) include transshipment using barges and oil tankers, pipeline operation (e.g. Batangas to Manila FPIC white oil and black oil pipelines), oil depot operation, and addition of biofuels (10% bioethanol and 2% CME biodiesel) and other fuel brand additives for product differentiation (e.g. Blaze 98, XCS 95, Unleaded 93, B2 Diesel).

OOCC = Other Oil Company Costs (P/L) = (TS + PL + DE) * (1 – % biofuel) + BIO

Where:

TS = Transshipment = 0.38 P/L (for oil tanker ships and barges)

PL = Pipeline = 0.000 P/L (for FPIC)

DE = depot = 0.27 P/L (gasoline)
= 0.28 P/L (diesel)

BIO = Biofuels = 10% * (P/L of ETHANOL) = 10% * 26.30 = 2.63 P/L (gasoline)
= 2% * (P/L of CME Biodiesel) = 2% * 64.00 = 1.28 P/L (diesel)

From the depot, the oil products with their brand additives and biofuels are then transported using oil company-owned, retailer-owned or independent operator-owned tank trucks:

HF = Hauler's Fee (P/L) = 0.21 P/L (gasoline and diesel)

Finally, with the oil product delivered at the retail station, the petroleum dealer retails the products (gasoline, diesel, kerosene, LPG for cooking and transport, lube oils) to its customers. The profit margin of the dealer (refiller's margin for LPG marketers and dealer's margin for gasoline and diesel retailers) is called the dealer's margin (DM):

DM = Dealer's Margin (P/L) = 1.72 (gasoline)
= 1.47 (diesel)

The Total Local Costs (LC) for all local value-adding activities is then computed:

TLC = Total Local Costs (P/L) = OCGM + OOCC + HF + DM

The VAT on all local value-adding activities (collected by the BIR on local activities) is then calculated:

VAT2 (local costs) = 10% * Total Local Cost (Nov 2005 – Jan 2006)
= 12% * Total Local Cost (Feb 2006 – present)

Finally, the Pump Price (PP) is calculated as the sum of all imported and local costs with the TPLC oil portion corrected for the biofuels content:

PP = Pump Price (P/L) = TPLC * (1 - % biofuel) + TLC + VAT2 + OPSF
= TPLC * (1 - % biofuel) + TLC * (1 + %VAT2) + OPSF

Substituting all the terms and making the PP equal to the actual PP, we obtain

PP =TPLC * (1 – % biofuel) + [TPLC * (1 - % biofuel) * %GM + (TS + PL + DE) * (1 – % biofuel) + BIO + HF + DM] * (1 + %VAT2) + OPSF

Determining Oil Company Gross Margin (OCGM)

The calculated pump price is then compared with the actual pump price. To make the variance zero, the % gross margin assumed is adjusted until the variance is zero:

Variance (P/L) = Actual Pump Price – Calculated Pump Price

The OCGM is the residual value from subtracting all costs in the supply chain from the retail pump price. The % gross margin (%GM) may be calculated algebraically from the final PP formula as follows:

[PP - OPSF - TPLC * (1 - % biofuel)] / (1 + VAT2) = TPLC * (1 - % biofuel) * %GM + (TS + PL + DE) * (1 - % biofuel) + BIO + HF + DM

%GM = {[PP - OPSF - TPLC * (1 - % biofuel)] / (1 + VAT2) – [(TS + PL + DE) * (1 - % biofuel) + BIO + HF + DM]} / {TPLC * (1 - % biofuel)}

Hence, the OCGM in pesos per liter is calculated as follows:

OCGM (P/L) = TPLC * (1 - % biofuel) * %GM

Where: % biofuel = 10% for gasoline and 2% for diesel
VAT2 = 12% value added tax
OPSF = Oil Price Stabilization Fund contribution (+) or drawdown (-)

If there is OPSF contribution (+) by the oil companies, this will reduce the oil company gross margin; while an OPSF drawdown (-) will increase the oil company gross margin.

Determining the Variance Between Actual Pump Price and Calculated Pump Price

The calculated pump price based on the supply cost (MOPS), foreign exchange rate and % oil company margin (the other cost factors are usually constant) is then compared with the actual pump price.

Variance (₱/Liter) = Actual Pump Price – Calculated Pump Price

If the Variance is greater than zero (positive), there is over-recovery (overpricing); while if the Variance is less than zero (negative), there is under-recovery (underpricing).

As to whether the level of over-recovery constitute profiteering is a subjective matter that needs to be validated by having consistently large variance over the predicted or calculated pump price based on a reasonable % gross margin. It is intuitive to calculate the long-term average % gross margin to see how the oil refiner or oil marketer operates to recover its invested capital.

D.2.2. *Composition of Oil Pump Price (CIF, gov't imposts, gross margin, transport, depot cost, biofuels, hauling cost, dealer margin)*

The Tax Paid Landed Cost and pump price breakdown for 2012 is shown below:

Table D.7 – TPLC and Pump Price Build-up for 2012

GASOLINE	2012	%	DIESEL	2012	%
FOB	33.5624	74.67%	FOB	34.8400	83.73%
FRT	0.6712	1.49%	FRT	0.6968	1.67%
INS	1.3425	2.99%	INS	1.3936	3.35%
CIF	35.5762	79.15%	CIF	36.9304	88.76%
DUT	0.0000	0.00%	DUT	0.0000	0.00%
SD	0.00	0.00%	SD	0.00	0.00%
BF	0.0446	0.10%	BF	0.0463	0.11%
BC	0.0445	0.10%	BC	0.0462	0.11%
AC	0.0915	0.20%	AC	0.0976	0.23%
WF	0.0275	0.06%	WF	0.0293	0.07%
IPF	0.000021	0.00%	IPF	0.000021	0.00%
CDS	0.000006	0.00%	CDS	0.000006	0.00%
ET	4.3500	9.68%	ET	0.0000	0.00%
VAT1	4.8161	10.71%	VAT1	4.4580	10.71%
TPLC	**44.9504**	**100.00%**	**TPLC**	**41.6078**	**100.00%**
TPLC	40.4553	72.68%	TPLC	40.7756	88.77%
OCGM	6.8628	12.33%	OCGM	0.8854	1.93%
RC	0.0000	0.00%	RC	0.0000	0.00%
TS	0.4707	0.85%	TS	0.5125	1.12%
PC	0.0000	0.00%	PC	0.0000	0.00%
DEP	0.2805	0.50%	DEP	0.3052	0.66%
BIO	3.7790	6.79%	BIO	1.2336	2.69%
HF	0.3599	0.65%	HF	0.1970	0.43%
DM	1.8260	3.28%	DM	1.4717	3.20%

VAT2	1.6295	2.93%	VAT2	0.5526	1.20%
OPSF	0.0000	0.00%	OPSF	0.0000	0.00%
PP	**55.6635**	**100.00%**	**PP**	**45.9336**	**100.00%**
DUT	0.0000	0.00%	DUT	0.0000	0.00%
SD	0.0000	0.00%	SD	0.0000	0.00%
WF	0.0247	0.04%	WF	0.0287	0.06%
IPF	0.0000	0.00%	IPF	0.0000	0.00%
CDS	0.0000	0.00%	CDS	0.0000	0.00%
ET	3.9150	7.03%	ET	0.0000	0.00%
VAT1	4.3345	7.79%	VAT1	4.3688	9.51%
VAT2	1.6295	2.93%	VAT2	0.5526	1.20%
Govt Imposts	**9.9037**	**17.79%**	**Govt Imposts**	**4.9502**	**10.78%**
% ETHANOL	90%		% CME BIODIESEL	98%	

Gasoline Pump Price Build-up

For the TPLC cost breakdown, the main import cost is the CIF value at 79.15% (FOB, FRT, INS), followed by VAT1 at 10.71%, excise or specific tax at 9.68%, arrastre charge at 0.20%, brokerage fee at 0.10%, bank charge for LC at 0.10%, wharfage at 0.06% and other minor charges of the BOC (IPF, CDS).

For gasoline pump price, the main cost is the TPLC import cost at 72.68% of the pump price, followed by the oil company gross margin of 12.33% (to cover refining, marketing, administrative, and profit margin), biofuels at 6.79%, dealer's margin at 3.28%, VAT2 at 2.93%, transshipment at 0.85%, depot operation at 0.50% and hauler's fee at 0.65%.

Diesel Pump Price Build-up

For the TPLC cost breakdown, the main import cost is the CIF value at 88.77% (FOB, FRT, INS), followed by VAT1 at 10.71%, arrastre charge at 0.23%, brokerage fee at 0.11%, bank charge for LC at 0.11%, wharfage at 0.07% and other minor charges by the BOC (IPF, CDS).

For diesel pump price, the main cost is the TPLC import cost at 89.44% of the pump price, followed by dealer's margin at 3.14%, biofuels at 2.73%, the oil company gross margin of 1.73% (to cover refining, marketing, administrative, and profit margin), VAT2 at 1.13%, transshipment at 0.80%, depot operation at 0.59% and hauler's fee at 0.45%.

Total Government Imposts in Pump Price Build-up

The total taxes collected by the BOC/BIR (customs duty, special duty, import processing fee, customs doc stamp, excise tax, value added tax) for gasoline is 9.9037 ₱/L or 17.79% of the pump price; while for diesel, the total tax is 5.0456 ₱/L or 10.78% of the pump price.

Historical Oil Pump Price Breakdown

The historical oil pump price breakdown is shown in the charts below as absolute Peso per Liter and as % of pump price. The CIF is the main cost component followed by government taxes (duty, excise tax and VAT), oil company gross margin (costs and profit margin) and dealer's margin.

There are years with negative gross margin which is compensated by drawing from the OPSF to ensure positive margin during the regulated period. Following steep decline in the international price of crude oil and products, there large gross margin are trimmed via contribution to the OPSF kitty to replenish the fund.

Figure D.1 – Gasoline Price Breakdown (1974-2012) in Pesos per Liter

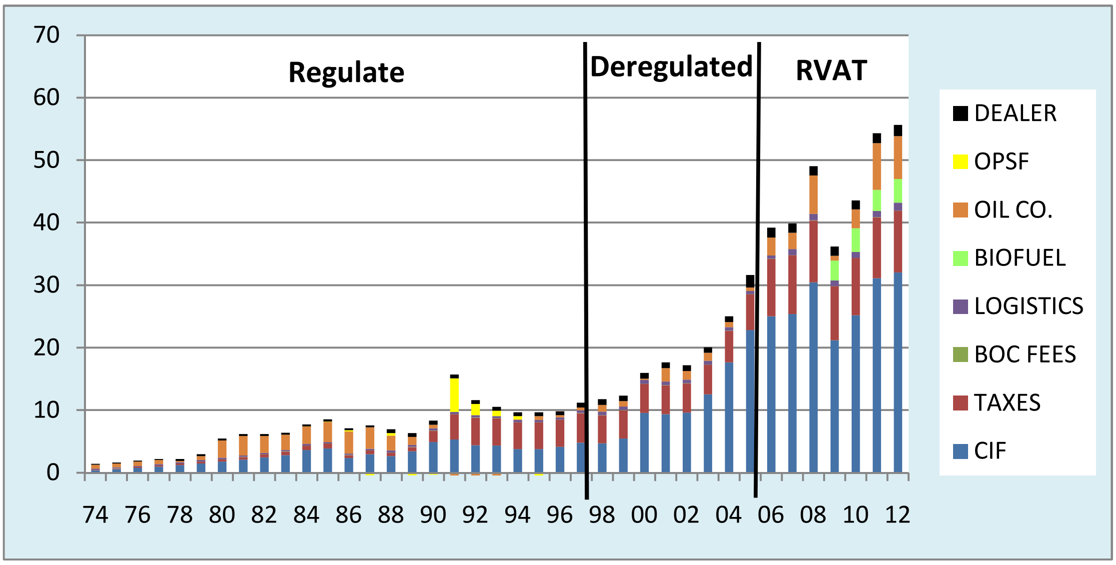


Figure D.2 – Gasoline Price Breakdown (1974-2012) in % of Pump Price

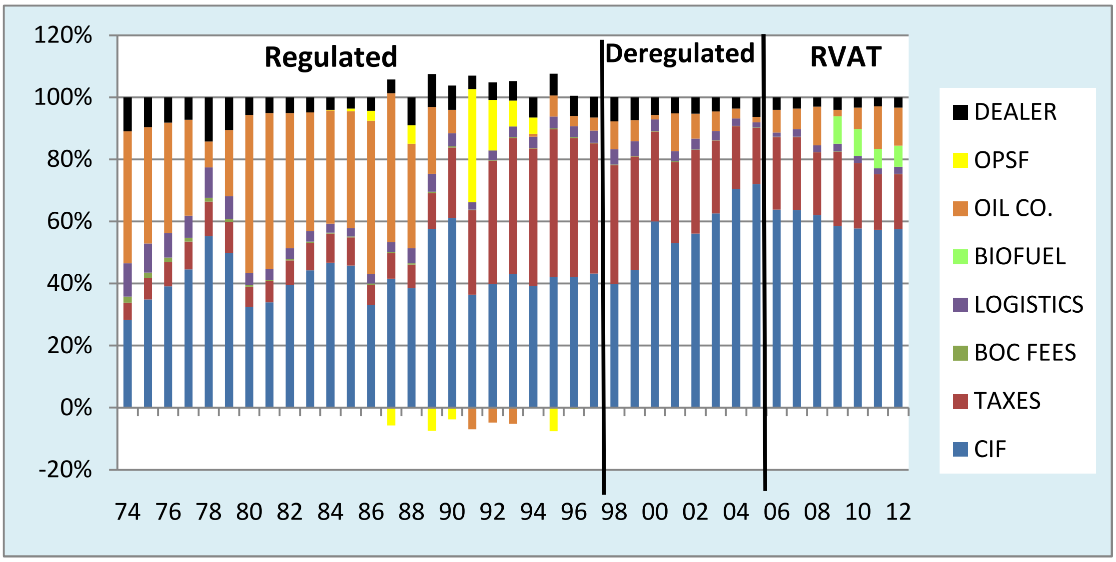


Table D.8 – Gasoline Pump Price Breakdown by Regulatory Framework

UNLEADED GAS	Regulated (1974-97)	Deregulated (1998-2005)	RVAT (2006-12)
CIF	42.2%	57.3%	60.1%
Biofuel	0.0%	0.0%	4.0%
Taxes	18.5%	27.4%	21.1%
BOC Fees	0.6%	0.2%	0.1%
Logistics	4.9%	3.4%	2.2%
Oil Co. Margin	24.7%	6.1%	9.0%
OPSF	2.1%	0.0%	0.0%
Dealer Margin	7.0%	5.7%	3.5%

Source of Primary Data: Industry Players, BOC, BIR, DOE

Figure D.3 – Diesel Price Breakdown (1974-2012) in Pesos per Liter

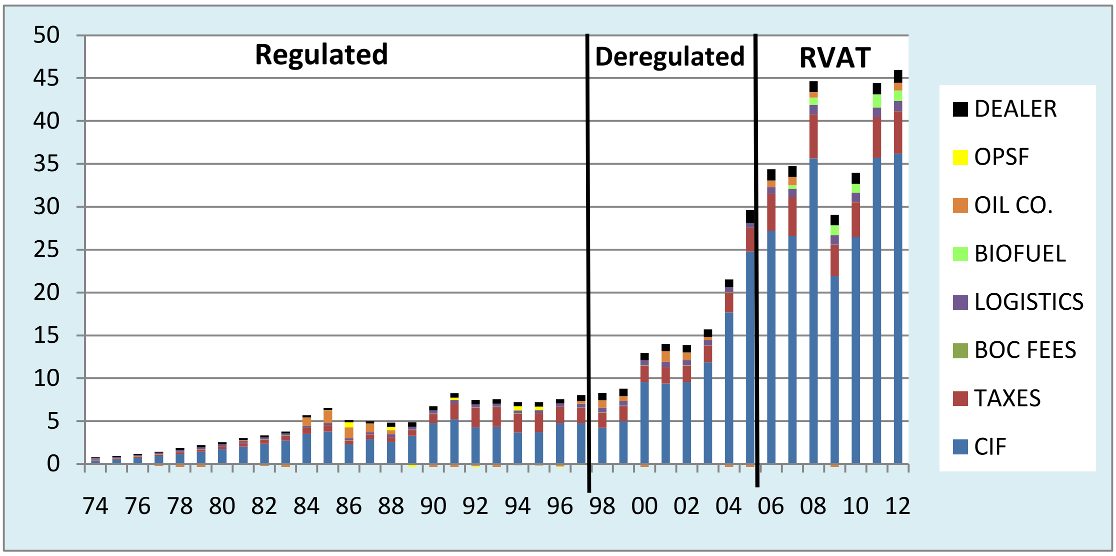


Figure D.4 – Diesel Price Breakdown (1974-2012) in % of Pump Price

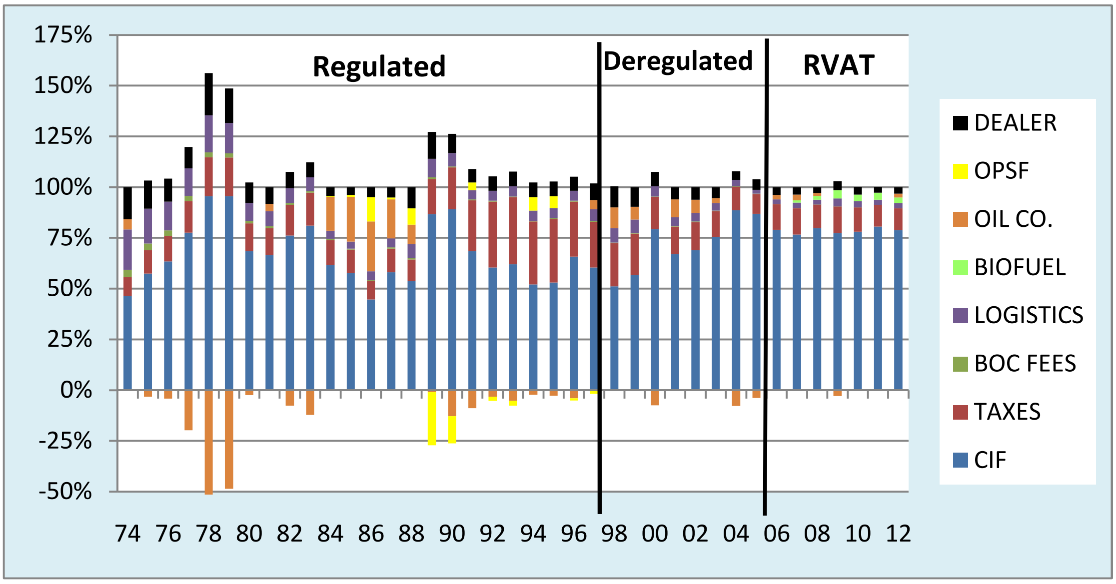


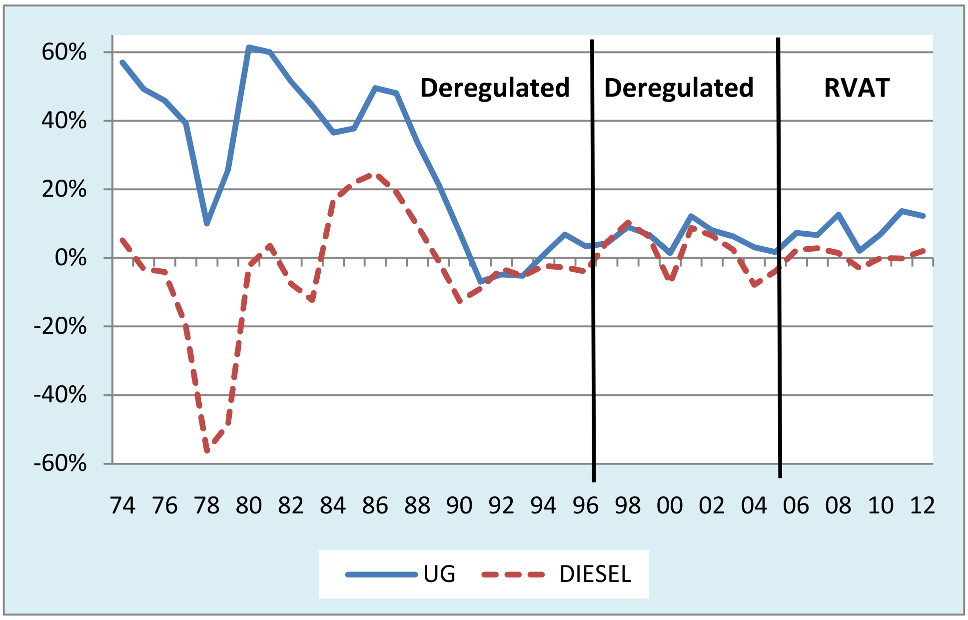
Table D.9 – Diesel Pump Price Breakdown by Regulatory Framework

DIESEL	Regulated (1974-97)	Deregulated (1998-2005)	RVAT (2006-12)
CIF	66.7%	71.8%	78.6%
Biofuel	0.0%	0.0%	2.3%
Taxes	18.4%	14.9%	11.9%

BOC Fees	1.1%	0.2%	0.1%
Logistics	8.4%	4.5%	2.9%
Oil Co. Margin	-3.7%	1.9%	0.7%
OPSF	-0.4%	0.0%	0.0%
Dealer Margin	9.4%	6.8%	3.5%

Source of Primary Data: Industry Players, BOC, BIR, DOE

Figure D.5 – Oil Company Margins (1974-2012) in % of Pump Price



Logistical import and local costs are minor costs which includes BOC fee, bank charges, arrastre charge, wharfage charge, import processing fee, customs doc stamps, transshipment, pipeline, depot, biofuels and hauling fee.

The oil pump price breakdown in Pesos per Liter and % of Pump Price are shown in Annex D.5 and Annex D.6, respectively.

It is worthy to note that gasoline taxes (customs duty, special duty or Estanislao Peso) were much higher during the regulated period (18.5% and 27.4%) vs. the deregulated period (21.1%). The same is true for diesel taxes: regulated period (18.4% and 14.9%) vs. deregulated period (11.9%).

Likewise, gasoline gross margin were much larger during the regulated period (24.7% and 6.1%) vs. deregulated period (8.8%) due to the regulator (ERB) ensuring positive returns even for the least efficient oil company so it may continue to survive to provide the needed security in oil supply.

However, diesel gross margin in both regulated and deregulated periods (-3.7%, 1.9% and 0.8%) were negative to marginal levels only, indicative of the high degree of cross-subsidy enjoyed by diesel product from the larger margins of the gasoline product. This is due to the fact that there is a conscious government effort to lower the cost of diesel used mainly for public transport (buses, jeepneys, taxis) by absorbing most of the costs of the imported crude from gasoline products.

However, this cross-subsidy of diesel could not be sustained in the long term during the regulated period, so much so that when the government deregulated the pricing of oil products in 1997, the gross margin of gasoline was reduced as subsidy for diesel was gradually phased out as shown in the above figures.

Currently, the diesel retail business has a very low gross margin that a retail station needs the higher margin from gasoline sales to support the overall viability of the retail station. Gas stations with mainly diesel sales are presently experiencing financial difficulty due to squezzed margins, and need to provide other services and rental investments to remain viable.

D.2.3. *Oil Pump Price Formula to Predict Oil Price Adjustments*

Regulated Period (1973 – 1997)

Initially, the TWG team for oil pump price presented the formulas during the regulated period (1973-1997) and deregulated period (1998-present) as well as the cost inputs provided by DOE.

Later on, after due consultation with the BIR and BOC and with the shipping and trucking groups and the oil companies, most of the cost inputs needed in the oil pump price formula were obtained.

The DOE Oil Industry Monitoring Bureau staff also provided the initial historical data on a daily basis from 1973 to 2012 consisting of pump price (gasoline, diesel), DUBAI, MOPS (gasoline, diesel) and FOREX. At this point, a sample excel file was prepared for editing by the DOE and the oil companies to supply historical data on a monthly average.

The TWG team on oil pump price presented the following formulas for calculating the absolute pump price patterned to the regulated period:

FOB$, $/bbl = MOPS + PREMIUM
CIF$, $/bbl = FOB$ + FRT$ + INS$
CIF, P/bbl = CIF$ x (FOREX, P/$)
SUB1, P/bbl = CIF + WFG + BOE + OCN + DOC + DMR + DUT + SPE

VAT1, P/bbl = SUB1 x 12%
TPLC, P/bbl = SUB1 + VAT1
TPLC, P/L = (TPLC, P/bbl) / (158.9868 L/bbl)
OCGM, P/L = TPLC x % OCGM
SUB2, P/L = OCGM + BIOFUEL + DEPOT + DM + HF + TS
VAT2, P/L = SUB2 x 12%
LOCAL COSTS, P/L = SUB2 + VAT2
PUMP PRICE, P/L = TPLC + LOCAL COSTS

Where:

FRT$ = ocean freight = FOB$ x 2.00%
INS$ = ocean insurance = FOB$ x 4.00%
WFG = wharfage and arrastre charges, P/bbl
BOE = Board of Energy fee = CIF x 0.10%
OCN = ocean loss = CIF x 0.50%
DOC = doc stamps = CIF x 0.15%
DMR = demurrage (actual claim for unloading delays)
DUT = customs duty = CIF x 3.00%
SPE = specific tax (excise tax) = 4.36 P/L gasoline, 1.63 P/L diesel
OCGM = oil company gross margin, P/L = TPLC x % OCGM
% OCGM = % oil company gross margin, % of TPLC

BIOFUELS = 2% x 80 P/L of CME for diesel, 10% x 50 P/L of ETHANOL for gasoline

DEPOT = 0.250 P/L (depends on bulk plant location and type of products carried)

DM = dealer's margin = 1.200 P/L for gasoline, kerosene, avturbo, diesel
= 1.3640 P/kg for LPG

RM = refiller's margin = 0.500 P/kg for refillers of LPG

TS = transshipment = 0.200 P/L for gasoline, kerosene, avturbo, diesel; 0.0897 P/L for fuel oil; 0.3226 P/kg for LPG (tankers and barges)

HF = hauler's fee = 0.1140 P/L for gasoline, kerosene, avturbo, diesel
= 0.1254 P/L for fuel oil
= 0.3059 P/kg for LPG

If the purpose is to compute the incremental price adjustment between period 2 and period 1, most of the cost factors will cancel out (WFG, DMR, SPE) and the following simplified equation shows that the main price determinant would be the change in

FOB and FOREX as well as the assumed % oil company gross margin and current level of customs duty and VAT:

ADJ = Change in TPLC + Change in LOCAL COSTS

ADJ = { [FOB(2) x FOREX(2) – FOB(1) x FOREX(1)] x (1 + 2.00% + 4.00%) x (1+ 0.10% + 0.50% + 0.15% + 3.00%) } 1.12 / 158.9868 x (1 + % OCGM x 1.12)

By simply monitoring the MOPS or FOB and the FOREX, the expected oil pump price adjustments could be estimated quickly since the MOPS of FOB, FOREX and %OCGM or gross margin are known/regulated during that period.

Deregulated Period and RVAT Period (oil company gross margin unregulated)

With the advent of oil deregulation and varying regulatory framework (RVAT), the first step is to calibrate the model by calculating the oil company gross margin from the pump price (PP) and Tax Paid Landed Cost (TPLC) and subtracting the other logistical costs and VAT:

%GM = {[PP - OPSF - TPLC x (1 - % biofuel)] / (1 + VAT2) – [(TS + PL + DE) x (1 - % biofuel) + BIO + HF + DM]} / {TPLC x (1 - % biofuel)}

Then, the predicted pump price may be calculated from the following formula which starts from the supply cost to the oil marketer or oil refiner (TPLC), then adding the local value adding activities such as refining and marketing, transshipment, pipeline, depot, biofuel, hauling fee and dealer’s margin. Adjustments due to level of biofuel addition, any subsidy (OPSF) and % gross margin of the oil company are also made:

PP = TPLC x (1 - % biofuel) + [TPLC x (1 - % biofuel) x %GM + (TS + PL + DE) x (1 - % biofuel) + BIO + HF + DM] x (1 + %VAT2) + OPSF

The theoretical pump price in period 1 (previous period) is calculated from TPLC1 which is a function of MOPS1 or DUBAI1 and the exchange rate FOREX1; while the period 2 (current period) is calculated from TPLC2 which is a function of MOPS2 or DUBAI2 and FOREX2:

PP1 = function of TPLC1 (DUBAI1 or MOPS1, FOREX1)
PP2 = function of TPLC2 (DUBAI2 or MOPS2, FOREX2)

Then the theoretical price adjustment (Delta PP) is finally calculated:

Delta PP = PP2 – PP1

The calculation of PP1 and PP2 is found at the bottom of the Excel Model prepared by the TWG (See Oil Price Model worksheet).

A complete example for oil pump price calculation for Jan-May 2012 is shown in Annex D.4. It is recommended that this Excel Model be made available to the public for their calculations in the spirit of transparency. Sample data may be provided to guide the public on how it is used.

The first step is to calculate the TPLC from the parcel size, import costs, exchange rates and government taxes and imposts. Then all the importation value adding activities are added up and a 12% VAT is applied to arrive at the TPLC.

Table D.10 – Tax Paid Landed Cost (TPLC) Calculation Model

TPLC Calculator As of Jan-Jun 2012 average	Gasoline	Diesel
Parcel Size, Bbl	300,000	300,000
Liters per Bbl	158.9868	158.9868
Total Volume, L	47,696,040	47,696,040
Density, kg/L	0.75	0.80
Total Metric Tons (1000 kg)	35,772	38,157
MOPS, $/Bbl	124.351	129.084
FOB, $	37,305,163	38,725,207
Freight, % FOB	2.00%	2.00%
Insurance, % FOB	4.00%	4.00%
CIF, $	39,543,472	41,048,719
Exchange Rate, PhP/$	42.911	42.911
CIF, PhP	1,696,843,029	1,761,434,401
Customs Duty, % of CIF	0.00%	0.00%
Customs Duty, PhP	0	0
Special Duty, PhP/L	0.00	0.00
Special Duty, PhP	0	0
Brokerage Fee, PhP	2,126,104	2,206,843
Bank Charge, PhP	2,121,054	2,201,793
Arrastre Charge, PhP	4,364,188	4,655,134
Wharfage Charge, PhP	1,311,045	1,398,448
Import Processing Fee, PhP	1,000	1,000
Customs Doc Stamps, PhP	256	256
Excise Tax, PhP/L	4.35	0.00
Excise Tax, PhP	207,477,774	0
Landed Cost (LC), PhP	1,914,244,449	1,771,897,874
VAT1 on Importation, % LC	12%	12%

VAT1 on Importation, PhP	229,709,334	212,627,745
Tax Paid Landed Cost, PhP	2,143,953,783	1,984,525,619
Tax Paid Landed Cost, PhP/L	**44.9504**	**41.6078**

Source: Bureau of Customs calculation procedure

The second step is to add the pure oil costs with the biofuels that will be added to the fuel blend. Gasoline is 90% petroleum and 10% ETHANOL while diesel is 98% petroleum and 2% CME BIODIESEL.

Table D.11 – Oil Pump Price Calculation Model

Pump Price Model		
As of Jan-Jun 2012 average	**Gasoline**	**Diesel**
% Pure Oil	90.00%	98.00%
TPLC, PhP/L	40.4553	40.7756
Oil Company Gross Margin, % of TPLC	16.96%	2.17%
Oil Company Gross Margin, PhP/L	6.8628	0.8854
Refining Cost, PhP/L	0.0000	0.0000
Transshipment, PhP/L	0.4707	0.5125
Pipeline Cost, PhP/L	0.0000	0.0000
Depot Operation, PhP/L	0.2805	0.3052
Pure Biofuel Cost, PhP/L biofuel	37.7897	61.6786
% Biofuel in Blend	10.00%	2.00%
Biofuel Cost, PhP/L	3.7790	1.2336
Hauler's Fee	0.3599	0.1970
Dealer's Margin	1.8260	1.4717
Sub-Total Local Costs, PhP/L	13.5788	4.6053
VAT2 on Local Costs , %	12%	12%
VAT2 on Local Costs , PhP/L	1.6295	0.5526
OPSF	0.0000	0.0000
Pump Price, PhP/L	**55.6635**	**45.9336**

Source: DOE, Oil Companies and Engr. Marcial Ocampo.

Based on the above oil company gross margin and pump price, the % return on sales of the oil industry is estimated to be 5.39% on sales which is comparable to the one calculated using the financial statements submitted by the oil companies to SEC. The weighing factor used is 1 part gasoline sales per 2 part diesel sales as per DOE advise.

Table D.12 – Estimated Oil Company Gross Margins

	Gasoline	Diesel	Oil Company Average
Assumed Volume Share	1/3	2/3	3/3 =100%
Gross Margin (P/L)*	6.8628	0.8854	2.8778
Pump Price (P/L)*	55.6635	45.9336	
100% x Gross margin / Pump Price	12.33%	1.93%	5.39%

**Based on raw data for period covering Jan-June 2012*

D.2.4. *Retail Market Competition and Actual Oil Pump Price*

Oil firms should ensure that they do not charge their customers prices that bear no reasonable relation to the economic value of the good or service provided, and is above that economic value. In the end, competition dictates final oil pump price (regional price fluctuations and differences).

As to whether the level of over-recovery constitute profiteering is a subjective matter that needs to be validated by having consistently large variance over the predicted or calculated pump price based on a reasonable % gross margin. It is intuitive to calculate the long-term average % gross margin to see how the oil refiner or oil marketer operates to recover its invested capital.

After this IOPRC exercise, it may be entirely possible that a standard norm on % gross margin for crude oil refiners and oil importers/marketers would be adopted through a greater understanding and sensitivity to the plight of the end consumers. The level of % gross margin adopted will enable the crude oil refiners and oil importers/marketers recover their costs and expenses and earn a reasonable profit comparable to other capital-intensive industries that will allow a sustainable operation while protecting the rights of the consuming public from overpricing.

Thus, the DOE or an independent entity could estimate the calculated pump price given changes in the MOPS, FOREX, customs duty, excise tax and VAT, and other cost inputs incurred during importation and local delivery of the product.

By regularly monitoring the variance between the actual pump price and calculated pump price, the cumulative and average variance over an agreed period (say 1 year period) should approach zero if there is neither under-recovery nor over-recovery.

In this manner, the DOE thru its independent entity, could assure the oil consuming public that the oil industry participants are not over-profiteering at the expense of the end consumers and the oil industry is a vibrant and sustainable contributor to the national economy by way of its provision of timely, affordable and secure oil supplies, collection of needed government revenues (customs duty, specific tax, value added tax and other fees), and it conducts its business in a responsible and transparent manner with assurance of reasonable returns.

Adjusting local prices to reflect correctly the international oil price movements will also protect the country from unwanted smuggling and loss of valuable tax revenues: pricing our products below international prices will encourage smuggling of oil products out of the country with higher prices while pricing our products above international prices will encourage smuggling of oil products into our country. This will happen if we adopt regulated pricing using the OPSF mechanism for compensating oil companies when prices are kept artificially low, and overpricing the consumers when international prices are low to build-up the OPSF buffer.

D.2.5. *Is there Overpricing of Oil Products?*

Is the gross oil company margin (to recover refining and marketing costs, to provide profit margin) excessive?

The ratio of MOPS gasoline to Dubai crude and MOPS diesel to Dubai crude is approximately the processing/refining cost needed to convert crude oil to its finished product form. It ranges during the early years from 1.179 (gasoline) and 1.144 (diesel) indicating that gasoline is more expensive to process than diesel during the 1984 period. (See ANNEX D.1)

In later years by 1997 at the end of the regulated period, the ratio of MOPS gasoline to Dubai rose to 1.354 while that of diesel to 1.337, maintaining the same relative cost ratio. By 2002, this cost ratio dropped to 1.176 for gasoline and 1.167 for diesel.

By 2007, the ratio increased to 1.212 for gasoline and 1.277 for diesel, indicating that diesel has become more expensive to process than gasoline thru the use of more thermal catalytic cracking (TCC) units to produce more diesel and gasoline from crudes and minimize exports of fuel oil and pitch stocks at a price lower than crude cost.

By 2011, the ratio has stabilized to 1.127 for gasoline and 1.188 for diesel. For the first half of 2012, the ratio is 1.119 for gasoline and 1.162 for diesel. So if you have Dubai crude cost, simply multiply by 1.119 to convert to MOPS gasoline and 1.162 to convert to MOPS diesel, i.e. you need to add 11.9% and 16.2% as cost of processing for gasoline and diesel respectively from Dubai crude oil.

The next significant ratio is the ratio of actual pump price to the Tax Paid Landed Cost of each product. This is the ratio of all the cost build-up of the raw material and delivering it to the end consumer after adding all the additional costs and taxes. There were periods of high ratios which resulted in large % oil company gross margins (See ANNEX D.2 for gasoline and ANNEX D.3 for diesel).

For gasoline during the regulated period 1984-1997, large ratio (1.375) of gasoline pump price to TPLC indicated a large % oil company gross margin (31.93% or 1.189 P/L gross margin from a TPLC of 6.584 P/L and predicted pump price of 9.053 P/L).

Diesel during the same regulated period 1984-1997 had a smaller ratio (1.160) with a moderate % oil company gross margin (7.26% or 0.198 P/L gross margin from a TPLC of 5.361 P/L and predicted pump price of 6.220 P/L).

During the deregulated period 1999-2005, the ratio was smaller (1.148) for gasoline with a modest % oil company gross margin (6.74% or 1.027 P/L gross margin from a TPLC of 17.423 P/L and predicted pump price of 19.993 P/L); while diesel had a much smaller ratio (1.091) with a very small % oil company gross margin (1.38% or -0.075 P/L gross margin from a TPLC of 14.786 P/L and predicted pump price of 16.129 P/L).

The years of 1984-1988 exhibited very large ratio of around 1.727-2.417 with very large % oil company gross margin (63-119%) for gasoline; while for diesel, the ratio was also large up to 1.305-1.778 resulting in also large % oil company gross margin (21-44%).

Surely, the oil industry has its ups and downs during periods of uncertainties and crisis and the DOE needs to look into this further for an explanation of the large margins during the 1984-1988 periods. However, data from the DOE/ERB suggests large OPSF contributions by the oil companies during the 1984-1988 periods indicating the part of the calculated margins went to beefing up the OPSF. This was a period of large margins to recoup previous losses and also to contribute positively to the OPSF fund.

With the R-VAT deregulated period 2006-2012, the ratio stabilized at (1.209) for gasoline with a modest % oil company gross margin (11.57% or 4.322 P/L gross margin from a TPLC of 37.491 P/L and predicted pump price of 45.312 P/L; while diesel had stagnated at a small ratio (1.091) with oil company gross margin 0.79% or 0.316 P/L gross margin from a TPLC of 34.775 P/L and predicted pump price of 37.940 P/L).

The entry of my small players into the oil industry as a result of the Oil Deregulation Law somewhat provided competition that restrained the ratio pump price to TPLC and % oil company gross margins to respectable levels from the view point of consumers, but also provided sustainable returns.

As of June 2012, gasoline have average returns of 16.96% of TPLC or 6.863 P/L which seems to compensate for the much lower diesel average returns of 2.17% of TPLC or 0.885 P/L. This is a sentiment that was borne out during the consultation with the Big 3 (Caltex, Shell, Petron) and the minor oil industry players.

The following table shows a comparison of the pump price breakdown between 1997 (regulated) and 2012 (deregulated RVAT) periods. It is noteworthy to mention that supply cost (CIF) has increased by 14.4% to 18.3%; taxes (customs duty, exise tax and VAT) has decreased (-24.2% and -11.8%), logistical costs (imporation and local delivery) has generally decreased indicative of higher efficiency in transporting the fuels (-1.7% and -3.1%), oil company gross margin have increased for gasoline (8.1%) while diesel margins have declined (-2.7%), and lastly dealer margins continued to be squezzed by rising pump prices (-3.4% and -5.0%).

Table D.13 – Oil Company Margins (1997 vs 2012) in % of Pump Price

	UNLEADED GAS			DIESEL		
	1997	**2012**	**Change**	**1997**	**2012**	**Change**
CIF	43.2%	57.5%	14.4%	60.5%	78.8%	18.3%
Taxes	41.9%	17.7%	-24.2%	22.5%	10.7%	-11.8%
BOC Fees	0.2%	0.0%	-0.2%	0.4%	0.0%	-0.3%
Logistics	3.9%	2.3%	-1.7%	5.7%	2.6%	-3.1%
Oil Co. Margin	4.2%	12.3%	8.1%	4.6%	1.9%	-2.7%
OPSF	-0.2%	0.0%	0.2%	-1.9%	0.0%	1.9%
Dealer Margin	6.7%	3.3%	-3.4%	8.3%	3.2%	-5.0%

Source of Primary Data: Industry Players, BOC, BIR, DOE

The table above shows there are more benefits arising from deregulation as compared to the regulated environment where pump prices are fixed at uniform intervals, and undergo a politically-charged ERB hearings to arrive at the new prices, where upon massive under or over recoveries accumulate, thus resulting in unwanted consequences such as hoarding in anticipation of huge price increases, inward smuggling into the country when prices are kept high compared to neighboring countries in order to replenish the OPSF, and outward smuggling towards our neighboring countries when prices are kept low when oil companies withdraw from the OPSF to keep prices artificially low. In either case, the government's tax revenue losses are tremendous due to inward smuggling and security of supply is never assured because of outward smuggling.

Hence, a refiner, importer or retailer needs to have more than modest gasoline sales to compensate for the lower diesel margins in order to survive and sustain its operations. Thus single pumps selling diesel products only will find it difficult to survive since it has to match the lower price of other competitors selling diesel and gasoline products.

D.2.6. *Is there Excessive Profits resulting in Grossly Unfair Prices?*

The largest absolute gross margin for gasoline was 7.300-6.863 P/L in 2011-2012 to recover all costs and provide a profit which is nowhere from the claimed over 8.00 P/L overprice (that is gross margin to meet costs and reasonable profit to sustain operations).

For diesel, the largest absolute gross margin was 1.437-1.257 P/L way back in 1985-1986 during the good years of the oil industry consisting mainly of crude oil refiners during the regulated period.

However, if some players would not pay the right taxes (customs duty, specific tax, VAT on imports and local activities), then indeed there would be an overprice perhaps of that 8.00 P/L magnitude, but certainly, not from the law-abiding oil industry participants that pays dutifully all taxes upon importation and withdrawal from their customs bonded warehouses and issuance of official receipts to the end users at the retail outlets and direct customer accounts.

Is there an over price today for gasoline and diesel? THE ANSWER IS NONE.

Using an oil pump price calculation model developed by the Committee -- wherein the retail prices of gasoline and diesel are built up from import costs to transport and distribution including all taxes -- there is no evidence of overpricing:

- Using the OPPC model developed by the IOPRC, no evidence was found of overpricing of some P8 per liter for diesel and P16 per liter for unleaded gasoline, as claimed by some consumer groups.
- As of June 2012, the average oil company gross margin was estimated at 16.96% of Tax Paid Landed Cost (TPLC) for gasoline and 2.17% of TPLC for diesel.
- In June 2012, the average oil company gross margin as percentage of pump price is 12.3% (6.86 pesos per liter) for gasoline and 1.9% (0.88 pesos per liter) for diesel. This gives a weighted average of 5.4% (2.88 pesos per liter), assuming that sales proportion are in the order of one-third gasoline sales to two-thirds diesel sales.
- The oil company gross margin for gasoline during the regulated periods were much larger than that during the deregulated period, indicating the level of competition arising from the oil industry deregulation law.
- On the other hand, the oil company gross margin for diesel during the regulated period, as well as during the deregulated period, were consistently lower compared to gasoline. This suggests that oil companies are cross-

subsidizing diesel from their higher gasoline margins to sustain their operations.

The oil pump price breakdown (1973-2012) in Pesos per Liter and % of Pump Price are shown in Annex D.5 and Annex D.6, respectively.

ANNEX D.1 - Historical Pump Price, and Forex (1973-2012)

Monthly Average	PREMIUM 95	DIESEL OIL	FOREX
	PUMP	PUMP	
	₽ /Liter	₽ /Liter	(₽ / US$)
1973 (regulated)			
January	0.358	0.258	3.002
February	0.370	0.270	3.102
March	0.370	0.270	3.202
April	0.370	0.270	3.302
May	0.370	0.270	3.402
June	0.370	0.270	3.502
July	0.370	0.270	3.602
August	0.370	0.270	3.702
September	0.370	0.270	3.802
October	0.381	0.278	3.902
November	0.553	0.411	4.002
December	0.640	0.480	4.102
AVE	*0.408*	*0.299*	*3.552*
1974			
January	0.640	0.480	4.002
February	0.789	0.598	4.102
March	1.020	0.780	4.202
April	1.085	0.825	4.302
May	1.150	0.870	4.402
June	1.150	0.870	4.502
July	1.150	0.870	4.602
August	1.150	0.870	4.702
September	1.150	0.870	4.802
October	1.150	0.870	4.902
November	1.150	0.870	5.002
December	1.150	0.870	5.102
AVE	*1.061*	*0.804*	*4.552*
1975			
January	1.150	0.870	5.002

February	1.150	0.870	5.102
March	1.150	0.870	5.202
April	1.150	0.870	5.302
May	1.217	0.911	5.402
June	1.280	0.950	5.502
July	1.280	0.950	5.602
August	1.280	0.950	5.702
September	1.280	0.950	5.802
October	1.280	0.950	5.902
November	1.280	0.950	6.002
December	1.280	0.950	6.102
AVE	*1.231*	*0.920*	*5.552*
1976			
January	1.394	1.043	6.002
February	1.500	1.130	6.102
March	1.500	1.130	6.202
April	1.500	1.130	6.302
May	1.500	1.130	6.402
June	1.500	1.130	6.502
July	1.500	1.130	6.602
August	1.500	1.130	6.702
September	1.500	1.130	6.802
October	1.500	1.130	6.902
November	1.500	1.130	7.002
December	1.500	1.130	7.102
AVE	*1.491*	*1.123*	*6.552*
1977			
January	1.500	1.130	7.002
February	1.500	1.130	7.102
March	1.500	1.130	7.202
April	1.603	1.157	7.302
May	1.810	1.210	7.402
June	1.810	1.210	7.502
July	1.810	1.210	7.602
August	1.810	1.210	7.702
September	1.810	1.210	7.802
October	1.810	1.210	7.902
November	1.810	1.210	8.002
December	1.810	1.210	8.102
AVE	*1.715*	*1.186*	*7.552*

1978			
January	1.810	1.210	8.002
February	1.810	1.210	8.102
March	1.810	1.210	8.202
April	1.810	1.210	8.302
May	1.810	1.210	8.402
June	1.810	1.210	8.502
July	1.810	1.210	8.602
August	1.810	1.210	8.702
September	1.810	1.210	8.802
October	1.810	1.210	8.902
November	1.810	1.210	9.002
December	1.810	1.210	9.102
AVE	*1.810*	*1.210*	*8.552*
1979			
January	1.810	1.210	9.002
February	1.810	1.210	9.102
March	1.932	1.271	9.202
April	2.230	1.420	9.302
May	2.230	1.420	9.402
June	2.230	1.420	9.502
July	2.230	1.420	9.602
August	3.000	1.690	9.702
September	3.000	1.690	9.802
October	3.000	1.690	9.902
November	3.000	1.690	10.002
December	3.000	1.690	10.102
AVE	*2.456*	*1.485*	*9.552*
1980			
January	3.000	1.690	10.002
February	4.138	2.229	10.102
March	4.500	2.400	10.202
April	4.500	2.400	10.302
May	4.500	2.400	10.402
June	4.500	2.400	10.502
July	4.500	2.400	10.602
August	4.921	2.784	10.702
September	4.950	2.810	10.802
October	4.950	2.810	10.902
November	4.950	2.810	11.002

December	4.950	2.810	11.102
AVE	*4.530*	*2.495*	*10.552*
1981			
January	4.950	2.810	11.002
February	4.950	2.810	11.102
March	5.047	2.907	11.202
April	5.250	3.110	11.302
May	5.250	3.110	11.402
June	5.250	3.110	11.502
July	5.250	3.110	11.602
August	5.250	3.110	11.702
September	5.250	3.110	11.802
October	5.250	3.110	11.902
November	5.250	3.110	12.002
December	5.250	3.110	12.102
AVE	*5.183*	*3.043*	*11.552*
1982			
January	5.250	3.110	12.002
February	5.250	3.110	12.102
March	5.250	3.110	12.202
April	5.250	3.110	12.302
May	5.250	3.110	12.402
June	5.250	3.110	12.502
July	5.250	3.110	12.602
August	5.250	3.110	12.702
September	5.250	3.110	12.802
October	5.250	3.110	12.902
November	5.250	3.110	13.002
December	5.250	3.110	13.102
AVE	*5.250*	*3.110*	*12.552*
1983			
January	5.250	3.110	13.002
February	5.250	3.110	13.102
March	5.250	3.110	13.202
April	5.250	3.110	13.302
May	5.250	3.110	13.402
June	5.250	3.110	13.502
July	5.470	3.430	13.602
August	5.470	3.430	13.702
September	5.470	3.430	13.802

October	5.470	3.430	13.902
November	5.737	3.697	14.002
December	6.470	4.430	14.102
AVE	*5.466*	*3.376*	*13.552*
1984			
January	6.470	4.430	14.002
February	6.470	4.430	14.002
March	6.470	4.430	14.002
April	6.470	4.430	14.002
May	6.660	4.638	14.002
June	8.002	5.938	17.581
July	8.280	6.200	18.002
August	8.280	6.200	18.002
September	8.280	6.200	18.003
October	8.652	6.610	19.148
November	9.240	7.260	19.960
December	9.240	7.260	19.855
AVE	*7.709*	*5.669*	*16.713*
1985			
January	9.069	7.097	19.123
February	9.010	7.040	18.711
March	8.518	6.548	18.647
April	8.400	6.430	18.651
May	8.400	6.430	18.640
June	8.400	6.430	18.507
July	8.400	6.430	18.396
August	8.400	6.430	18.605
September	8.400	6.430	18.616
October	8.400	6.430	18.704
November	8.400	6.430	18.737
December	8.400	6.430	18.896
AVE	*8.516*	*6.546*	*18.686*
1986			
January	8.174	6.270	19.042
February	7.400	5.720	20.472
March	7.303	5.542	20.781
April	7.150	5.260	20.505
May	7.069	5.099	20.500
June	6.900	4.760	20.552
July	6.900	4.760	18.740

August	6.900	4.760	20.432
September	6.900	4.760	20.504
October	6.900	4.760	20.451
November	6.900	4.760	20.436
December	6.900	4.760	20.519
AVE	*7.116*	*5.101*	*20.244*
1987			
January	6.900	4.760	20.466
February	6.900	4.760	20.544
March	6.900	4.760	20.558
April	6.900	4.760	20.505
May	6.900	4.760	20.473
June	6.900	4.760	20.456
July	6.900	4.760	20.450
August	7.477	5.167	20.439
September	7.500	5.250	20.601
October	7.500	5.250	20.706
November	7.500	5.250	20.814
December	7.500	5.250	20.814
AVE	*7.148*	*4.957*	*20.569*
1988			
January	7.500	5.250	20.846
February	7.500	5.250	20.903
March	7.500	5.250	21.028
April	7.500	5.250	21.030
May	7.032	5.016	20.955
June	7.000	5.000	20.949
July	7.000	5.000	21.025
August	6.910	4.865	21.059
September	6.800	4.700	21.249
October	6.800	4.700	21.362
November	6.033	3.933	21.377
December	5.800	3.700	21.356
AVE	*6.948*	*4.826*	*21.095*
1989			
January	5.800	3.700	21.342
February	5.800	3.700	21.357
March	5.800	3.700	21.339
April	5.800	3.700	21.414
May	5.800	3.700	21.580

June	5.800	3.700	21.680
July	5.800	3.700	21.887
August	5.800	3.700	21.880
September	5.800	3.700	21.969
October	5.800	3.700	21.959
November	5.842	3.742	22.099
December	7.060	4.960	22.335
AVE	*5.909*	*3.809*	*21.737*
1990			
January	7.060	4.960	22.464
February	7.060	4.960	22.624
March	7.060	4.960	22.759
April	7.060	4.960	22.761
May	7.060	4.960	22.902
June	7.060	4.960	23.103
July	7.060	4.960	23.563
August	7.060	4.960	24.447
September	7.663	5.387	25.352
October	8.870	6.240	25.750
November	8.870	6.240	28.000
December	15.649	7.607	28.000
AVE	*8.128*	*5.429*	*24.310*
1991			
January	15.950	7.750	28.000
February	15.950	7.750	28.000
March	15.950	7.750	28.000
April	15.950	7.750	27.926
May	15.950	7.750	27.819
June	15.950	7.750	27.796
July	15.950	7.750	27.621
August	14.063	7.489	27.200
September	12.700	7.300	26.983
October	12.700	7.300	26.995
November	12.700	7.300	26.737
December	12.429	7.300	26.668
AVE	*14.687*	*7.578*	*27.479*
1992			
January	12.000	7.300	26.545
February	12.000	7.300	26.158
March	12.000	7.300	25.810

April	11.433	7.130	25.667
May	11.000	7.000	26.150
June	11.000	7.000	26.121
July	11.000	7.000	25.262
August	11.000	7.000	24.669
September	11.000	7.000	24.726
October	10.419	7.000	24.785
November	10.000	7.000	24.936
December	10.000	7.000	25.322
AVE	*11.071*	*7.086*	*25.512*
1993			
January	10.000	7.000	25.280
February	10.000	7.000	25.312
March	10.000	7.000	25.366
April	10.000	7.000	26.078
May	10.000	7.000	27.006
June	10.000	7.000	27.206
July	10.000	7.000	27.569
August	10.000	7.000	27.949
September	10.000	7.000	28.234
October	10.000	7.000	29.160
November	10.000	7.000	28.485
December	10.000	7.000	27.794
AVE	*10.000*	*7.000*	*27.120*
1994			
January	10.200	7.200	27.725
February	10.388	7.388	27.646
March	10.000	7.000	27.587
April	10.000	7.000	27.530
May	10.000	7.000	27.053
June	10.000	7.000	26.976
July	10.000	7.000	26.461
August	9.290	7.000	26.313
September	9.000	7.000	25.911
October	9.000	7.000	25.394
November	9.000	7.000	24.265
December	9.000	7.000	24.145
AVE	*9.607*	*7.049*	*26.417*
1995			
January	9.000	7.000	24.622

February	9.000	7.000	25.028
March	9.000	7.000	25.859
April	9.000	7.000	26.008
May	9.000	7.000	25.849
June	9.000	7.000	25.674
July	9.000	7.000	25.514
August	9.000	7.000	25.711
September	9.000	7.000	25.969
October	9.000	7.000	25.965
November	9.000	7.000	26.167
December	9.000	7.000	26.206
AVE	*9.000*	*7.000*	*25.714*
1996			
January	9.029	7.029	26.212
February	9.484	7.030	26.159
March	9.500	7.030	26.196
April	9.500	7.030	26.190
May	9.500	7.030	26.176
June	9.500	7.030	26.194
July	9.500	7.030	26.200
August	9.790	7.053	26.199
September	10.150	7.070	26.236
October	10.250	7.312	26.269
November	10.250	7.570	26.266
December	10.690	8.022	26.292
AVE	*9.762*	*7.186*	*26.216*
1997			
January	10.807	8.244	26.317
February	10.898	8.310	26.341
March	10.886	7.795	26.332
April	11.147	7.667	26.364
May	11.039	7.700	26.372
June	10.940	7.682	26.376
July	10.746	7.650	27.668
August	11.230	7.750	29.331
September	11.321	7.771	32.395
October	11.570	7.830	34.464
November	11.570	7.830	34.518
December	11.570	7.830	37.171
AVE	*11.144*	*7.838*	*29.471*

1998			
January	12.112	8.088	42.661
February	12.620	8.330	40.414
March	11.814	8.145	39.004
April (deregulated)	11.260	8.028	38.442
May	11.220	8.020	39.297
June	11.649	8.319	40.399
July	11.680	8.340	41.781
August	11.680	8.347	43.038
September	11.724	8.379	43.776
October	11.769	8.396	42.888
November	11.786	8.374	39.944
December	11.645	8.263	39.073
AVE	*11.747*	*8.252*	*40.893*
1999			
January	11.235	7.934	38.404
February	11.190	7.900	38.780
March	11.190	7.900	38.911
April	11.337	8.032	38.242
May	11.809	8.448	37.838
June	12.266	8.830	37.899
July	12.336	8.875	38.280
August	12.636	9.103	39.261
September	12.932	9.336	40.174
October	13.493	9.539	40.315
November	14.000	9.890	40.341
December	14.000	9.890	40.623
AVE	*12.369*	*8.806*	*39.089*
2000			
January	14.000	9.890	40.427
February	14.480	10.370	40.572
March	15.074	10.964	40.938
April	14.973	11.093	41.188
May	14.880	11.070	41.806
June	15.187	11.377	42.649
July	15.954	12.144	44.356
August	16.380	12.570	44.898
September	16.838	13.026	45.737
October	18.050	14.230	48.106

November	18.058	14.238	49.754
December	18.060	14.240	49.896
AVE	*15.994*	*12.101*	*44.194*
2001			
January	17.650	13.915	50.969
February	17.530	13.820	48.290
March	17.530	13.820	48.467
April	17.530	13.820	50.185
May	17.669	13.948	50.539
June	18.010	14.260	51.488
July	18.323	14.592	53.224
August	18.113	14.442	51.988
September	18.050	14.400	51.250
October	17.760	14.196	51.733
November	17.022	13.673	51.990
December	16.374	13.104	51.789
AVE	*17.630*	*13.999*	*50.993*
2002			
January	15.908	12.678	51.410
February	15.840	12.620	51.282
March	15.998	12.755	51.066
April	16.816	13.546	50.987
May	17.249	13.979	49.838
June	17.392	14.122	50.406
July	17.100	13.830	50.596
August	17.313	14.043	51.793
September	17.764	14.494	52.129
October	18.348	14.859	52.907
November	18.390	14.860	53.308
December	18.114	14.576	53.519
AVE	*17.186*	*13.864*	*51.604*
2003			
January	18.678	14.867	53.564
February	19.810	15.525	54.075
March	20.880	16.377	54.591
April	20.740	15.987	52.807
May	20.006	15.457	52.507
June	19.380	14.980	53.399
July	19.380	14.980	53.714
August	19.974	15.406	54.991

September	20.290	15.780	55.024
October	20.265	15.965	54.952
November	20.737	16.437	55.372
December	21.030	16.730	55.445
AVE	*20.098*	*15.708*	*54.203*
2004			
January	21.598	17.365	55.526
February	22.389	17.809	56.070
March	23.011	17.830	56.303
April	23.290	17.830	55.904
May	23.878	18.378	55.845
June	25.140	19.640	55.985
July	25.230	19.730	55.953
August	25.974	20.474	55.834
September	26.630	21.390	56.213
October	26.696	22.373	56.341
November	28.130	23.230	56.322
December	28.124	23.280	56.183
AVE	*25.007*	*19.944*	*56.040*
2005			
January	26.970	23.370	55.766
February	27.363	23.670	54.813
March	29.018	25.218	54.440
April	30.766	26.957	54.492
May	30.111	27.488	54.341
June	29.753	28.170	55.179
July	31.175	29.521	56.006
August	32.377	30.267	55.952
September	33.935	31.363	56.156
October	35.340	32.468	55.708
November (R-VAT)	37.130	32.153	54.561
December	36.080	31.170	53.612
AVE	*31.668*	*28.485*	*55.085*
2006			
January	36.115	31.197	52.617
February	37.490	32.490	51.817
March	37.079	32.401	51.219
April	37.540	33.540	51.360
May	39.675	35.611	52.127

June	41.873	36.290	53.157
July	43.143	36.643	52.398
August	43.869	37.627	51.362
September	40.973	36.357	50.401
October	38.740	34.240	50.004
November	37.440	33.340	49.843
December	37.240	33.240	49.467
AVE	*39.265*	*34.415*	*51.314*
2007			
January	36.621	32.621	46.694
February	35.696	31.696	48.381
March	36.047	31.918	48.517
April	37.400	32.900	47.822
May	38.885	33.966	46.814
June	40.300	34.450	46.160
July	40.515	34.515	45.625
August	40.950	34.950	46.074
September	40.700	35.133	46.131
October	42.063	36.563	44.380
November	43.383	37.533	43.218
December	44.337	38.337	41.743
AVE	*39.741*	*34.549*	*45.963*
2008			
January	44.450	38.450	40.938
February	43.977	36.957	40.671
March	45.331	38.311	41.252
April	47.293	40.273	41.820
May	50.395	43.263	42.902
June	56.160	49.140	44.281
July	60.041	55.986	44.956
August	57.283	56.150	44.877
September	52.293	51.273	46.692
October	48.283	47.069	48.025
November	42.627	39.573	49.186
December	34.541	34.521	48.094
AVE	*48.556*	*44.247*	*44.475*
2009			
January	32.992	31.946	47.207
February	32.070	24.986	47.585
March	32.371	23.218	48.458

April	35.233	25.733	48.217
May	35.484	26.000	47.524
June	37.383	29.608	47.905
July	35.895	28.742	48.146
August	39.484	30.403	48.161
September	38.357	28.527	48.139
October	36.781	28.281	46.851
November	37.410	29.217	47.032
December	40.495	32.105	46.421
AVE	*36.163*	*28.230*	*47.637*
2010			
January	42.621	33.121	46.028
February	42.500	32.125	46.310
March	44.226	33.831	45.742
April	45.017	34.733	44.637
May	44.097	34.468	45.597
June	43.067	33.467	46.303
July	42.919	33.484	46.320
August	42.411	33.516	45.182
September	41.458	32.675	44.314
October	42.839	33.750	43.440
November	44.125	34.808	43.492
December	46.782	36.661	41.955
AVE	*43.505*	*33.887*	*44.943*
2011			
January	49.242	39.274	44.172
February	50.188	41.188	43.703
March	53.826	45.537	43.516
April	56.007	47.833	43.240
May	56.284	45.595	43.131
June	54.998	45.052	43.366
July	55.531	44.710	42.809
August	55.158	43.929	42.421
September	56.440	43.947	43.026
October	55.977	43.382	43.451
November	54.318	46.018	43.275
December	53.546	45.374	43.649
AVE	*54.293*	*44.320*	*43.313*
2012			
January	56.006	46.267	43.619

February	56.407	46.658	42.661
March	57.869	48.271	42.857
April	57.955	47.748	42.700
May	54.989	45.153	42.851
June	50.747	41.505	42.776
July			
August			
September			
October			
November			
December			
AVE	*55.662*	*45.934*	*42.911*

Source: 2012 IOPRC TWG oil price team using data from 1984-2012 DOE Oil Industry Monitoring Bureau, estimates by Engr. Marcial Ocampo for 1973-1984

Annex D.2 - Historical TPLC, Pump Price, Gross Margin – Gasoline

GASOLINE PREMIUM 95 UNLEADED 93	TPLC PhP/L	Ratio Pump to TPLC	OIL COMPANY GROSS MARGIN % of TPLC	 P/L	OPSF P/L	Ratio GM PP	ACTUAL PRICE P/L
1973	0.439	0.928	-35.89%	- 0.158	0.000	-38.66%	0.408
1974	0.602	1.762	100.45%	0.605	0.000	57.01%	1.061
1975	0.797	1.544	76.01%	0.606	0.000	49.22%	1.231
1976	1.025	1.455	66.86%	0.685	0.000	45.94%	1.491
1977	1.284	1.336	52.43%	0.673	0.000	39.24%	1.715
1978	1.575	1.149	11.53%	0.182	0.000	10.04%	1.810
1979	1.899	1.293	33.25%	0.631	0.000	25.71%	2.456
1980	2.254	2.009	123.42%	2.782	0.000	61.42%	4.530
1981	2.642	1.962	117.75%	3.111	0.000	60.02%	5.183
1982	3.061	1.715	88.08%	2.697	0.000	51.36%	5.250
1983	3.513	1.556	69.28%	2.434	0.000	44.53%	5.466
AVERAGE **(1973 - 1983 REGULATED)**	**1.736**	**1.603**	**63.93%**	**1.295**	**0.000**	**46.56%**	**2.782**
1984	4.464	1.727	63.07%	2.816	0.020	36.52%	7.709
1985	4.801	1.774	66.96%	3.215	0.066	37.75%	8.516
1986	2.945	2.417	119.62%	3.523	0.224	49.50%	7.116
1987	3.687	1.939	93.22%	3.437	-0.408	48.08%	7.148
1988	3.330	2.086	70.31%	2.342	0.413	33.71%	6.948
1989	4.210	1.403	30.19%	1.271	-0.441	21.51%	5.909
1990	6.843	1.188	8.80%	0.602	-0.304	7.41%	8.128
1991	9.474	1.550	-10.74%	- 1.018	5.359	-6.93%	14.687
1992	8.939	1.239	-5.99%	- 0.535	1.804	-4.83%	11.071
1993	8.832	1.132	-5.90%	- 0.521	0.839	-5.21%	10.000
1994	8.190	1.173	1.17%	0.096	0.510	1.00%	9.607
1995	8.200	1.098	7.51%	0.616	-0.682	6.85%	9.000
1996	8.611	1.134	3.82%	0.329	-0.044	3.37%	9.762
1997	9.644	1.156	4.90%	0.472	-0.022	4.24%	11.144
AVERAGE **(1994 – 1997)**	**6.584**	**1.375**	**31.93%**	**1.189**	**0.524**	**13.13%**	**9.053**
1998	**9.307**	**1.262**	**11.38%**	**1.059**	**-0.004**	**0.090**	**11.747**
1999	10.124	1.222	8.23%	0.833	0.000	6.74%	12.369
2000	14.361	1.114	1.58%	0.227	0.000	1.42%	15.994
2001	14.123	1.248	15.22%	2.149	0.000	12.19%	17.630
2002	14.415	1.192	9.57%	1.380	0.000	8.03%	17.186
2003	17.432	1.153	7.22%	1.259	0.000	6.27%	20.098
2004	22.831	1.095	3.45%	0.787	0.000	3.15%	25.007
2005	28.675	1.104	1.93%	0.555	0.000	1.75%	31.668
AVERAGE	**17.423**	**1.148**	**6.74%**	**1.027**	**0.000**	**5.14%**	**19.993**

(1999 – 2005) DEREGULATED)							
2006	33.804	1.162	7.81%	2.641	0.000	6.73%	39.265
2007	34.373	1.156	7.59%	2.609	0.000	6.56%	39.741
2008	39.513	1.229	15.60%	6.165	0.000	12.70%	48.556
2009	30.793	1.174	4.35%	1.272	0.000	3.52%	36.163
2010	35.184	1.237	10.18%	3.401	0.000	7.82%	43.505
2011	43.821	1.239	18.51%	7.300	0.000	13.45%	54.293
2012	44.950	1.238	16.96%	6.863	0.000	12.33%	55.662
AVERAGE **(2006 - 2012 RVAT)**	**37.491**	**1.209**	**11.57%**	**4.322**	**0.000**	**9.54%**	**45.312**

Source: 2012 IOPRC TWG oil price team using data from DOE Oil Industry Monitoring Bureaustaff

Annex D.3 - Historical TPLC, Pump Price, Gross Margin – Diesel

0.50% DIESEL 0.25% DIESEL 0.05% DIESEL	TPLC PhP/L	Ratio Pump to TPLC	OIL COMPANY GROSS MARGIN % of TPLC	OIL COMPANY GROSS MARGIN P/L	OPSF P/L	Ratio GM PP	ACTUAL PRICE P/L
1973	0.420	0.712	-73.21%	- 0.307	0.000	- 102.78%	0.299
1974	0.575	1.398	7.19%	0.041	0.000	5.14%	0.804
1975	0.762	1.207	-3.86%	- 0.029	0.000	-3.20%	0.920
1976	0.982	1.143	-4.72%	- 0.046	0.000	-4.12%	1.123
1977	1.233	0.961	-19.05%	- 0.235	0.000	-19.82%	1.186
1978	1.517	0.798	-44.83%	- 0.680	0.000	-56.21%	1.210
1979	1.833	0.810	-39.33%	- 0.721	0.000	-48.53%	1.485
1980	2.181	1.144	-2.70%	- 0.059	0.000	-2.36%	2.495
1981	2.560	1.188	4.26%	0.109	0.000	3.59%	3.043
1982	2.972	1.046	-7.93%	- 0.236	0.000	-7.58%	3.110
1983	3.416	0.988	-12.12%	- 0.414	0.000	-12.27%	3.376
***AVERAGE* (1973 - 1983 REGULATED)**	**1.677**	**1.032**	**-17.84%**	**- 0.234**	**0.000**	**-13.53%**	**1.732**
1984	4.344	1.305	21.85%	0.949	0.020	16.75%	5.669
1985	4.671	1.402	30.77%	1.437	0.064	21.95%	6.546
1986	2.869	1.778	43.82%	1.257	0.607	24.65%	5.101
1987	3.589	1.381	26.43%	0.949	0.047	19.14%	4.957
1988	3.244	1.488	13.99%	0.454	0.386	9.40%	4.826
1989	4.097	0.930	-0.88%	- 0.036	-1.000	-0.95%	3.809
1990	5.988	0.907	-11.43%	- 0.685	-0.714	-12.61%	5.429
1991	7.222	1.049	-9.34%	- 0.675	0.280	-8.90%	7.578
1992	6.720	1.054	-3.31%	- 0.223	-0.155	-3.14%	7.086
1993	6.798	1.030	-5.49%	- 0.373	-0.162	-5.33%	7.000
1994	5.994	1.176	-2.70%	- 0.162	0.476	-2.29%	7.049
1995	6.038	1.159	-3.23%	- 0.195	0.411	-2.79%	7.000
1996	6.812	1.055	-4.24%	- 0.289	-0.083	-4.02%	7.186
1997	6.674	1.174	5.42%	0.361	-0.147	4.61%	7.838
***AVERAGE* (1984-1997 REGULATED)**	**5.361**	**1.160**	**7.26%**	**0.198**	**0.002**	**3.18%**	**6.220**
1998	**6.108**	**1.351**	**13.89%**	**0.848**	**-0.030**	**0.103**	**8.252**

1999	6.904	1.276	7.96%	0.550	0.000	6.24%	8.806
2000	11.625	1.041	-7.74%	-0.899	0.000	-7.43%	12.101
2001	11.441	1.224	10.81%	1.237	0.000	8.83%	13.999
2002	11.622	1.193	7.75%	0.901	0.000	6.50%	13.864
2003	13.999	1.122	2.63%	0.368	0.000	2.35%	15.708
2004	20.177	0.988	-7.76%	-1.565	0.000	-7.85%	19.944
2005	27.731	1.027	-4.03%	-1.116	0.000	-3.92%	28.485
***AVERAGE* (1999 - 2005 DEREGULATED)**	**14.786**	**1.091**	**1.38%**	**-0.075**	**0.000**	**-0.46%**	**16.129**
2006	31.390	1.096	1.86%	0.583	0.000	1.69%	34.415
2007	31.093	1.111	3.06%	0.945	0.000	2.74%	34.549
2008	41.382	1.069	1.62%	0.658	0.000	1.49%	44.247
2009	25.953	1.088	-2.76%	-0.703	0.000	-2.49%	28.230
2010	30.960	1.095	0.01%	0.004	0.000	0.01%	33.887
2011	41.038	1.080	-0.40%	-0.162	0.000	-0.36%	44.320
2012	41.608	1.104	2.17%	0.885	0.000	1.93%	45.934
***AVERAGE* (2006 - 2012 RVAT)**	**34.775**	**1.091**	**0.79%**	**0.316**	**0.000**	**0.83%**	**37.940**

Source: 2012 IOPRC TWG oil price team using data from DOE Oil Industry Monitoring Bureau staff

Annex D.4 – Oil Pump Price Calculator (Excel Model)

Oil Pump Price Calculation (OPPC) Model - Diesel

1) TPLC Calculator - Diesel **HYPOTHETICAL CASE**	**Period 1**	**Period 2**		**Delta (2 - 1)**
Parcel Size, Bbl	300,000	300,000		
Liters per Bbl	158.9868	158.9868		
Total Volume, L	47,696,040	47,696,040		
Density, kg/L	0.80	0.80		
Total Metric Tons (1000 kg)	38,157	38,157		
FOB, $/Bbl	135.000	135.000		
FOB, $	40,500,000	40,500,000		
Freight, % FOB	3.00%	3.00%		
Insurance, % FOB	5.00%	5.00%		
CIF, $	43,740,000	43,740,000		
Exchange Rate, PhP/$	42.00	42.00		
CIF, PhP	1,837,080,000	1,837,080,000		
Customs Duty, % of CIF	0.00%	0.00%		
Customs Duty, PhP	0	0		
Special Duty, PhP/L	0.00	0.00	5,300	
Special Duty, PhP	0	0	200,000	
Brokerage Fee, PhP	2,301,400	2,301,400	0.00125	
Bank Charge, PhP	2,296,350	2,296,350	0.00125	
Arrastre Charge, PhP	4,655,134	4,655,134	122.00	
Wharfage Charge, PhP	1,398,448	1,398,448	36.65	
Import Processing Fee, PhP	1,000	1,000		
Customs Doc Stamps, PhP	256	256		
Excise Tax, PhP/L	0.00	0.00		
Excise Tax, PhP	0	0		
Landed Cost (LC), PhP	1,847,732,587	1,847,732,587		
VAT1 on Importation, % LC	12%	12%		
VAT1 on Importation, PhP	221,727,910	221,727,910		
Tax Paid Landed Cost, PhP	2,069,460,498	2,069,460,498		
Tax Paid Landed Cost, PhP/L	**43.3885**	**43.3885**		0.0000

2) Pump Price Model - Diesel **HYPOTHETICAL CASE**	**Diesel**	**Period 2**		**Delta (2 - 1)**
% Pure Oil	98.00%	98.00%		
TPLC, PhP/L	42.5207	42.5207		
Oil Company Gross Margin, % of TPLC	2.17%	2.17%		
Oil Company Gross Margin, PhP/L	0.9227	0.9227		
Refining Cost, PhP/L	0.0000	0.0000	0.0000	
Transshipment, PhP/L	0.5125	0.5125	0.5230	
Pipeline Cost, PhP/L	0.0000	0.0000	0.0000	
Depot Operation, PhP/L	0.3052	0.3052	0.3114	
Pure Biofuel Cost, PhP/L biofuel	60.0000	60.0000		

% Biofuel in Blend	2.00%	2.00%		
Biofuel Cost, PhP/L	1.2000	1.2000		
Hauler's Fee	0.1970	0.1970		
Dealer's Margin	1.4717	1.4717		
Sub-Total Local Costs, PhP/L	4.6091	4.6091		
VAT2 on Local Costs , %	12%	12%		
VAT2 on Local Costs , PhP/L	0.5531	0.5531		
OPSF	0.0000	0.0000		
Pump Price, PhP/L	**47.6829**	**47.6829**		0.0000

3) Pump Price Build-Up Summary	**Period 1**		**Period 2**	
DIESEL	**PhP/L**	**%**	**PhP/L**	**%**
FOB	35.6633	82.20%	35.6633	82.20%
FRT	1.0699	2.47%	1.0699	2.47%
INS	1.7832	4.11%	1.7832	4.11%
CIF	38.5164	88.77%	38.5164	88.77%
DUT	0.0000	0.00%	0.0000	0.00%
SD	0.00	0.00%	0.00	0.00%
BF	0.0483	0.11%	0.0483	0.11%
BC	0.0481	0.11%	0.0481	0.11%
AC	0.0976	0.22%	0.0976	0.22%
WF	0.0293	0.07%	0.0293	0.07%
IPF	0.0000	0.00%	0.0000	0.00%
CDS	0.0000	0.00%	0.0000	0.00%
ET	0.0000	0.00%	0.0000	0.00%
VAT1	4.6488	10.71%	4.6488	10.71%
TPLC	**43.3885**	**100.00%**	**43.3885**	**100.00%**
TPLC	42.5207	89.17%	42.5207	89.17%
OCGM	0.9227	1.94%	0.9227	1.94%
RC	0.0000	0.00%	0.0000	0.00%
TS	0.5125	1.07%	0.5125	1.07%
PC	0.0000	0.00%	0.0000	0.00%
DEP	0.3052	0.64%	0.3052	0.64%
BIO	1.2000	2.52%	1.2000	2.52%
HF	0.1970	0.41%	0.1970	0.41%
DM	1.4717	3.09%	1.4717	3.09%
VAT2	0.5531	1.16%	0.5531	1.16%
OPSF	0.0000	0.00%	0.0000	0.00%
PP	**47.6829**	**100.00%**	**47.6829**	**100.00%**
DUT	0.0000	0.00%	0.0000	0.00%
SD	0.0000	0.00%	0.0000	0.00%
WF	0.0287	0.06%	0.0287	0.06%
IPF	0.0000	0.00%	0.0000	0.00%
CDS	0.0000	0.00%	0.0000	0.00%
ET	0.0000	0.00%	0.0000	0.00%

VAT1	4.5558	9.55%	4.5558	9.55%
VAT2	0.5531	1.16%	0.5531	1.16%
Govt Imposts	**5.1376**	**10.77%**	**5.1376**	**10.77%**
Delta (Period 2 - Period 1)			**0.0000**	**0.00%**

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Annex D.5 – Unleaded Gasoline Pump Price Breakdown
Gasoline Pump Price Breakdown, in Pesos per Liter

YEAR	CIF	TAXES	BOC FEES	LOGISTICS	BIOFUEL	OIL CO.	OPSF	DEALER
74	0.402	0.080	0.028	0.153	0.000	0.605	0.000	0.157
75	0.564	0.113	0.028	0.153	0.000	0.606	0.000	0.157
76	0.753	0.151	0.028	0.153	0.000	0.685	0.000	0.157
77	0.969	0.194	0.028	0.154	0.000	0.673	0.000	0.157
78	1.211	0.242	0.028	0.215	0.000	0.182	0.000	0.313
79	1.480	0.296	0.028	0.215	0.000	0.631	0.000	0.313
80	1.776	0.355	0.028	0.216	0.000	2.782	0.000	0.313
81	2.098	0.420	0.028	0.217	0.000	3.111	0.000	0.313
82	2.447	0.489	0.028	0.218	0.000	2.697	0.000	0.313
83	2.823	0.565	0.028	0.219	0.000	2.434	0.000	0.313
84	3.613	0.723	0.028	0.221	0.000	2.816	0.020	0.313
85	3.893	0.779	0.028	0.221	0.000	3.215	0.066	0.313
86	2.350	0.470	0.028	0.217	0.000	3.523	0.224	0.313
87	2.967	0.593	0.028	0.219	0.000	3.437	-0.408	0.313
88	2.671	0.534	0.028	0.338	0.000	2.342	0.413	0.626
89	3.402	0.680	0.028	0.340	0.000	1.271	-0.441	0.626
90	4.893	1.819	0.028	0.344	0.000	0.602	-0.304	0.626
91	5.337	4.004	0.028	0.345	0.000	-1.018	5.359	0.626
92	4.407	4.401	0.028	0.342	0.000	-0.535	1.804	0.626
93	4.319	4.384	0.028	0.342	0.000	-0.521	0.839	0.626
94	3.785	4.277	0.028	0.341	0.000	0.096	0.510	0.626
95	3.793	4.279	0.028	0.341	0.000	0.616	-0.682	0.626
96	4.121	4.360	0.028	0.342	0.000	0.329	-0.044	0.626
97	4.825	4.688	0.028	0.441	0.000	0.472	-0.022	0.746
98	4.686	4.491	0.028	0.578	0.000	1.059	-0.004	0.913
99	5.477	4.514	0.028	0.580	0.000	0.833	0.000	0.913
00	9.580	4.637	0.028	0.591	0.000	0.227	0.000	0.913
01	9.350	4.630	0.028	0.590	0.000	2.149	0.000	0.913
02	9.633	4.639	0.028	0.591	0.000	1.380	0.000	0.913
03	12.555	4.727	0.028	0.598	0.000	1.259	0.000	0.913
04	17.631	5.037	0.028	0.611	0.000	0.787	0.000	0.913
05	22.807	5.738	0.028	0.519	0.000	0.555	0.000	2.000
06	25.021	9.174	0.028	0.748	0.000	2.641	0.000	1.600
07	25.395	9.384	0.028	0.990	0.000	2.609	0.000	1.467
08	30.436	9.902	0.028	1.038	0.000	6.165	0.000	1.467
09	21.185	8.644	0.026	0.896	2.680	1.272	0.000	1.475
10	25.152	9.182	0.026	0.974	3.364	3.401	0.000	1.452
11	31.113	9.734	0.025	1.096	3.445	7.300	0.000	1.596
12	32.019	9.879	0.025	1.274	3.779	6.863	0.000	1.826

Gasoline Pump Price Breakdown, in % of Pump Price

YEAR	CIF	TAXES	BOC FEES	LOGISTICS	BIOFUEL	OIL CO.	OPSF	DEALER
74	28.2%	5.6%	1.9%	10.7%	0.0%	42.5%	0.0%	11.0%
75	34.8%	7.0%	1.7%	9.4%	0.0%	37.4%	0.0%	9.7%
76	39.1%	7.8%	1.4%	8.0%	0.0%	35.6%	0.0%	8.1%
77	44.6%	8.9%	1.3%	7.1%	0.0%	31.0%	0.0%	7.2%
78	55.3%	11.1%	1.3%	9.8%	0.0%	8.3%	0.0%	14.3%
79	49.9%	10.0%	0.9%	7.3%	0.0%	21.3%	0.0%	10.6%
80	32.5%	6.5%	0.5%	3.9%	0.0%	50.9%	0.0%	5.7%
81	33.9%	6.8%	0.4%	3.5%	0.0%	50.3%	0.0%	5.1%
82	39.5%	7.9%	0.4%	3.5%	0.0%	43.6%	0.0%	5.1%
83	44.2%	8.8%	0.4%	3.4%	0.0%	38.2%	0.0%	4.9%
84	46.7%	9.3%	0.4%	2.9%	0.0%	36.4%	0.3%	4.0%
85	45.7%	9.1%	0.3%	2.6%	0.0%	37.8%	0.8%	3.7%
86	33.0%	6.6%	0.4%	3.1%	0.0%	49.4%	3.1%	4.4%
87	41.5%	8.3%	0.4%	3.1%	0.0%	48.1%	-5.7%	4.4%
88	38.4%	7.7%	0.4%	4.9%	0.0%	33.7%	5.9%	9.0%
89	57.6%	11.5%	0.5%	5.8%	0.0%	21.5%	-7.5%	10.6%
90	61.1%	22.7%	0.3%	4.3%	0.0%	7.5%	-3.8%	7.8%
91	36.4%	27.3%	0.2%	2.3%	0.0%	-6.9%	36.5%	4.3%
92	39.8%	39.7%	0.2%	3.1%	0.0%	-4.8%	16.3%	5.7%
93	43.1%	43.8%	0.3%	3.4%	0.0%	-5.2%	8.4%	6.2%
94	39.2%	44.3%	0.3%	3.5%	0.0%	1.0%	5.3%	6.5%
95	42.1%	47.5%	0.3%	3.8%	0.0%	6.8%	-7.6%	7.0%
96	42.2%	44.7%	0.3%	3.5%	0.0%	3.4%	-0.5%	6.4%
97	43.2%	41.9%	0.2%	3.9%	0.0%	4.2%	-0.2%	6.7%
98	39.9%	38.2%	0.2%	4.9%	0.0%	9.0%	0.0%	7.8%
99	44.4%	36.6%	0.2%	4.7%	0.0%	6.7%	0.0%	7.4%
00	60.0%	29.0%	0.2%	3.7%	0.0%	1.4%	0.0%	5.7%
01	52.9%	26.2%	0.2%	3.3%	0.0%	12.2%	0.0%	5.2%
02	56.1%	27.0%	0.2%	3.4%	0.0%	8.0%	0.0%	5.3%
03	62.5%	23.5%	0.1%	3.0%	0.0%	6.3%	0.0%	4.5%
04	70.5%	20.1%	0.1%	2.4%	0.0%	3.1%	0.0%	3.7%
05	72.1%	18.1%	0.1%	1.6%	0.0%	1.8%	0.0%	6.3%
06	63.8%	23.4%	0.1%	1.9%	0.0%	6.7%	0.0%	4.1%
07	63.7%	23.5%	0.1%	2.5%	0.0%	6.5%	0.0%	3.7%
08	62.1%	20.2%	0.1%	2.1%	0.0%	12.6%	0.0%	3.0%
09	58.6%	23.9%	0.1%	2.5%	7.4%	3.5%	0.0%	4.1%
10	57.8%	21.1%	0.1%	2.2%	7.7%	7.8%	0.0%	3.3%
11	57.3%	17.9%	0.0%	2.0%	6.3%	13.4%	0.0%	2.9%
12	57.5%	17.7%	0.0%	2.3%	6.8%	12.3%	0.0%	3.3%

Annex D.6 – Diesel Pump Price Breakdown

Diesel Pump Price Breakdown, in Pesos per Liter

YEAR	CIF	TAXES	BOC FEES	LOGISTICS	BIOFUEL	OIL CO.	OPSF	DEALER
74	0.373	0.075	0.029	0.159	0.000	0.041	0.000	0.126
75	0.528	0.106	0.029	0.159	0.000	-0.029	0.000	0.126
76	0.711	0.142	0.029	0.159	0.000	-0.046	0.000	0.126
77	0.920	0.184	0.029	0.160	0.000	-0.235	0.000	0.126
78	1.156	0.231	0.029	0.220	0.000	-0.680	0.000	0.253
79	1.419	0.284	0.029	0.221	0.000	-0.721	0.000	0.253
80	1.708	0.342	0.029	0.222	0.000	-0.059	0.000	0.253
81	2.024	0.405	0.029	0.223	0.000	0.109	0.000	0.253
82	2.366	0.473	0.029	0.224	0.000	-0.236	0.000	0.253
83	2.735	0.547	0.029	0.224	0.000	-0.414	0.000	0.253
84	3.507	0.701	0.029	0.226	0.000	0.949	0.020	0.253
85	3.778	0.756	0.029	0.227	0.000	1.437	0.064	0.253
86	2.281	0.456	0.029	0.223	0.000	1.257	0.607	0.253
87	2.879	0.576	0.029	0.225	0.000	0.949	0.047	0.253
88	2.592	0.518	0.029	0.344	0.000	0.454	0.386	0.505
89	3.301	0.660	0.029	0.346	0.000	-0.036	-1.000	0.505
90	4.749	1.100	0.029	0.349	0.000	-0.685	-0.714	0.505
91	5.180	1.903	0.029	0.350	0.000	-0.675	0.280	0.505
92	4.277	2.305	0.029	0.348	0.000	-0.223	-0.155	0.505
93	4.342	2.318	0.029	0.348	0.000	-0.373	-0.162	0.505
94	3.673	2.185	0.029	0.347	0.000	-0.162	0.476	0.505
95	3.710	2.192	0.029	0.347	0.000	-0.195	0.411	0.505
96	4.731	1.942	0.029	0.349	0.000	-0.289	-0.083	0.505
97	4.762	1.773	0.029	0.447	0.000	0.361	-0.147	0.650
98	4.214	1.756	0.029	0.583	0.000	0.848	-0.030	0.853
99	4.985	1.780	0.029	0.585	0.000	0.550	0.000	0.853
00	9.557	1.917	0.029	0.597	0.000	-0.899	0.000	0.853
01	9.379	1.911	0.029	0.596	0.000	1.237	0.000	0.853
02	9.555	1.917	0.029	0.597	0.000	0.901	0.000	0.853
03	11.857	1.986	0.029	0.602	0.000	0.368	0.000	0.853
04	17.675	2.330	0.029	0.617	0.000	-1.565	0.000	0.853
05	24.774	2.780	0.029	0.530	0.000	-1.116	0.000	1.500
06	27.142	4.369	0.029	0.955	0.000	0.583	0.000	1.300
07	26.586	4.518	0.029	0.994	0.385	0.945	0.000	1.267
08	35.636	5.141	0.029	1.042	0.854	0.658	0.000	1.267
09	21.874	3.683	0.029	1.050	1.068	-0.703	0.000	1.250
10	26.505	4.031	0.029	1.060	1.025	0.004	0.000	1.286
11	35.695	4.750	0.029	1.197	1.523	-0.162	0.000	1.300
12	36.192	4.921	0.029	1.201	1.234	0.885	0.000	1.472

Diesel Pump Price Breakdown, in % of Pump Price

YEAR	CIF	TAXES	BOC FEES	LOGISTICS	BIOFUEL	OIL CO.	OPSF	DEALER
74	46.4%	9.3%	3.7%	19.8%	0.0%	5.2%	0.0%	15.7%
75	57.5%	11.5%	3.2%	17.3%	0.0%	-3.2%	0.0%	13.7%
76	63.4%	12.7%	2.6%	14.2%	0.0%	-4.1%	0.0%	11.3%
77	77.7%	15.5%	2.5%	13.5%	0.0%	-19.8%	0.0%	10.7%
78	95.6%	19.1%	2.4%	18.2%	0.0%	-56.2%	0.0%	20.9%
79	95.6%	19.1%	2.0%	14.9%	0.0%	-48.6%	0.0%	17.0%
80	68.5%	13.7%	1.2%	8.9%	0.0%	-2.4%	0.0%	10.1%
81	66.5%	13.3%	1.0%	7.3%	0.0%	3.6%	0.0%	8.3%
82	76.1%	15.2%	0.9%	7.2%	0.0%	-7.6%	0.0%	8.1%
83	81.1%	16.2%	0.9%	6.7%	0.0%	-12.3%	0.0%	7.5%
84	61.7%	12.3%	0.5%	4.0%	0.0%	16.7%	0.3%	4.4%
85	57.7%	11.5%	0.4%	3.5%	0.0%	22.0%	1.0%	3.9%
86	44.7%	8.9%	0.6%	4.4%	0.0%	24.6%	11.9%	4.9%
87	58.1%	11.6%	0.6%	4.5%	0.0%	19.1%	0.9%	5.1%
88	53.7%	10.7%	0.6%	7.1%	0.0%	9.4%	8.0%	10.5%
89	86.7%	17.3%	0.8%	9.1%	0.0%	-0.9%	-26.3%	13.3%
90	89.0%	20.6%	0.6%	6.5%	0.0%	-12.8%	-13.4%	9.5%
91	68.4%	25.1%	0.4%	4.6%	0.0%	-8.9%	3.7%	6.7%
92	60.3%	32.5%	0.4%	4.9%	0.0%	-3.1%	-2.2%	7.1%
93	62.0%	33.1%	0.4%	5.0%	0.0%	-5.3%	-2.3%	7.2%
94	52.1%	31.0%	0.4%	4.9%	0.0%	-2.3%	6.7%	7.2%
95	53.0%	31.3%	0.4%	5.0%	0.0%	-2.8%	5.9%	7.2%
96	65.8%	27.0%	0.4%	4.9%	0.0%	-4.0%	-1.2%	7.0%
97	60.5%	22.5%	0.4%	5.7%	0.0%	4.6%	-1.9%	8.3%
98	51.1%	21.3%	0.4%	7.1%	0.0%	10.3%	-0.4%	10.3%
99	56.8%	20.3%	0.3%	6.7%	0.0%	6.3%	0.0%	9.7%
00	79.3%	15.9%	0.2%	4.9%	0.0%	-7.5%	0.0%	7.1%
01	67.0%	13.6%	0.2%	4.3%	0.0%	8.8%	0.0%	6.1%
02	69.0%	13.8%	0.2%	4.3%	0.0%	6.5%	0.0%	6.2%
03	75.5%	12.7%	0.2%	3.8%	0.0%	2.3%	0.0%	5.4%
04	88.6%	11.7%	0.1%	3.1%	0.0%	-7.8%	0.0%	4.3%
05	86.9%	9.8%	0.1%	1.9%	0.0%	-3.9%	0.0%	5.3%
06	79.0%	12.7%	0.1%	2.8%	0.0%	1.7%	0.0%	3.8%
07	76.6%	13.0%	0.1%	2.9%	1.1%	2.7%	0.0%	3.6%
08	79.9%	11.5%	0.1%	2.3%	1.9%	1.5%	0.0%	2.8%
09	77.4%	13.0%	0.1%	3.7%	3.8%	-2.5%	0.0%	4.4%
10	78.1%	11.9%	0.1%	3.1%	3.0%	0.0%	0.0%	3.8%
11	80.5%	10.7%	0.1%	2.7%	3.4%	-0.4%	0.0%	2.9%
12	78.8%	10.7%	0.1%	2.6%	2.7%	1.9%	0.0%	3.2%

Annex D.7 – Oil Pump Price Calculation Procedure

Calibrate Model by Calculating % Gross Margin from Pump Price Less All Costs:

%GM = {[PP - OPSF - TPLC * (1 - % biofuel)] / (1 + VAT2) – [(TS + PL + DE) * (1 - % biofuel) + BIO + HF + DM]} / {TPLC * (1 - % biofuel)}

Calculate Pump Price using the % Gross Margin and Other Cost Inputs:

PP = TPLC * (1 - % biofuel) + [TPLC x (1 - % biofuel) * %GM + (TS + PL + DE) * (1 - % biofuel) + BIO + HF + DM] * (1 + %VAT2) + OPSF

The calculation of TPLC and PP are shown below:

DUBAI$ = given Dubai crude price

MOPS$ = DUBAI$ x (factor to refine crude to finished product)
= MOPS product price + premium (risks due to conflict, supply, transport availability)

FOB$ = Freight on Board in US$ = MOPS * 300,000

FRT$ = Ocean Freight in US$ = FOB$ * 2.00%

INS$ = Ocean Insurance in US$ = FOB$ * 4.00%

CIF$ = Cargo, Insurance & Freight in US$ = FOB$ + FRT$ + INS$

CIF = CIF in Pesos = CIF$ x (FOREX, P/$)

CD = Customs Duty = CIF * 3.00% (now zero due to ASEAN AFTA)

BF= Brokerage Fee = 5,300 + (CIF – 200,000) * 0.00125

BC = Bank Charges = CIF * 0.00125

AC = Arrastre Charge (gasoline) = 122 * (0.75 * 158.9868 / 1000) * 300,000
AC = Arrastre Charge (diesel) = 122 * (0.80 * 158.9868 / 1000) * 300,000

WC = Wharfage Charge (gasoline) = 36.65 * (0.75 * 158.9868 / 1000) * 300,000
WC = Wharfage Charge (diesel) = 36.65 * (0.80 * 158.9868 / 1000) * 300,000

IPF = Import Processing Fee = 1,000 per import entry

CDS = Customs Documentary Stamp = 256 per import entry

ET = Excise Tax (gasoline) = 4.35 * 158.9868 * 300,000
ET = Excise Tax (diesel) = 1.63 * 158.9868 * 300,000

LC = Landed Cost = CIF + CD + BF + BC + AC + WC + IPF + CDS + ET

VAT1 (on import) = 10% * Landed Cost (Nov 2005 – Jan 2000)
= 12% * Landed Cost (Feb 2006 – present)

TPLC = LC + VAT1 (imports) = LC * (1 + %VAT1)

TPLC (P/L) = TPLC / (300,000 * 158.9868)

Summary to BOC = CD + IPF + CDS + ET + VAT1
Summary to BOC (P/L) = Summary to BOC / (300,000 * 158.9868)

OCGM = Oil Company Gross Margin (P/L) = TPLC * (1 - % biofuel) * % gross margin

OOCC = Other Oil Company Costs (P/L) = (TS + PL + DE) * (1 – % biofuel) + BIO

TS = Transshipment = 0.38 P/L (for oil tanker ships and barges)

PL = Pipeline = 0.000 P/L (for FPIC)

DE = depot = 0.27 P/L (gasoline)
= 0.28 P/L (diesel)

BIO = Biofuels = 10% * (P/L of ETHANOL) = 2.63 P/L (gasoline)
= 2% * (P/L of CME Biodiesel) = 1.28 P/L (diesel)

HF = Hauler's Fee (P/L) = 0.21 P/L (gasoline and diesel)

DM = Dealer's Margin (P/L) = 1.72 (gasoline)
= 1.47 (diesel)

TLC = Total Local Costs (P/L) = OCGM + OOCC + HF + DM

VAT2 (local costs) = 10% * Total Local Cost (Nov 2005 – Jan 2006)
= 12% * Total Local Cost (Feb 2006 – present)

PP = Pump Price (P/L) = TPLC * (1 - % biofuel) + TLC + VAT2 + OPSF
= TPLC * (1 - % biofuel) + TLC * (1 + %VAT2) + OPSF

PP = TPLC * (1 - % biofuel) + [TPLC x (1 - % biofuel) * %GM + (TS + PL + DE) * (1 - % biofuel) + BIO + HF + DM] * (1 + %VAT2) + OPSF

III. Report of Consultations

Report on Results of Consultations

1. Participants in the Consultations

The IOPRC has conducted consultations with the following:

1. Public
   - Public Land Transport Sector, Non-Government Organizations, and Other Stakeholders
2. Oil Refiners and Importers/Marketers
   - Petron Corporation, Pilipinas Shell Petroleum Corporation, Chevron Philippines, City Oil Philippines, Eastern Petroleum, Jetti, Inc., Phoenix Petroleum Philippines, Inc., PTT, Inc., Seaoil Philippines, Inc., Total Philippines Corporation, TWA, Inc. (Flying V), and Unioil Petroleum Philippines
3. Oil Transport Company and Associations
   - Confederation of Truckers Association of the Philippines (CTAP), Philippine Interisland Shipping Association (PISA), and First Philippine Industrial Corporation (FPIC)
4. Government Agencies
   - Department of Finance – Bureau of Internal Revenue, National Tax Research Center, and Bureau of Customs; Department of Energy – Oil Industry Management Bureau
5. Platts
6. Representatives of Previous Studies
   - 2005 Report of the Independent Committee Reviewing the Downstream Oil Industry Deregulation Act of 1998, and 2008 SGV-UA&P Independent Study on Oil Prices

See Attachment "A" for the list of participants.

The IOPRC has also conducted two (2) media briefings, the first of which was attended by nineteen (19) participants representing twelve (12) media organizations and the second of which was attended by thirty-nine (39) participants representing eighteen (18) media organizations.

2. Comments made during Consultations, and IOPRC's Reactions

1. IOPRC's Limited Mandate

Public: A public land transport sector participant stated that the IOPRC should expand its mandate to include the review of the Act, since allegedly it is difficult to tackle the issue of "over-pricing" separately from the Act, which is the root of the problem.	The mandate of the IOPRC is stated in DOE Department Order No. (DO2012-03-0004 (Creating an Independent Committee to Review the Records of Oil Companies), in response to allegations that oil companies have been accumulating excessive profits resulting in grossly unfair pricing.
Some participants stated the Act is the root of the alleged problem about oil prices.	The IOPRC has determined that the Act's goal of increased competition and thus

Some claimed that the repeal of the Act is the solution, while some have claimed that its amendment may suffice. It was claimed that the removal of the government's power to control oil price is not appropriate for the Philippines.

Some of the related proposals by the participants included the imposition of public hearing prior to oil price hikes, the creation of a buffer fund against oil price volatility, the buyback of Petron, the government procurement of oil to lower prices and provide savings to the sector, and the centralization of terminals and depots.

A participant stated that under the Act oil companies compete for higher prices than lower prices.

fair price (lower price than in an oligopoly) is being achieved. Based on data from the DOE:

- The market share of independent oil companies has risen from 0% in 1998 to 25.7% in 2011.
- The number of retail stations has risen from around 270 as of 2000 to more than 4,000 as of end-2011, around 800 (20%) of which are operated by independent oil companies.
- Pump prices are lower where there are more retail stations, as stated in Technical Working Paper "B".

Competition and the price elasticity of demand will put a damper on the volatility of oil product prices.

The buyback of Petron, and the nationalization of the oil industry, is not within the mandate of the IOPRC. Moreover, the proposal assumes that the government has the money to do it and will not incur higher deficits in its operation.

However, taking a long-run view, the IOPRC recommends that the idea of centralized terminals and depots be seriously pursued. Common depots accessible to independent oil companies would provide lower costs and better competition from the independent oil companies. The study on the viability of this suggestion should include the funding source for "infrastructure".

Amendment or repeal of the Act would also benefit private vehicle owners (with higher incomes), who account for a high percentage of fuel consumption.

Government procurement of oil is unnecessary since the proposed currency-oil price adjustment mechanism already addresses the purpose of lowering prices.

2. Publication of the IOPRC's report

Public: A stakeholder inquired about the process for the publication of the IOPRC's report.

The IOPRC, upon the request of the Secretary, may conduct a press conference regarding the report. Under the TOR, the DOE shall have the primary opportunity to publish the report.

Another stakeholder suggested that it conducts a peer review of the IOPRC's report.

The IOPRC is independent from oil companies, special interest groups, the government, and the public. Nevertheless, the IOPRC conducted at least three (3) public consultations and was open to receive any position paper from any interested party.

3. Oil Companies' Pricing Policy

Public: A participant claimed that fuel prices within some municipalities/provinces are different.

Distance from Manila and degree of competition do affect fuel prices. Please refer to Technical Working Paper "B".

Another participant stated that there is around a sixty percent (60%) difference between oil pump price and import price (based on benchmark).

The Technical Working Papers "A" and "B" both address the difference between the retail pump price and the MOPS dollar price. It should be noted that the difference within the retail pump price and the MOPS price incorporates the cost of freight, insurance, handling, taxes, duties, and other imposts upon entry. In addition, there are storage and distribution costs, and Value-Added Taxes.

Some participants stated that the simultaneous or successive nature of price hikes indicates cartelization.

Simultaneous changes in prices can indicate either competition or collusion. In fact, competition is characterized essentially by the need of competitors to match prices in order to maintain market share. Simultaneity of price changes is insufficient to show that a cartel exists. It may be due to the existence of a dominant company that is a price leader. Nonetheless, if there were a cartel, then profits of major oil companies should have been above average. IOPRC findings indicate that the profits are not.

Further, price hikes tend to be successive in nature because they track the changes in the movements of global oil product prices.

Some participants stated that there is a need to determine how oil companies exhaust their stock, as they increase prices seemingly in disregard of their inventory cost.	Viewed on a longer term, given that oil product prices rise and fall, a consistent inventory policy will result in the balancing out of price increases and decreases. This issue is addressed more in Technical Working Paper "D".
A participant stated that independent oil companies offer a discount of up to ₱3.00.	This is hardly a problem. The provision of discount by independent oil companies is an argument in favor of the Downstream Oil Industry Deregulation Act of 1998 (the "Act"). If it is cheaper (assuming fuel quality is the same) to purchase oil from an independent oil company, the market will patronize it more. The major oil companies have relatively rigid ratios to meet, although they still have to contend with market conditions to remain competitive.
A participant claimed that price rollbacks do not occur as fast as or to the same extent as hikes.	The Technical Working Paper "A" found a slight asymmetry in the latest of the five periods examined.
A public land transport sector participant cited the study conducted by Mr. Ian Salas of the University of the Philippines as authority in stating that there is "over-pricing", and that the price rollbacks do not take effect as immediately as increases in price hikes.	The Salas study was done in 2002, when the Act was still in its initial stage of implementation. Moreover, the study was found to be technically deficient in Technical Working Paper "A".
<u>Oil Companies:</u> Most oil companies stated that pricing is based on MOPS and foreign exchange rates (FOREX). An oil company stated, however, that its actual landed cost can vary depending on timing, vessel size, shipment size, product specifications or availability, among others, and it also incurs additional landed cost through logistics, operations, and marketing. Other factors in pricing that were shared included supply and demand, logistics cost, and competition. Some oil companies claimed that they need to match the price of their competitors even if the price is below their cost or else they	All these factors and comments were considered in Technical Working Paper "D".

would lose their market share; another oil company stated that it needs to lower its prices if a competitor is already encroaching on its market share. An oil company stated that depending on competition, the level and frequency of price adjustments may vary.

An oil company stated that the smuggling of products and blending of biofuels also affect pricing.

Certainly, smuggling will affect oil product price levels, but this matter should be addressed by the Department of Finance. In the meetings of the IOPRC with the Bureau of Customs, which is said to collect not only the excise tax but also VAT on behalf of the BIR, the latter stated that there are systems (e.g. an electronic calculation, sounding of tanks) in place to address the issue of smuggling.

Two oil companies stated that the closure of the FPIC white oil pipeline increased their transhipment cost. Around sixty percent (60%) of the demand in Metro Manila and nearby areas of Bulacan and Laguna areas is supplied through the pipeline.

This issue will be resolved when the pipeline reopens. However, its reopening is dependent on the final resolution of the legal case surrounding the pipeline's closure.

Some oil companies stated that their dealers have the freedom to set their retail prices. Another oil company stated that it may make recommendations.

An independent oil company stated that it cannot influence pump price due to its small market share, that it generally follows the price leader in its pricing, and that it aims for price parity with the major oil companies. Another independent oil company, however, stated that there is no price leader anymore.

Two oil companies stated that they do not engage in hedging as they buy their products from the spot market.

Public: Some participants stated that the benchmark prices are higher than the actual cost of oil, and hence the actual procurement cost should instead be used by the IOPRC. But, another participant

MOPS is a worldwide standard that reflects market-driven prices. Actual procurement costs may be different from MOPS in the short-run but would tend to be close to MOPS in the long-run.

recognized the use of base pricing in Singapore, which is MOPS.

Singapore is closest to the Philippines, and is the main source of finished petroleum products for the Philippines.

4. Oil companies' continuing operations despite losses

Public: Some participants have questioned some oil companies' continuation of doing business in the Philippines despite their losses.

Oil Companies: An oil company claimed that it continues to operate despite losses because of its positive outlook about the Philippine economy.

This issue is addressed in Technical Working Paper "C". It is not unreasonable for a company to operate at a loss for a given short period of time, as it would try to recoup this in better times, and also because if it would not keep prices aligned to its competitor's prices, it would lose market share and have bigger losses. Companies, especially those investing large amounts, are there for the long haul.

There are companies that have chosen to tolerate losses in order to obtain a sustainable market share in the Philippines.

5. IRR methodology

Public: A participant suggested that different industries have different risks that need to be considered in the IOPRC's IRR method.

The IOPRC did not compare the IRR of the oil industry with the IRR of the other industries. Instead, the oil industry IRR was compared to the yields of government securities. Interestingly, the IRR of the oil industry was found to be lower.

7. Examination of supply contracts of oil companies

Public: Some participants stated that the need for an examination of oil companies' supply contracts with suppliers abroad, specifically on the identity of the suppliers, actual cost, and inventory.

The confidentiality of these contracts is protected by the country's laws.

The IOPRC was able to view the relevant provisions in a supply contract of an oil company. It was seen that the acquisition prices were benchmarked to Dubai and Oman crude oil prices, as reported by Platts.

7. Method of comparing oil industry with power and telecommunications industries (ROE method)

Public: Some stakeholders stated that comparing the oil industry with power and telecommunications industries will surely not result in a conclusion of excessive

Rates of return measure profitability (in terms of ratios or percentages) and not levels. Besides, the comparison includes diverse industries such as real estate, profits for the oil industry, since the said industries have higher returns than the oil industry.

mining, and gaming. The result of the comparison is shown in Technical Working Paper “C”.

Even without a definition of excessive profits, comparing rates of return against other industries would be a good indicator.

8. Oil companies’ fuel quality and quantity

<u>Public:</u> Some participants raised the issue of the sale of substandard fuel.

The DOE’s budget for monitoring should be increased. The DOE has to be provided with the necessary resources to do this efficiently and effectively. The penalty of ₱10,000 is too low to have deterrence effect.

A public land transport sector participant stated that the pumps in retail stations in a province are not properly calibrated and do not dispense the correct quantity of fuel.

This matter is not covered by the mandate of the IOPRC. The calibration and sealing of pumps is the duty of local government units, which give permits to and collect taxes from these stations, while the checking of calibration is the duty of the DOE.

<u>Oil Companies:</u> An oil company stated that there are some oil companies selling non-compliant products, and this puts it at a disadvantage since compliance (e.g. biofuels blend) entails costs that non-compliant companies do not incur. An oil company stated that blending requirements for biofuels (10% bioethanol for gasoline, and 2% coco-methyl esther for diesel) have a significant impact on cost.

The appropriate response is stricter enforcement of the law.

9. Taxes

<u>Public:</u> Some participants stated that VAT forms a big part of the pump prices of oil products. Proposals ranged from the total removal of VAT (for all or at least certain products, such as diesel, unleaded gasoline, and autogas) to its reduction.

The IOPRC has found out that around 20.3% of the pump price for unleaded gasoline (plus excise tax) and 10.9% of the pump price for diesel is accounted for by VAT, as shown in the Technical Working Paper “A” and Box 3 (Short History of Oil Tax Regimes). At its peak (1993-1995), the total tax on unleaded gasoline and diesel was around 45% and 33% respectively.

A public land transport sector participant stated that the sector pays a number of taxes and charges, including road users’

This matter is not within the mandate of the IOPRC.

tax, Local Government Unit (LGU) tax, common carrier's percentage tax (quarterly gross receipts), and toll.

Another public land transport sector participant stated that his group is willing to contribute to the government through the payment of taxes, but the sector has not been informed about how the taxes have redounded specifically for the benefit of the sector. The participant suggested that dedicated programs (for health, education, and housing) to assist the sector should be created.

10. Targeted Subsidy, and Emergency Measures (Capping Price)

Public: A participant stated that the amount of Pantawid Pasada subsidy pales in comparison to the VAT collected from the sector, especially if the passengers are students who pay discounted fares.

Some taxi business sector participants requested that the sector be also covered by the Pantawid Pasada Program.

In lieu of a Pantawid Pasada subsidy, the government (national and local) should consider a foreign currency/oil price adjustment mechanism, a monthly fare hike formula that is responsive to the crude oil changes (average of previous month, with the latest fare hike as base or reference) considering the share of drivers in the overall fare. Please see recommendations.

A participant stated that a long-term solution is for the government to subsidize the putting up of independent oil depots.

This matter is not covered within the mandate of the IOPRC.

A participant stated that there would a risk of inadequate supply if oil prices are capped in times of crises, such as after the typhoon "Ondoy".

The IOPRC agrees. Price ceilings may be justifiable only in the very short-run. Ultimately, price ceilings always result in supply shortages. In any event, emergency measures should be dictated by the peculiar exigencies of the particular situation.

11. Oil being a concern not only of the transport sector but also small and medium-scale enterprises.

Public: A participant stated that oil is a concern not only of the transport sector but also of small and medium-scale enterprises.

Yes.

12. Promotion of Alternative Fuels and Indigenous Natural Resources

Public: A public land transport sector participant stated that the use of alternative fuels, such as through CNG buses, hybrid

The Renewable Energy Act of 2008 and the Biofuels Act of 2006 address this.

vehicles, and biofuels, should be promoted by the government.

It is also suggested that Congress allocate funds for the establishment of CNG stations in Luzon, Visayas, and Mindanao, so that the buses that have converted, or may convert, to CNG may justify their investment.

There were other allegations/suggestions/issues raised that fall outside the mandate of the IOPRC, and that the IOPRC would rather not address. These issues include the following:

a. Charging of road users' tax to tricycles, even if they are not allowed on national highways
b. Phasing out of deteriorated or smoke-belching vehicles, including government vehicles
c. Continuing sale of two-stroke engine motorcycles, despite the phase out by government
d. Extortion of drivers
e. Improper issuance of driver's licences
f. Corruption in the Land Transportation and Franchise Regulatory Board (LTFRB) and Land Transportation Office (LTO)
g. Heavy traffic flow of vehicles
h. Cooperatives for truckers (e.g. putting up of gasoline stations; and importing of tires, batteries, and oils)
i. Government purchase of oil to ensure low price
j. Regulation of registration of acquired vehicles and the grant of franchises (as to type and number)
k. Self-sufficiency in the Philippines' fuel requirements
l. Continuity of the IOPRC's study, and the participation of a multi-sectoral team
m. Lack of increase in tricycle fares in certain areas over the last four (4) years.

Attachment "A"

List of Participants in the Consultations

I. Public

Public Land Transport Sector:

Fifty (50) participants representing twenty-eight (28) organizations, namely:

1. Danny Rubio, Sr. (1-UTAK)

2. Dionisio Tabudlong (1-UTAK)
3. Domingo Garde (1-UTAK)
4. George Raton (1-UTAK)
5. Gino Maderazo (1-UTAK)
6. Jojo Cruz (1-UTAK)
7. Beth Katalbas (1-UTAK Bacolod)
8. Manuel Duran (1-UTAK Davao City)
9. Benjamin Rubio (1-UTAK Laguna)
10. Mar Garvida (1-UTAK NCR)
11. Rudy de Guzman (1-UTAK Pampanga)
12. Arnelio Manigo (ACTO)
13. Diosdado Sta. Ana (ACTO)
14. Efren de Luna (ACTO)
15. Joy Cunanan (ACTO)
16. Julio Codilan (ACTO)
17. Levy Hernandez (ACTO)
18. Marcelino de Guzman (ACTO)
19. Merlinda Bernardo (ACTO)
20. Melencio Vargas (ALTODAP)
21. Bernard Mendoza (ATM)
22. Rolando Bantegui (ATM)
23. Antonio Cruz (ATOMM)
24. Leonora Naval (ATOMM)
25. Rodolfo de Ocampo (CTAP)
26. Mary Ann Reyes (Dumper Phil. Taxi Drivers Assoc.)
27. Jonie Itliong (FEJODAP)
28. Rogelio Chavez, Jr. (JTC/NLTC)
29. Orlando F. Marquez (LTOP)
30. Juliet de Jesus (METROBUS)
31. Vulfre Estepa (NACJODAP)
32. Abdulkadir Zacaria (NACTODAP)
33. Hadji Akmad Wahab (NACTODAP)
34. Ronelio Tarriela (NAFAODAP)
35. Ernesto Cruz (NCTU)
36. Jaime Aguilar (NCTU)
37. Ato Ignacio (NLTC)
38. George San Mateo (PISTON)
39. Roy Sande (PISTON)
40. Dante Lagman (PMT)
41. Larry Pascua (PMT)
42. Atty. Jesus Suntay (PNTOA)
43. Rogelio Javinal (PMT)
44. Dina Castro (PNTOA)
45. Molly Basinal (PNTOA)
46. Rei V. (PNTOA)
47. Angelbert Apaya (SOLUBOA)
48. Arnel de Castro (SOLUBOA)
49. Bren Sayasa II (TRANSPORTER)
50. Patrick Vergara (TRANSPORTER)

Non-Government Organizations:

Nineteen (19) participants representing twelve (12) organizations, namely:

1. Leon Estrella Peralta (Anti-Trapo Movement)
2. Dr. Gilda G. Peralta, OD (Anti-Trapo Movement)
3. Renato Reyes (BAYAN)
4. Althea Acap (BAYAN)
5. Arnold Padilla (BAYAN)
6. Rep. Teddy A. Casino (Bayan Muna)
7. Vincent Borneo (Bayan Muna)
8. Prof. Danilo Arao (CAOPI)
9. Joan May Salvador (GABRIELA)
10. Sophia Garduce (GABRIELA)
11. Jazminda Lumang (IBON Foundation)
12. Estrelieta Bagasbas (KADAMAY)
13. Sammy Malunes (KMU)
14. Gerry Martinez (Migrante International)
15. Dindo David (NEPA)
16. Fernando Hicap (PAMALAKAYA)
17. Gerry Albert Corpuz (PAMALAKAYA)
18. Prof. Roger Birosel (TUCP)
19. Rhoda C. Mercado (TUCP)

Other Stakeholders:

Twenty (20) participants representing ten (10) organizations. New participants are as follows:

1. David Arcenas (AAP)
2. Antonio A. Ver (H&WB Corporation)
3. Kit D. Buenaventura (H&WB Corporation)
4. Claire dela Fuente (IMBOA)
5. Rosalina Canlas (IMBOA)
6. Wilma Valcorea (IMBOA)
7. Dr. Benjamin Austria (PCCI)
8. Rhuby R. Conel (PCCI)

Former participants are as follows:

1. Dr. Gilda Peralta (Anti-Trapo Movement)
2. Leon Peralta (Anti-Trapo Movement)
3. Arnold Padilla (BAYAN)
4. Renato Reyes (BAYAN)
5. Diony Bendot (BAYAN)
6. Carl Ala (BAYAN MUNA)
7. Teodoro Casiño (BAYAN MUNA)
8. Sammy T. Malunes (KMU)
9. Ernesto Cruz (NCTU)
10. Jaime Aguilar (NCTU)
11. Dindo David (NEPA)
12. Dennis Decano (NEPA)

II. Oil Companies/Associations

1) Meeting with Oil Transport Associations

a. Pepito Dino (Vice President for External Affairs, Confederation of Truckers Association of the Philippines or CTAP)
b. Ernesto S. Paguyo (Executive Director, Philippine Interisland Shipping Association or PISA)

2) Meeting with Chevron
    a. Ida Sanchez (Chief Financial Officer)
    b. Raissa Bautista (Policy, Government & Public Affairs Manager)
3) Meeting with Shell
    a. Roberto Kanapi (VP for Communications)
    b. Atty. Shaiful Zainuddin (VP for Finance)
    c. Toby Nebrida (Media Relations Manager)
    d. Atty. Janet Regalado (VP for Legal)
    e. Rosemarie Jean Lim (Communications Manager)
4) Meeting with Petron
    a. Atty. Katrina Nicdao (Corporate Affairs Department) – 1st Meeting
    b. Efren Gabrillo (Assistant Vice President for Controllers)
    c. Atty. Erika Paulino (Legal Counsel)
    d. Maggie Uy (Market Support Manager)
    e. Raffy Ledesma (Strategic Communications Manager)
    f. Atty. Liesl Arguelles (Tax Manager)
    g. Ms. July Ann Vivas (Senior Financial Analyst)
5) Meeting with Total, PTT and the Independent Oil Companies
    a. Frederick Tagorda (Manager, City Oil)
    b. Fernando L. Martinez (President and CEO, Eastern Petroleum)
    c. Jocelyn Nañasca (Supply and Logistics Manager, Jetti)
    d. Joselito Magalona (President, Jetti)
    e. Leo Bellas (Marketing Manager, Jetti)
    f. Ahmielle A. Salazar (Accounting Manager, PTT, Inc.)
    g. Korawat Sumungkol (Retail Marketing Manager, PTT, Inc.)
    h. Atty. Kristine Soto (In-House Legal Counsel, PTT, Inc.)
    i. Roby Tanjuatco (Corporate Communications Manager, PTT, Inc.)
    j. Abigail Ho (Government Affairs and Institutional Linkages Manager, SEAOIL)
    k. Arturo Cruz (Marketing Director, Seaoil)
    l. Glenn Yu (President and CEO, Seaoil)
    m. Irma V. Leong (Accounting Manager, Total)
    n. Malou Espina (Manager for Corporate Communications, Total)
    o. Mon Decena (Vice President for Retail, Total)
    p. Anna Vi Estorninos (VP for Trade and Supply, TWA, Inc.)
    q. Ramon Villavicencio (President, TWA, Inc.)
    r. Tanya Samillano (Operations Manager, TWA, Inc.)
    s. May Sorra (Operations Manager, Unioil)
    t. Ramon Villarin (Retail Manager, Unioil)
6) Meeting with Phoenix Petroleum Philippines, Inc.

a. Atty. Raymond Zorilla (AVP for Corporate Affairs)
b. John Henry Yap (Fuel Supply Manager)

7) Meeting with First Philippine Industrial Corporation (FPIC)
   a. Ireneo A. Raule (SVP for Operations and Maintenance)
   b. Anna S. Del Rosario (VP for Comptrollership)
   c. Atty. Jenny De Villa (In-House Counsel)

III. Government Agencies

1) Meeting with the Bureau of Internal Revenue (BIR) and National Tax Research Center (NTRC)
   a. Usec. John Sevilla (Department of Finance)
   b. Trinidad Rodriguez (Executive Director, NTRC)
   c. Mark Lester Aude (Senior Tax Officer, NTRC)
   d. Trinidad Andres (OIC Chief, Large Taxpayers (LT) Field Operations Division, BIR)
   e. Jonathan Jaminola (OIC Chief, LT Excise Audit Division, BIR)
2) Meeting with the Bureau of Customs (BOC)
   a. Atty. Joel Raymond R. Arcinue – 1st Meeting
   b. Atty. Vincent P. C. Maronilla (Special Secretary, Office of the Deputy Commissioner-Assessment and Operations Group) – 1st and 2nd Meetings
   c. Rico E. Reyes, Jr. (Customs Operations Officer III, Office of the Commissioner)

IV. Platts

1. Eric Cheo (Asia Pacific Business Development Manager)
2. Chong Ching Ong (Client Development Manager for Strategic Accounts)
3. Jorge Montepeque (Markets and Pricing Global Director)
4. Calvin Lee (Asia Pricing Manager for Price Group)
5. York Shing (Client Services Consultant)

V. Representatives of Previous Studies

1. Carlos R. Alindada (Chairman, Independent Review Committee 2005)
2. Dr. Peter Lee U (Member, Independent Review Committee 2005 and Report for DOE-SGV-UA&P Study on Oil Prices 2008)